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ASSESSMENT OF PHYSICO-CHEMICAL CHARACTERISTICS OF GARAMBI DAM WATER IN MURUD, DIST-RAIGAD (M. S.)

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ABSTRACT:-

The water sample from Garambi dam of Murud Taluka was analyzed for their physicochemical characteristics. Laboratory tests were performed for the analysis of samples for Temperature, pH, Electrical conductivity, TDS, Alkalinity, Chloride, DO, BOD, Total hardness, Calcium hardness, Magnesium hardness and Salinity were analyzed in the month of December 2017. By observing the result it can be concluded that the parameters which were taken to study the water quality are below the pollution level for ground water which satisfies the requirement for the use of various purposes like domestic, agricultural, industrial etc. The usefulness of these parameters in predicting dam water quality characteristics were discussed.

Keywords: Garambi Dam water, water quality standard, Physico-chemical Parameter.

INTRODUCTION:

Water is the most important in shaping the land and regulating the climate. It is one of the most important compounds that profoundly influence life [1]. Groundwater is used for domestic and industrial water supply and also for irrigation purposes in all over the world. In the last few decades, there has been a tremendous increase in the demand for fresh water due to rapid growth of population and the accelerated pace of industrialization. According to WHO organization, about 80% of all the diseases in human beings are caused by water [2]. Once the groundwater is contaminated; its quality cannot be restored back easily and to device ways and means to protect it.

Bhagat S. Chauhan, S. K. Sagar [3] has studied, in present investigation an attempt was made for assessment of physico-chemical parameter and quality of Sutlej River in Nangal area of Punjab (India). Manjusha Bohr, Prakash Kadave, Sheetal Bhor, Manisha Bhosale [4] has studied Water quality assessment of the River Godavari, at Ramkunda Nashik. Pratiksha Tambekar, pravin P. Morey, R.J. Batra and R.G. Weiginnwar [5] have studied physico-chemical parameter evaluation of water quality around Chandrapur (Maharashtra). Vijaya Kumar K.M. and Vijaya Kumara [6] have studied physico-chemical analysis water quality of Kundapurs Mangrove forest (Karnataka). J.G. Koliyar and N.S. Rokade [7] have studied in order to understand the water quality in pond lake, Mumbai. Prabhakar R. Pawar and Balasaheb G. Kulkarni [8] have studied assessment of water quality in the karanja creek (Raigad).

Garambi Dam is built by Nawab Sir Siddi Ahmed Khan, the last ruler of the east while Siddi reign. This dam is dedicated to Queen Victoria and is the source of water supply to the town. The dam is situated amidst lush greenery which makes it an amazing picturesque location. The sound of nature - water and birds - makes this location a more appealing one.

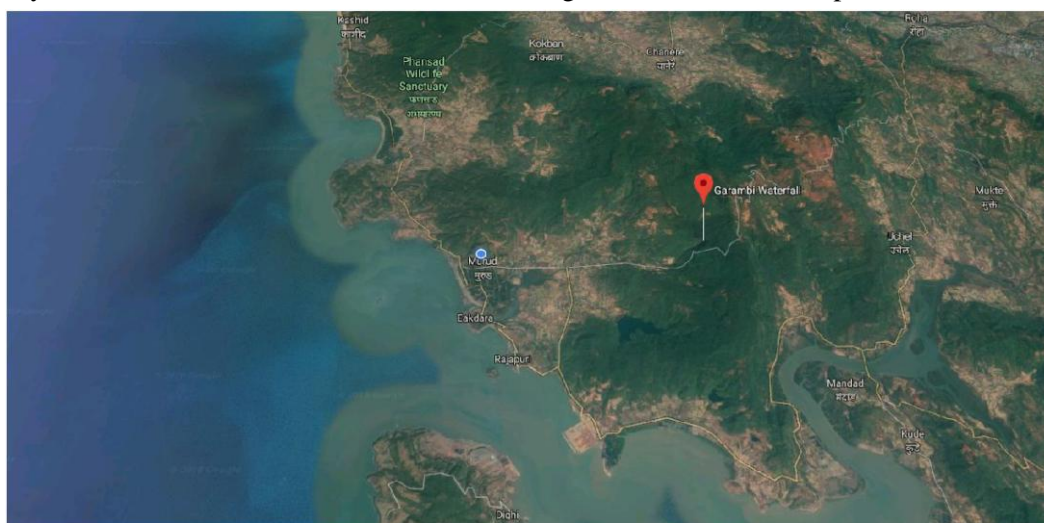
The water sample was collected from the dam early in the morning between 7.00 am to 9.00 am and was analyzed to compare the differences occurred in Physico-chemical parameters such as Temperature, pH, Electrical conductivity, TDS, Alkalinity, Chloride, DO, BOD, Total hardness, Ca-hardness, Magnesium hardness and Salinity.



Garambi Dam

The research work is carried out, keeping in mind the following objectives.

- To study the chemical composition and water quality parameters of dam.
- To investigate the possible sources and Cause of pollution in the dam if any.
- To study if these effects can be attributed to the change in the chemical composition of the dam water.



Satellite map of Garambi dam

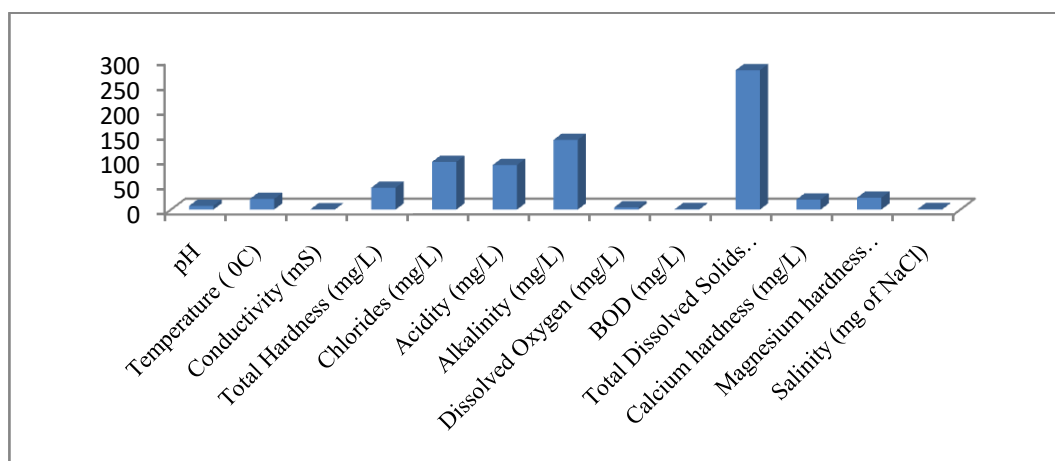
MATERIAL & METHOD:-

Sample of water was collected in sterile plastic bottle of 2 litre capacity from the dam. At the same time the temperature & pH were noted. The physico-chemical analysis was carried out within 24 hours of collection in a laboratory as per APHA (1989), (1992), AWWA & WPPFA, Trivedy & Goel (1986) [9-10]. The chemicals were used of A. R. grade and are standardized as per Inorganic quantitative analysis by Vogel (1964) & (2006) [11-12]. The result is statistically analyzed by calculating mean & standard deviation.

RESULTS & DISCUSSION:-

Parameters	Garambi Dam Mean±S.D
pH	7.47± 0.02
Temperature (°C)	21.3 ± 0.3
Conductivity (mS)	0.663 ± 0.004
Total Hardness (mg/L)	44 ± 1.0
Chlorides (mg/L)	95.85 ± 0.02
Acidity (mg/L)	89.6 ± 0.15
Alkalinity (mg/L)	140 ± 0.3
Dissolved Oxygen (mg/L)	4.464 ± 0.016
BOD (mg/L)	1.031±0.06
Total Dissolved Solids (mg/L)	280 ± 1.0
Calcium hardness (mg/L)	20± 0.3
Magnesium hardness (mg/L)	24± 0.3
Salinity (mg of NaCl)	1.172 ± 0.003

Table-1:- Values of different parameters of water sample of Garambi dam. (Mean and Standard deviation is calculated)



Graph showing concentration range of various parameters at Garambi Dam.

1. Temperature:

Temperature is the most importance environment factor with effect on plants and animals. Water has several unique thermal properties which combine to minimize temperature change. The Water temperature depends on the depth of the water column, climatic and topographic changes [13].

A rise in temperature of water leads to the speeding up of chemical reactions in water, reduces the solubility of gases and amplifies the tastes and odour. At higher temperature with less dissolved gases the water becomes tasteless and even does not quench the thirst and decreases the solubility of oxygen.

Temperature also determines various other factors such as pH, Conductivity, saturation level of gases and various forms of alkalinity. The temperature of Garambi dam water is 21.3 ± 0.3 °C.

2. pH:

pH, one of the most common analyses in soil and water testing, is the standard measure of how acidic or alkaline a solution is. pH has no direct adverse effect on health. pH governs the distribution, transport and fate of heavy metals in aquatic ecosystem. It is measured a scale from 0 - 14. pH of 7 is neutral, pH is less than 7 is acidic and pH greater than 7 is basic. Aquatic organisms need the pH of their water body to be a certain range optimal growth and survival. pH of water sample collected is 7.47 ± 0.02 .

3. Electrical Conductance:

Conductivity is the measure of a substance or solution to conduct electric current. Presence of salts and contamination with wastewater increases conductivity of water. It is a indication of pollution. Electrical conductivity used to quickly estimate the ionic or soluble salt concentration in soils, water supplies, fertilizer solution and chemical solution. It is highly depended upon temperature.

Conductivity however is an important criterion in determining the suitability of water for irrigation. The conductance of water sample is 0.663 ± 0.004 mS.

The observed value of electrical conductance is quite low and less electrolyte.

4. Total Hardness:

Total hardness is defined as the sum of calcium and magnesium hardness in mg/L as CaCO_3 . Total hardness of water an important factor that indicates toxic effect and poisonous elements [14].

There is no adverse effect of hardness on health. Hard water is also not suitable for domestic and irrigation purposes. Total hardness of water collected is 44 ± 1.0 mg/L.

The degree of hardness of drinking water has been classified in terms of the equivalent CaCO_3 concentration as follows: Soft - 0-60mg/L, Medium - 60-120 mg/L, Hard - 120-180 mg/L, Very hard - >180 mg/L. The observed value was quiet less than the acceptable limit of 300 mg/L.

5. Chlorides:

Chloride is mainly obtained from the dissolution of salts of hydrochloric acid as table salt (NaCl), NaCO_2 and added through industrial waste, sewage, sea water etc. Surface water bodies often have low concentration of chlorides as compare to ground water. It has key importance for metabolism activity in human body and other main physiological processes. High chloride concentration damage metallic pipes and structure as well as harms growing plants. According to WHO standards concentration of chloride should not exceed 250 mg/L.

The chloride content of the water sample is found to be 95.85 ± 0.02 mg/L.

6. Acidity:

Acidity of water is its capacity to neutralize a strong base and is mostly due to the presence of strong mineral acids, weak acids and the salt of strong acids and weak bases. Addition of wastewater having acidity producing substances increases the acidity of water. The observed acidity of water sample is 89.6 ± 0.15 mg/L of CaCO_3 . The value is much less than threshold value i. e. 200 mg/L of CaCO_3 . This indicates that sample of water are in safe range.

7. Alkalinity:

Alkalinity is a chemical measurement of water's ability to neutralize acid. Alkalinity is also a measure of water buffering capacity or its ability to resist changes in pH upon the addition of acids or bases. Alkalinity of natural water is due to primarily to the presence of weak acid salts, although strong bases may also contribute (i.e. OH^-) in the extreme environment. Bicarbonate represents the major form of alkalinity in natural water, so its source being the partitioning of CO_2 from the atmosphere and the weathering of carbonate minerals in rocks and soil. Other salts of weak acids, such as borate, silicates, ammonia, phosphate, and organic bases from natural organic matter may be present in small amounts.

The observed alkalinity of water sample is 140 ± 0.3 mg/L of CaCO_3 . The observed value of alkalinity of sample is within the permissible range i.e. below 200 mg/L.

8. Dissolved Oxygen:

The amount of oxygen dissolved in water, such as a lake, river or stream. Dissolved oxygen is the most important indicator of the health of water bodies and its capacity to support a balanced aquatic ecosystem of plants and animals. Warm water released from industrial outlets, flowages or storm sewers can also reduce dissolved oxygen levels. Dissolved oxygen may play a large role in the survival of aquatic life in temperature lakes and reservoirs during summer months. Dissolved oxygen of water sample collected is 4.464 ± 0.016 mg/L. It may be due to high temperature and inorganic reluctance such as hydrogen sulfide, ammonia, nitrites, ferrous ions and other oxidizable substances also tend to decrease dissolved oxygen in water.

9. Biochemical Oxygen Demand (BOD):

Biochemical oxygen measures the amount of oxygen that microorganisms consume while decomposing organic matter, it also measures the chemical oxidation of inorganic matter. BOD is a measure of organic material contamination in water, specified in mg/L. BOD is the amount of dissolved oxygen required for the biochemical decomposition of organic compounds and the oxidation of certain inorganic materials (e.g., iron, sulphites).

The observed value of BOD is 1.031 ± 0.06 mg/L which is within the permissible range i. e. 0.75-1.5 mg/L.

10. Total Dissolved Solids (TDS):

Total dissolved solids are the total amount of mobile charged ions, including minerals, salts or metal dissolved in a given volume of water in mg/L. TDS is directly related to the purity of water and the quality of water purification system and affects everything that consumes, lives in, or uses water, whether organic or inorganic, whether for better or for worse. Common inorganic salts that can be found in water include calcium, magnesium, potassium and sodium, which are cations and carbonates, nitrates, bicarbonates, chlorides and sulphates which are anions. They give a particular taste to water at higher concentration and also reduce its palatability.

The total solid present in water sample collected is 280 ± 1.0 mg/L which is lower than threshold value of total solid content i.e. 500 mg/L.

11. Calcium hardness:

Calcium is naturally present in water. Calcium is a determinant of water hardness, because it can be found in water as Ca^{2+} ions. As per Indian Standards the calcium content of water should not be more than 75 mg/L. This has been specified in the IS 10500:- Drinking Water –Specifications.

In the study the calcium content in water sample has been found to be 20 ± 0.3 mg/L which is within the limit as per Specification.

12. Magnesium hardness:

Magnesium is naturally present in water. Magnesium is a determinant of water hardness, because it can be found in water as Mg^{2+} ions. As per ISI the magnesium content of water should not be more than 50 mg/L.

In the study the magnesium content in water sample has been found to be 24 ± 0.3 mg/L which is within the limit as per Specification.

13. Salinity:-

Salinity which is defined as the total concentration of electrically charged ions in the water. These ions are the four major cations-calcium, magnesium, potassium and sodium, and the four common anions carbonates (CO_3), sulphates (SO_4), chlorides (Cl) and bicarbonates (HCO). Other components of salinity are charged nitrogenous compounds such as nitrates (NO_3), ammonium ions (NH_4) and phosphates (PO_4) [15]. In general the salinity of surface waters depends on the drainage area, the nature of its rock, precipitation, human activity in the area and its proximity to marine water [16]. Waters with salinity below 1% are fresh and waters with salinity higher than 1% are brackish/marine [17].

The observed value of salinity for water sample is 1.172 ± 0.003 mg of NaCl.

CONCLUSION:

The study assessed the evolution of water quality in dam water of Garambi, Murud taluka which was carried out by taking certain important parameters like Temperature, pH, Electrical conductivity, TDS, Alkalinity, Chloride, DO, BOD, Total hardness, Calcium hardness, Magnesium hardness and Salinity. The data of physico-chemical and biological parameters clearly shows that the water of Garambi dam is within the permissible range as per APHA (1989), (1992), Trivedi and Goel (1986). Such water is suitable for drinking purpose and can be used for domestic as well as irrigation purpose.

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ISOLATION AND CHARACTERIZATION OF PHOSPHATE SOLUBILISING BACTERIA (PSB) FROM RICE FIELD SOIL AND STUDY OF EFFECTS OF PH AND TEMPERATURE FOR EFFECTIVE PHOSPHATE SOLUBILIZATION

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Abstract:

In the present study, 05 phosphate-solubilizing bacteria were isolated from rice field around Panvel city. 05 phosphate-solubilizing bacteria (PSB) were isolated from the rice field soil. Isolates further partially identified by studying its cultural and biochemical characteristics and it was revealed that, the isolates resemble with *Bacillus*, *Pseudomonas*, *Azotobacter*, and *Rhizobia*. The phosphate-solubilizing ability of the isolates was first qualitatively evaluated by the formation of clear zones around the colonies growing on sterile NBRIP media containing tribasic calcium phosphate as a main source of phosphorus. The isolates exhibited the solubilization index ranging from 2 to 5. The quantitative evaluation revealed that, the isolates released organic phosphate upto 52.63 µg/ml. Indole acetic acid production by isolates was also determined and it was found that, isolates produces 3.22 to 35.48 µg/ml of IAA. The pH 7 and temperature 27°C found as optimal parameters. To check biofertilizer efficiency of isolates pot assay was performed. It seen that test plants showed significant growth with respect to root and shoot length as compared to control plant.

Key words: PSB, Rice field Soil, solubilization index, IAA, Pot assay.

Introduction:

Microorganisms play a very important role in almost every sector. As microorganisms are involved in biogeochemical cycling of nutrients, they maintain soil fertility and improve crop protection. As we know, numbers of macro and micronutrients are required for the optimal growth of plant. Of those, Nitrogen, Phosphorus and Potassium are major nutrients. Out of these three major ingredients, Phosphorus has been called the *key of life* because it is directly involved in most of the life processes. Phosphorus plays an indispensable biochemical role in plant metabolism cell division, cell enlargement and several other processes in the living plant. (Sagervanshi A. et.al. 2012). The level of inorganic P is very low in the soil and the available P is in insoluble form.(Parsanna A. et.al. 2011). Maintaining a proper P-supplying level at the root zone can maximize the efficiency of plant roots to mobilize and acquire P from the rhizosphere by an integration of root morphological and physiological adaptive strategies. Furthermore, Phosphorus uptake and utilization by plants plays a vital role in the determination of final crop yield. (Shen J., et.al.2011).

Microorganisms solubilise the insoluble phosphates and maintain the soil health and quality.

The most common examples of PSMs are the species of *Pseudomonas*, *Bacillus*, *Micrococcus*, *Flavobacterium*, *Aspergillus*, *Penicillium*, *Fusarium*, *Rhizobium* and *Enterobacter*. *Bacillus megaterium*, *B. circulans*, *B. subtilis*, *Pseudomonas striata* and *Enterobacter* are referred as the most important strains. *Penicillium* and *Aspergillus* fungi are the most powerful P solubilizer. (Anand K. et.al. 2016)

These PSB also can stimulate plant growth by other mechanisms such as the production of phytohormones, nitrogen fixation, inhibition of phytopathogenic microorganisms, production of siderophores, organic acid production indole acetic acid production etc. (Aarab S.et.al. 2013).

Materials and Methods:

1.Collection and Enrichment of soil sample

- i. **Sample collection:** Rice field soil sample was collected from around Panvel region and kept at RT in plastic bag.
- ii. **Enrichment of soil sample:** 1gm of soil sample in each 100ml of Sterile NBRIP and PVK broth was inoculated. Then flasks were incubated on shaker at 27°C for 3days.

2. Isolation of phosphate solubilising bacteria : Enriched samples were serially diluted and spreaded on Sterile NBRIP and PVK agar plates. Enriched sample also streak plated on Sterile NBRIP media. After incubation at 27° C for two days, colonies showing phosphate solubilisation i.e. forming clear zone around bacterial growth were observed.

3. Maintenance of Isolates: The purified isolates were maintained onto Sterile NBRIP and NA slants with regular sub culturing every after 15 days and preserved at 4°C

4. Soil Analysis : The analysis of soil is essential step as it gives the detailed knowledge about the concentration of nutrient present into soil and thus the soil analysis was carried out by Himedia soil testing kit (K054S-1KT, Lot.No.0000217813). Various parameters such as pH, organic carbon, available phosphate, organic ammonical nitrogen, nitrate nitrogen and available potassium were determined using procedure given in handbook. The color of each test compared with standard chart and amount of nutrient present in the soil was recorded.

5. Screening of phosphate solubilising bacteria:

- i. **Qualitative assay:** 24hrs old cultures of isolates were spot inoculated at the centre of Sterile NBRIP plates and PVK's plates. Then plates were incubated at 27°C for two days. On the basis of zone of solubilisation each of the isolates was screened for their ability to solubilise calcium phosphate present medium. The solubilisation zone in terms of solubilisation index was determined by subtracting the diameter of bacteria colony from the diameter of total zone. [Patel D. et al (2013)]
- ii. **Quantitative assay:** Soluble phosphate converted to heterocomplex in the presence of molybdate ions, which reduce to in presence of stannous chloride to give blue color complex, which is measured at 660nm. [Hafsa cherif-silini et al (2013)]. In our study, After enriching cultures in NBRIP for 5 days, cultures were centrifuged at 3000rpm for 30min. Concentration of soluble phosphate was determined in the supernatant by colorimetrically (1ml supernatant+ 10ml ammonium molybdate+ 1ml SnCl₂) and volume adjusted up to 50ml with D/W. The intensity of blue color measured at 660nm was directly proportional to concentration of soluble phosphate. The concentration of soluble phosphate was determined by plotting Graph of standard Graph of KH₂PO₄.

6. Morphological and Biochemical identification

Bacteria grow on solid media as colonies. Key features of these bacterial colonies serve as important criteria for their identification. Therefore isolates were partially identified using morphological and Gram nature of isolates and biochemical characterization.

7. Assay of plant growth promoting trait

Plant growth promoting traits includes production of growth hormones/factors like IAA, organic acid etc. In present study, IAA production by isolates was determined.

Test for Indole acetic acid: Indole acetic acid forms chelate with iron at acidic pH. The oxidation of indole acetic acid by ferric salts is the basis of colorimetric determination of acid based on the salkowski's reagent. [Mores R.M. et al 2012]. For this test, in present study, Isolates were cultured on Luria broth medium containing tryptophan for 24hrs. t 27° C at 150rpm on shaker. Then centrifugation of broth has done at 10,000rpm for 10min. Collected 1ml of each supernatant of particular isolates was mixed with 1.5ml of Salkowski's s reagent and kept for 30minutes. Production of IAA was checked at 530nm using UV-Vis.Spectrophotometer (Shimatzu). For quantification of unknown amount of IAA, standard was run simlteniously using IAA of 1000µg/ml concentration.

8. Effect of various factors like pH, Temperature:

Growth of microorganisms depends upon various parameters such as pH, Temperature. These are the main parameters if any change happens in theses parameters it affects the growth of microorganisms. Thus optimization of pH and Temperature was carried out. For determining the effect of temperature, cultures in Sterile NBRIP broth were incubated at 20°C, 28°C, and 36°C at pH 7.0 and mixing/aeration conditions were set at 180 rpm. For studying the effect of pH, cultures were inoculated in Sterile NBRIP broth with pH adjusted to 4.0, 7.0 and 8.0. [Nair S. K. et al (2016)]

9. Pot assay:

To check the biofertilizing ability of bacterial isolate i.e.PSM, it is necessary to monitor the growth of roots and shoots of the plant under study. In the present study, rice plants were selected to study the biofertilizing effects of PSBs. To achieve this objective, pot assay was performed and biofertilizer activity of all the bacterial isolates was successfully recorded using pot assay.

In the method, surface sterilised seeds were incubated in isolated bacteria's inoculums for 30 mins. Then seeds were sowed in each pot filled with sterile soil individually with isolates. The root length and shoot length were measured up to 21 days.

Results and Discussion:

Collection of soil sample: Rice field soil sample was collected around Panvel city in sterile plastic bag and kept at Room Temperature.



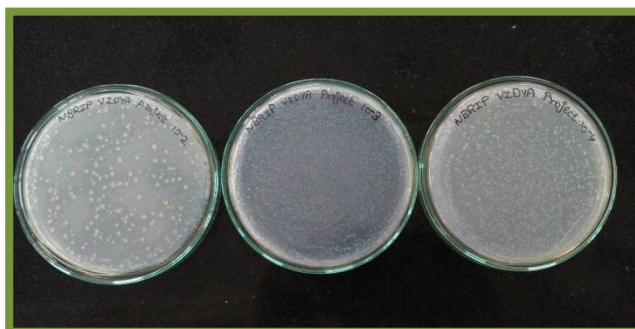
Fig. 1: Collected Rice field soil sample



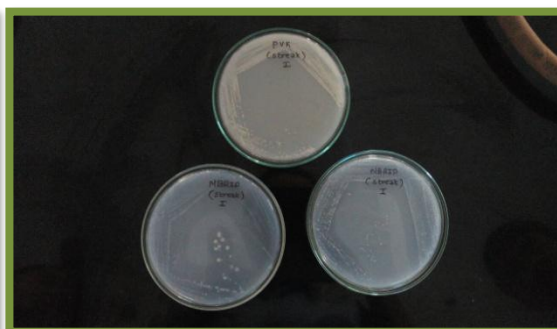
Fig. 2: Enrichment of soil sample

Enrichment of soil sample: Collected Rice field soil sample was enriched in Sterile PVK broth and Sterile NBRIP broth. These both are worked as selective media for phosphate solubilising bacteria.

Isolation of phosphate solubilising bacteria: After incubation period, total 6 isolates were obtained and labeled as RFIS1, RFIS2, RFIS3, RFIS4, RFIS4, RFIS5, RFIS6 but RFIS1 was fungal isolate. As present study was set in the way to focus only on phosphate solubilising bacteria, RFIS1 was not continued for further studies.



(Spread Plate Technique)



(Streak Plate Technique)

Fig. 3: Rice Field Soil Isolates

All the bacterial isolates were maintained on sterile NBRIP as well as NA slants and stored at 4°C in the refrigerator.

Soil analysis in the present study revealed that, the pH of rice field soil in the region from where the soil sampling was done, found to be 7.5. The Rice field soil was found to be rich with contains-Oxidizable Organic Carbon, Phosphate, Potassium, Ammonical- Nitrogen and Nitrate Nitrogen in the range of *low* (0.100 -0.300%), *Low* (less than 22kg/hectare), *medium* (112 to 280 Kg/ha), *low* (About 15kg/ha as N) and also *low* (About 10kg/ha as N) respectively.

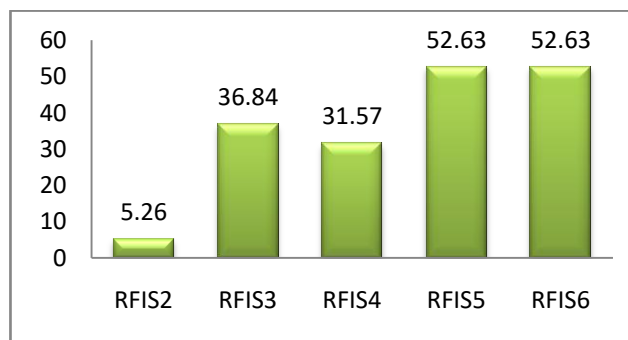
In the Screening of phosphate solubilising bacteria, qualitative assay revealed that, all the isolates have certain solubilization index. Phosphate solubilisation efficacy of each isolate was determined by

measuring solubilisation index (SI) by formula; $SI = \frac{\text{Colony diameter} + \text{Holozone diameter}}{\text{Colony diameter}}$.



Fig. 4: Clear zone seen around colony shows phosphate solubilisation

Quantitative assay : Phosphate solubilisation ability of isolates was determined by the amount of soluble phosphate released and referring it with standard graph, RFIS 5 and RFIS 6 showed highest phosphate solubilisation i.e. **52.63 µg P/ml**. whereas RFIS2 showed lowest phosphate solubilisation i.e. **5.26 µg P/ml**. In the graph on X-axis- isolates and on Y-axis -amount of phosphate released in µg /ml.



Graph 1: Phosphate solubilisation by Isolates

After enrichment, isolation and screening, total five bacterial isolates were showed phosphate solubilisation and therefore they are further identified by performing Morphological and Biochemical analysis/

Morphological characteristics of isolates are as follows:

Rice field isolates	Colony characteristics								
	Size (mm)	Shape	Color	Margin	Opacity	Elevation	Consistency	Gram nature	Motility

RFIS 2	2	Circular	Pale yellow	Entire	Translucent	Flat	mucoid	Gram negative rods	Motile
RFIS 3	4	circular	Pale yellow	Entire	Translucent	Flat	mucoid	Gram negative	Motile
RFIS 4	4	circular	Pale yellow	Entire	Translucent	Flat	mucoid	Gram positive cocci	Non--Motile
RFIS 5	3	circular	Pale yellow	Entire	Translucent	Convex	mucoid	Gram positive cocci	Non--Motile
RFIS 6	2	circular	Pale yellow	Entire	Opaque	Convex	mucoid	Gram positive cocci	Non--Motile

Table 1: Morphological Characteristics

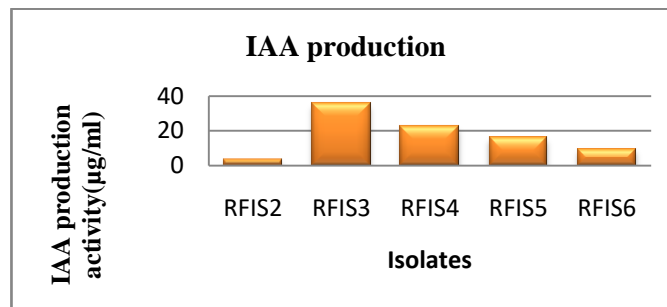
Biochemical characteristics of isolates are as follows:

Biochemical Test	Isolates				
	RFIS2	RFIS3	RFIS4	RFIS5	RFIS6
Glucose	AG	AG	AG	AG	AG
Lactose	-	AG	A	-	AG
Sucrose	AG	AG	AG	AG	AG
Mannitol	A	AG	AG	A	AG
Catalase	+	+	+	+	+
Oxidase	-	-	-	-	-
Nitrate reductase	+	+	+	+	+
Citrate utilization	+	+	+	+	+
Indole test	-	-	-	-	-
Methyl red	-	-	+	+	+
VP test	+	+	-	-	-

Table 2: Biochemical characteristics

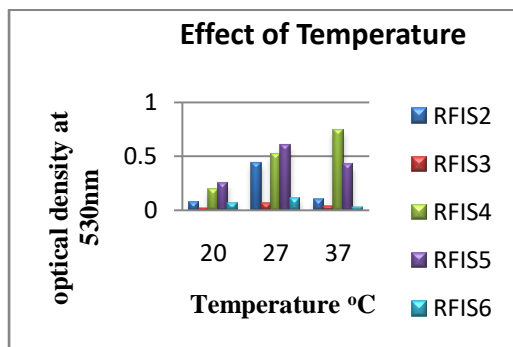
*Key: + = Positive test; - = Negative test; A = Acid Production; G = Gas Production.

In the present study, one of the plant growth promoting trait i.e. IAA was studied. IAA is a common product of L-tryptophan metabolism by several microorganisms including PGPR.. Bacterial IAA producers (BIPs) have the potential to interfere with growth related of plants processes by input of IAA into the plant's auxin pool. Thus, determination of production IAA by isolates is a important aspect of this study. Therefore IAA was determined by colorimetric assay. For comparison, standard assay was done parallel with isolates. Indole Acetic Acid (IAA) production was determined colorimetrically by using Salkowski's reagent. It was revealed that, all the isolates have ability to produce IAA at significant amount. IAA Production by RFIS 3 was found maximum which was equal to **35.48 µg/ml** whereas RFIS 2 showed lowest IAA production i.e. **3.22 µg/ml**. It concluded that RFIS 3 was more significant and potential IAA Producer than the other isolates.

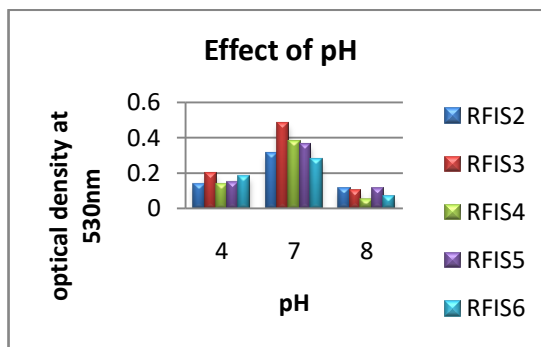


Graph 2: Indole acetic acid production by isolates

Effect of various factors like pH, Temperature: pH and temperature are important parameters for the growth of microorganisms. To determine optimum pH and temperature, bacterial isolates were subjected to different pH range (4,7 and 8) and different temperature range (20, 27 and 37°C). Growth of isolates was determined by colorimetrically at 530nm. By performing optimization of temperature, maximum growth of isolates was observed at 27 °C except RFIS 4 which exhibited maximum growth at 37 °C. Hence optimum temperature of isolates RFIS 2, 3, 5 & 6 was found to be 27 °C.



Graph 3: Optimization of temperature



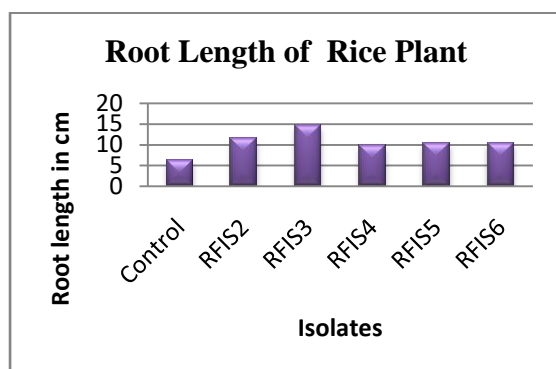
Graph 4: Optimization of pH

While, by performing optimization of pH, maximum growth of isolates was observed at pH 7. Hence optimal pH was found to be 7.

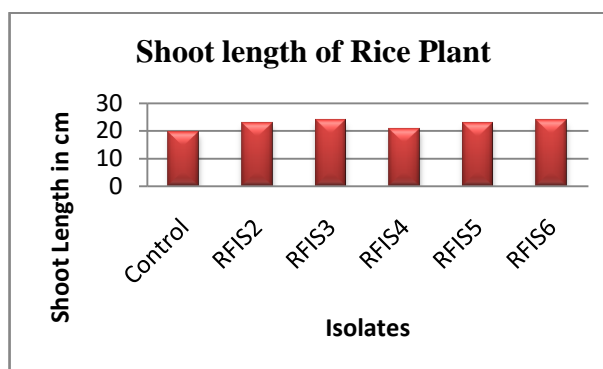
Pot assay : Pot assay was performed in duplicate to check biofertilizer efficacy in the form of growth promotion (Roots and shoots) of bacterial isolates .



Fig. 5: Growth promotion of rice plants with isolates



Graph 5: Average root length



Graph 6: Average shoot length

Recorded after treatment of 21 days (pot assay)

The shoot length and root length of control plant and test plants of rice was recorded in centimeter up to 21 days. It was seen that RFIS 3 showed **highest** shoot length and root length i.e. 23.80cm and 14.60cm respectively. It concluded that RFIS 3 has highest biofertilizer efficiency as compared to other isolates. Adding an insoluble phosphate source significantly increased total PSB populations in the soil, which implies that adding TCP was obviously beneficial for these isolates to proliferate and survive. Hence, more available P would be released into the soil and utilized by rice seeds for its optimal growth (i.e. shoots and roots).

Conclusion:

- Six phosphate solubilizing microbes have been successfully isolated from rice field soil sampled from around Panvel region.
- Clear haloes observed around the colonies indicates phosphate solubilisation. By qualitative assay, it can be concluded that, solubilisation index of isolates may be as small as up to 2 to highest up to 5 (RFIS3).
- Two Isolates exhibited highest solubilization and hence maximum release of P was recorded up to 52.63µg P/ml.
- Study also revealed that, the isolates may be *Pseudomonas*, *Enterobacter*, *Bacillus*, *Azotobacter* and *Rhizobium*. All these isolates have significant IAA production ability.
- The optimum pH for isolates is found to be 7 and their optimum temperature found to be 27°C.
- These parameters are favourable in the area under study. This also help to conclude that, the isolates can be used in the surrounding region of Panvel where the temperature usually remain in the range of 25 °C to 35 °C and the pH of soil is around 7.
- Pot assay conclude that, the isolates showed increased shoot length on 21 day as compared to control plant.

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TO STUDY THE IMPACT OF CERTAIN EXTERNAL CONDITIONS ON SEED GERMINATION IN VIGNA MUNGO (BLACK GRAM).

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ABSTRACT:-

Aqueous extract of Spinach leaves and prawns of 1%, 5%, 10% and 20% (W/V) was treated to Vigna mungo seeds was studied. Treated seeds shows late germination, decreased rate of germination percentage, less radicle length and no plumule formation. Beginning of germination delayed more by prawn extract treatment than Spinach leaves extract treatment. Seed germination percentage is more affected by prawn extract treatment than Spinach leaves extract treatment. Prawn extract treatment is more adverse in terms of radicle growth during germination than Spinach leaves extract treatment to seeds of Vigna mungo. There is no plumule formation takes place in both treated seeds during germination. The adverse effect of Spinach leaves extract treatment and prawn extract goes on increasing with increasing the concentration extracts.

INTRODUCTION:-

Vigna mungo of family fabaceae commonly called as black gram, urad bean, minapa pappuy, mungo bean or black matpe bean.

Cited from [http:// en.wikipedia.org/wiki/vigna mungo](http://en.wikipedia.org/wiki/vigna_mungo), Black gram is originated in India. It is widely utilized in Indian cuisines. According to Menon and kunup (1976), and Indra and kurup (2013), the black gram has better effect in cholesterol metabolism. They called the black gram as Hypolepidemic pulse. Therefore, the Vigna mungo is selected for present study.

The germination is one of vital process in plant physiology. According to Raven et. al (2005), seed germination depends upon internal and external conditions. In present study an attempt is made to study the impact of certain external conditions. In present study an attempt is made to study the impact of certain external condition on seed germination in Vigna mungo (black gram). Vegetable extract of Spinach leaves and non vegetable extract of prawn extract are used as external factors to observe effect on seed germination of Vigna mungo.

MATERIAL AND METHODS:-

Vigna mungo (black gram) seeds are selected for present study. Two sets of petri plates with blotting filter paper at base are taken. 10 seeds of Vigna mungo are placed in each petridish. Adequate distilled water is applied to first petridish as control. Treated petridishes are applied adequate quantity of 1% (wt/volume) 5%, 10% and 20% aqueous extract of Spinach leaves. The experiment is repeated as it is for second time. The observation of both experiments are considered as average.

Similarly, apply 1%, 5%, 10%, and 20% aqueous extract of dried prawns to 2 replicas of 4 petridishes with 10 seeds of black gram each. The control reference kept common.

The germination of seeds is treated as one of the important criteria to study the impact of vegetable extract and non vegetable extract on black gram. From day one of experiment upto 10th day, the number of seeds (out of 10) underwent germination were observed. Similarly the radicle length is also treated as another parameter for study of treated and control seeds germination. Average plumule length formation on 10th day of germination is considered as another mean to find impact of vegetable extract and non vegetable extract on seed germination process in black gram.

RESULTS AND DISCUSSION:-

Table I-A Effect of Spinach leaves extract on emergence of seeds of Vigna mungo

Treatment (Spinach leaves extract)	Number of seeds germination per day/s									
	1 st Day	2 nd Day	3 rd Day	4 th Day	5 th Day	6 th Day	7 th Day	8 th Day	9 th Day	10 th Day
Control	0	3	8	10	10	10	10	10	10	10
1%	0	1	1	2	2	4	4	4	6	6
5%	0	0	0	1	1	3	4	4	6	6
10%	0	0	0	1	3	4	4	4	5	5
20%	0	0	0	0	0	0	2	2	2	3

Table I-B Effect of Spinach leaves (Vegetable) extract on germination percentage in seeds of Vigna mungo.

Treatment (Spinach leaves extract)	Germination percentage per day/s									
	1 st Day	2 nd Day	3 rd Day	4 th Day	5 th Day	6 th Day	7 th Day	8 th Day	9 th Day	10 th Day
Control	0	30	80	100	100	100	100	100	100	100
1%	0	10	10	20	20	40	40	40	60	60
5%	0	0	0	10	10	30	40	40	60	60
10%	0	0	0	10	30	40	40	40	50	50
20%	0	0	0	0	0	0	20	20	20	20

Table I-C Effect of Spinach leaves extract on radicle (root) length in Vigna mungo

Treatment Spinach leaves extract	Average radicle length in cm on 10 th day of treatment
Control	1.35 cm
1%	1.23 cm
5%	0.95 cm
10%	0.2 cm
20%	0.17 cm

Table I-D Effect of Vegetable extract (Spinach leaves extract) on plumule (Shoot) length during seed germination of Vigna mungo.

Treatment (Spinach leaves extract)	Average plumule (shoot) length in cm on 10 th day germination
Control	1.35 cm
1%	--
5%	--
10%	--
20%	--

Table I-A, I-B, I-C and I-D shows germination of black gram seeds from day one to day 10 in control and Spinach extract treated seed germination at 1%,5%,10% and 20% concentration, average radicle length and average plumule length on 10th day of experiment.

From table I-A it is clear that the germination started on second day in control and 1% Spinach treatment. In 5% and 10% Spinach extract treatment, the germination started on third day, while in 20% Spinach extract treatment, the germination was stimulated on seventh day. It means the Spinach extract treatment shows late germination. It delays the seed germination in Vigna mungo.

The seeds germination percentage from first day to tenth day is also seen in Table I-B in black gram under controlled and treated conditions. It is observed that seed germination is 100% in control on fourth day of germination. In 1% spinach treatment, it is 20% germination while in 5% spinach treatment and 10% spinach treatment it is 10% each on fourth day of germination. The 20% spinach treated seeds of Vigna mungo not shows any germination% even on fourth day of germination. It shows that rate of germination is more in control while rate of germination % is less in Spinach leaves extract treated seeds in Vigna mungo. The rate of germination % goes on decreasing as the concentration of Spinach leaves extract treatment goes on increasing.

The Table I-B shows the 100% seed germination in control seeds of black gram on tenth day while 60%, 60%, 50% and 30% seed germination rate in 1%, 5%, 10% and 20% Spinach leaves extract treated seeds respectively. It means the rate of seed germination is less in Spinach leaves extract treated leaves as compared to control.

From the Table I-C it is clear that average radicle length is 4.35 cm. In 1% Spinach leaves treated seeds it is 1.23cm, it is 0.95cm, 0.2cm, 0.17cm in 5%, 10%, 20% spinach leaves extract treated seeds of Vigna mungo respectively. It is clear from these observations that average radicle length is affected due to spinach leaves extract treatment. The effect goes on increasing as the concentration of spinach leaves extract also goes on increasing.

The shoot length i.e plumule length of control and treated seeds during germination on 10th day of treatment is shown Table I-D. It is observed that the plumule formation is only seen in control seeds of Vigna mungo as compared to Spinach leaves extract treated seeds. It means the treatment of Spinach leaves extract shows adverse effect on the plumule formation during germination in Vigna mungo.

Table II-A Effect of Prawn extract on emergence of seeds if Vigna mungo.

Treatment (Spinach leaves extract)	Number of seed/s germination per day/s									
	1 st Day	2 nd Day	3 rd Day	4 th Day	5 th Day	6 th Day	7 th Day	8 th Day	9 th Day	10 th Day
Control	0	3	8	10	10	10	10	10	10	10
1%	0	0	0	0	2	2	3	4	4	5
5%	0	0	0	0	0	0	0	1	2	2
10%	0	0	0	0	0	0	0	0	1	1
20%	0	0	0	0	0	0	0	0	0	0

The Table-II-A shows the effect of prawn extract on the seed germination in Vigna mungo. It is seen from observation that the seed germination started in control seeds on second day of experiment. The seed germination started on 5th day of treatment in 1% prawn extract treatment. In 5% extract treated seeds the seed germination started at 8th day of treatment. In 10% prawn extract treated seeds the seed germination started at 9th day of treatment. In 20% prawn extract treated seeds, the seed germination not takes place even on 10th day of germination. It means the beginning of seed germination is affected due to the treatment of prawn extract. It is further added that the delay in beginning of seed goes on decreasing as the concentration of prawn extract treatment goes on increasing.

Table II- B Effect of Prawn extract on germination percentage of seeds of Vigna mungo.

Treatment (Spinach leaves extract)	Number of seed/s germination per day/s									
	1 st Day	2 nd Day	3 rd Day	4 th Day	5 th Day	6 th Day	7 th Day	8 th Day	9 th Day	10 th Day
Control	0	30	80	10	10	10	10	10	10	10
1%	0	0	0	0	20	20	30	40	40	50
5%	0	0	0	0	0	0	0	10	20	20
10%	0	0	0	0	0	0	0	0	10	10
20%	0	0	0	0	0	0	0	0	0	0

Table II-B shows the effect of percentage on concentration of prawn extract of seed germination in Vigna mungo. From these observation, it is clear that the seed percentage goes on increasing from first to tenth day of germination in control seeds. It is 100% rate of germination of 9th day of treatment. The rate of germination is only 50% in 1% prawn extract treated seeds on 10th day. It is 20%, 10% rate of seed germination in 5% and 10% prawn extract treated seeds on 10th day of treatment. However in 20% prawn extract treatment, the seed germination rate is nil even on 10th day of experiment. It means the rate of seed germination is affected by prawn extract treatment in Vigna mungo. The effect goes on adverse as the concentration of prawn extract goes on increasing. There is no germinations % at all in Vigna mungo.

Table II-C. Effect of prawn extract on radical (root) length in Vigna mungo.

Treatment prawn extract	Average radical (shoot) length in cm on 10 th day of treatment
Control	1.29cm
1%	0.75cm
5%	0.57cm
10%	0.28cm
20%	0.0cm

Table II-C shows the average radicle length of seeds in Vigna mungo on 10th day of germination in control and prawn extract treated seeds. It is clear from table II-C that the average root length (radicle) is 1.29 cm in control seeds as on 10th day of germination. It is 0.75cm, 0.57cm and 0.28cm in 1%, 5% and 10% prawn extract treated seeds while there no radicle formation in 20% prawn extract seeds. It indicates that the prawn extract treatment has adverse effect on radicle length in seeds of Vigna mungo. The adverse effect of prawn extract treatment goes on increasing as the concentration of prawn extract treatment goes on increasing from 1% to 20%.

Table II-D- Effect of prawn extract on plumule (shoot) length during sees germination of Vigna mungo.

Treatment prawn extract	Average radical (shoot) length in cm on 10 th day of treatment
Control	1.55 cm
1%	-
5%	-
10%	-
20%	-

Table-II-D shows effect of prawn extract treatment on plumule (shoot) formation in seeds of Vigna mungo. It is clear from Table-II-D that the length of plumule is 1.35cm in control seeds. There is no plumule formation in 1%, 5%, 10% and 20% prawn extract treated seeds. It means there is inhibiting

effect of prawn extract treatment on plumule formation in seeds of *Vigna mungo*. When observation of table I-A and Table II-A are compared; it is found that seed germination begin on 2nd day in control of *Vigna mungo*. The 1% Spinach leaves extract treated seed shows beginning of germination on 2nd day while 1% prawn extract treated seeds shows germination beginning on 5th day. The 1%, 5%, 10% and 20% Spinach leaves extract treated seeds shows beginning of germination on 2nd day, 4th day, 4th day of treatment respectively. However, in 1%, 5%, 10% and 20% prawn extract treated. Seeds of *Vigna mungo* shows beginning of germination 5th day, 7th day 9th day and no germination respectively. It means beginning of germination delayed more by prawn extract treatment than the Spinach leaves extract treatment on seeds of *Vigna mungo*.

Comparative account of Table I-B and Table II-B shows that germination percentage of control seeds of *Vigna mungo* is about 100% on 10th day of treatment. While it is 60%, 60%, 50% and 30% in 1%, 5%, 10% and 20% prawn extract treated seeds. It is 50%, 20%, 10% and zero in 1%, 5%, 10% and 20% prawn extract treated seeds. It means seed germination percentage is more affected by prawn extract treatment than Spinach leaves extract treatment.

From Table I-C and Table II-C, it is observed that the radicle length is maximum (4.35cm) in control seeds of *Vigna mungo*. The length of radicle is 1.23cm, 0.95cm 0.2cm and 0.17cm in 1%, 5%, 10% and 20% spinach leaves extract treated seeds during germination on 10th day of treatment. The length of radicle is 0.75cm, 0.57cm, 0.28cm and 0 cm in 1%, 5%, 10% and 20% prawn extract treatment is more adverse in terms of radicle growth during germination than Spinach leaves extract in seeds of *Vigna mungo*.

Table I-D and Table II-D comparative account shows that shoot formation in control, however, there is no shoot (plumule) formation in either Spinach leaves extract treated seeds or prawn extract treated seeds of *Vigna mungo*. It means either Spinach leaves extract treatment or prawn extract treatment affect the plumule (shoot) formation.

Anna Traveset (1998) published research paper. In this paper the effect of different invertebrates on seed germination of nearly 200 plant species was studied for searching patterns that predict the circumstances in which germination of seeds is enhanced, inhibited or unaffected by the passage through the digestive tract of seed disperser. It was found that seed disperse have an effect on the germination of seeds or on the rate of germination, or both. The seed of different plant species differ strongly in their germination response after ingestion.

According to Carley, E.H. and Watson R.D (1968) effect of various aqueous plant extracts seed germination. Aqueous extracts of residues from 23 plant species inhibited the germination of clover, lettuce, radish and wheat seeds. Extract from potato, sugar beat, sugarbrush, green soybean, alfalfa, pea and bean were extremely toxic to germinating seeds. The extract from Douglas-fir, peat moss and sphagnum moss stimulated the growth of some germinating seeds. The degree of toxicity was dependent upon the maturity of the plant residue, the concentration of the extract, the species from which the extract was obtained, and the species of seed used in making the bioassays.

Water extract of Quack grass (*Agropyron repense*) leaves or rhizome were not phytotoxic to the germination in oats and Alfaalafa.

Kommedahl, Thor; Kothimer, J.B and Bernardini, J.V. (1959), studied the effects of Quackgrass on germination and seedling development of certain crop plants. Weeds V.7 (1) pp 1-12. They observed the adverse effect of Quackgrass on germination and seedling development in certain crop plants.

Toumeau, D.L; Failes, G.D. and Heggeness, H.G. (1956), observed. The effect of aqueous extracts of plant tissue on germination, root growth, Coleoptile formation in wheat, pea seeds. Similarly, an attempt is made to study the impact of certain external conditions on seed germination of *Vigna mungo*.

CONCLUSION:-

Aqueous extract of spinach leaves and prawns of 1%, 5%, 10% and 20% (W/V) was treated to *Vigna mungo* seeds was studied. Treated seeds shows late germination, decreased rate of germination percentage, less radicle length and no plumule formation. Beginning of germination delayed more by prawn extract treatment than Spinach leaves extract treatment. Seed germination

percentage is more affected by prawn extract treatment than Spinach leaves extract treatment. Prawn extract treatment is more adverse in terms of radicle growth during germination than Spinach leaves extract treatment to seeds of *Vigna mungo*. There is no plumule formation takes place in both treated seeds during germination. The adverse effect of Spinach leaves extract treatment and prawn extract goes on increasing with increasing the concentration extracts.

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STUDIES ON PHYSICO-CHEMICAL CHARACTERISTICS OF DRINKING WATER SOURCES OF VIHOUR VILLAGE OF MURUD TEHSIL DISTRICT-RAIGAD, MAHARASHTRA, INDIA

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ABSTRACT:-

Fresh water is essential for agriculture, industry and human existence. It is a finite resource of earth. Fresh water resource are becoming deteriorate day-by-day at the very faster rate. Now water quality is a global problem. The present investigation reveals an acute awareness among the people about the quality of drinking water by taking water samples from different sources for analysis. The experiment analyses its various Physico-chemical and biological parameters such as Temperature, pH, Electrical conductivity, TDS, Alkalinity, Chloride, DO, BOD, Total hardness, Calcium hardness, Magnesium hardness and Salinity were analyzed in the month of December 2017. The results are compared with standards of WHO. From the obtained result it can be predicted that the parameters which were taken to study the water quality are below the pollution level for water which satisfies the requirement for the use of various purposes like domestic, agricultural etc.

Keywords: Drinking water resources, water quality standard, Physico-chemical Parameter.

INTRODUCTION:

Water is one of the most important parameter to the ecosystem. The sustainable development will not be possible without adequate quantity and quality of fresh water [1-2]. Fresh water resource are becoming deteriorate day-by-day at the very faster rate. Now water quality is a global problem [2]. The healthy aquatic ecosystem is depended on the biological diversity and Physico-chemical characteristics [3]. Better quality of water is described by its physical, chemical and biological characteristics. But some correlation was possible among these parameters and the significant one would be useful to indicate quality of water. Water supply systems are important, but at the same time wastewater treatment systems are also equally important. Approximately 80% of water turns to waste water after its utilization.

Water quality provides current information about the concentration of various solutes at a given place and time. Its quality parameters provide the basis for judging the suitability of water for its designated uses and to improve existing conditions [4]. There is no single or simple measure for water quality. Water may be tested for a few characteristics or numerous natural substances and contaminants depending on their needs. The nature and extent of water pollution is characterized by several physical, chemical and biological parameters. The increased anthropogenic activities due to industrialization have contributed to decline in water quality including climate and precipitation, soil type, vegetation, groundwater and flow conditions. The water quality of rivers and lakes changes with the seasons and geographic areas, even when there is no pollution presents [5].

The deterioration of water quality has led to the destruction of ecosystem balance, contamination and pollution of ground and surface water resources. Water quality degradation worldwide is due to many anthropogenic activities which release pollutants into the environment thereby having an adverse effect upon aquatic ecosystems. Quality of water can be regarded as a network of variables such as pH, oxygen concentration, temperature, etc. and any changes in these physical and chemical variables can affect aquatic biota in a variety of ways [6]. Since the quality water is directly related to health and is important for determination of water utility, it is very essential and important to test the quality of the water before it is used for drinking, domestic, agricultural or industrial purposes. The utility of river water for various purposes is governed by physicochemical and biological quality of the water [7].

It is well known that no straight forward reasons can be advanced for the deterioration of water quality, as it is dependent on several water quality parameters [8]. Ground water quality in the industrial areas is determined by measuring the concentration of some physico-chemical parameters and comparing them with drinking water standards [9].

Chandanshive Navnath Eknath [10] studied "The Seasonal Fluctuation of Physico-Chemical parameters of River Mula- Mutha at Pune, India and their Impact on Fish Biodiversity". MVS Vaishnavi et al [11] studied "Study of levels of heavy metals in the river waters of regions in and around Pune City, Maharashtra, India". Pali Sahu et al [12] studied "Physicochemical Analysis of Mula Mutha River Pune". Nidhi Jain et al [13] studied "Comparative Review of Physicochemical Assessment of Pavana River". Patil. P.N et al [14] studied "Physico-chemical parameters for testing of water".

According to Census 2011 information the location code or village code of Vihour village is 554254. Vihour village is located in Murud Tehsil of Raigarh district in Maharashtra, India. It is situated 4km away from sub-district headquarter Murud and 53km away from district headquarter Alibag. As per 2009 stats, Vihour is the gram panchayat of Vihour village.

The total geographical area of village is 634.63 hectares. Vihour has a total population of 2,021 peoples. There are about 469 houses in Vihour village. Murud is nearest town to Vihour which is approximately 4km away. The water sample such as Pipe water, bore well water and well water was collected early in the morning between 8.00 am to 10.00 am and was analyzed to compare the differences occurred in Physico-chemical parameters such as Temperature, pH, Electrical conductivity, TDS, Alkalinity, Chloride, DO, BOD, Total hardness, Ca-hardness, Magnesium hardness and Salinity.

The research work is carried out, keeping in mind the following objectives.

- To study the chemical composition and water quality parameters of different sources.
- To investigate the possible sources and Cause of pollution in the water if any.
- To study if these effects can be attributed to the change in the chemical composition of the different water sources.

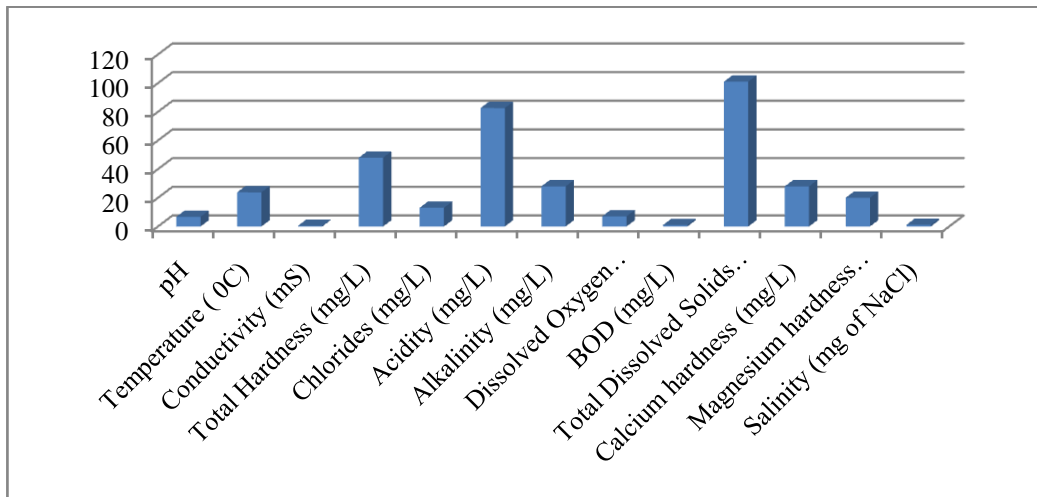
MATERIAL & METHOD:-

Sample of water was collected in sterile plastic bottle of 2 litre capacity from the dam. At the same time the temperature & pH were noted. The physico-chemical analysis was carried out within 24 hours of collection in a laboratory as per APHA (1989), (1992), AWWA & WPPFA, Trivedy & Goel (1986) [15-16]. The chemicals were used of A. R. grade and are standardized as per Inorganic quantitative analysis by Vogel (1964) & (2006) [17-18]. The result is statistically analyzed by calculating mean & standard deviation.

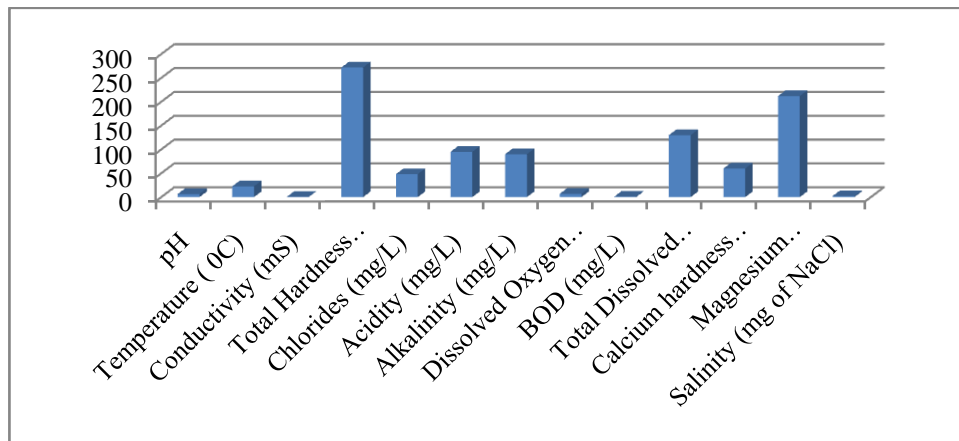
RESULTS & DISCUSSION:-

Parameters	Tap water Mean \pm S.D	Bore well water Mean \pm S.D	Well water Mean \pm S.D
pH	7.72 \pm 0.02	6.50 \pm 0.02	7.35 \pm 0.02
Temperature (°C)	24.3 \pm 0.3	22.8 \pm 0.3	24.7 \pm 0.3
Conductivity (mS)	0.173 \pm 0.002	0.480 \pm 0.002	0.222 \pm 0.002
Total Hardness (mg/L)	84 \pm 1.0	212 \pm 1.0	116 \pm 1.0
Chlorides (mg/L)	15.05 \pm 0.18	43.15 \pm 0.18	26.13 \pm 0.18
Acidity (mg/L)	42.6 \pm 0.3	75.0 \pm 0.3	45.3 \pm 0.3
Alkalinity (mg/L)	90 \pm 0.3	198 \pm 0.3	126 \pm 0.3
Dissolved Oxygen (mg/L)	7.126 \pm 0.015	6.896 \pm 0.015	7.266 \pm 0.015
BOD (mg/L)	1.231 \pm 0.03	0.993 \pm 0.03	1.127 \pm 0.03
Total Dissolved Solids (mg/L)	111 \pm 1.0	128 \pm 1.0	215 \pm 1.0
Calcium hardness (mg/L)	48 \pm 0.3	116 \pm 0.3	72 \pm 0.3
Magnesium hardness (mg/L)	36 \pm 0.3	96 \pm 0.3	44 \pm 0.3
Salinity (mg of NaCl)	1.172 \pm 0.003	1.758 \pm 0.003	2.344 \pm 0.003

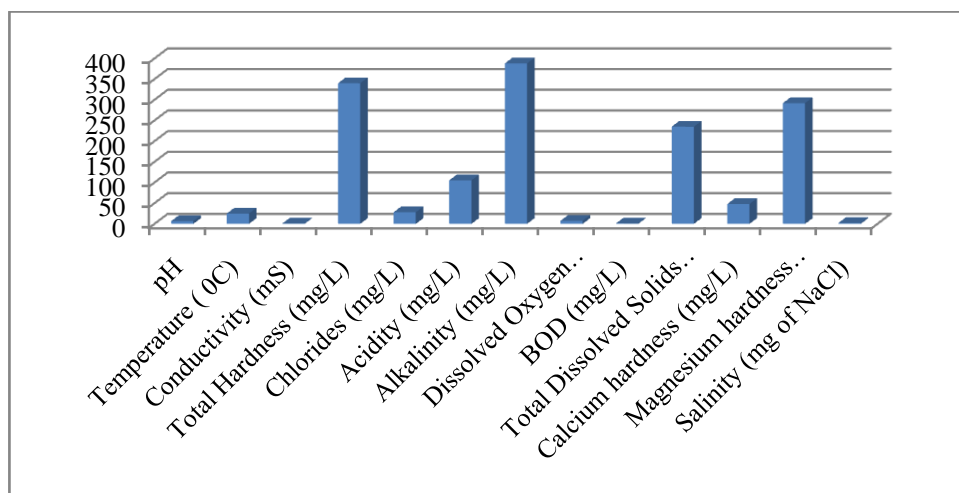
Table-1:- Values of different parameters of water sample of different drinking sources in Vihour village area. (Mean and Standard deviation is calculated)



a. Graph showing concentration range of various parameters of Tap water.



b. Graph showing concentration range of various parameters of bore well water.



c. Graph showing concentration range of various parameters of well water.

1. Temperature:

Temperature is the most importance environment factor with effect on plants and animals. Water has several unique thermal properties which combine to minimize temperature change. The Water temperature depends on the depth of the water column, climatic and topographic changes [19].

A rise in temperature of water leads to the speeding up of chemical reactions in water, reduces the solubility of gases and amplifies the tastes and odour. At higher temperature with less dissolved gases the water becomes tasteless and even does not quench the thirst and decreases the solubility of oxygen.

Temperature also determines various other factors such as pH, Conductivity, saturation level of gases and various forms of alkalinity. The temperature of Tap water is 24.3 ± 0.3 °C, bore well water temperature is 22.8 ± 0.3 °C and temperature of well water is found to be 24.7 ± 0.3 °C.

2. pH:

pH, one of the most common analyses in soil and water testing, is the standard measure of how acidic or alkaline a solution is. pH has no direct adverse effect on health. pH governs the distribution, transport and fate of heavy metals in aquatic ecosystem. It is measured a scale from 0 - 14. pH of 7 is neutral, pH is less than 7 is acidic and pH greater than 7 is basic. Aquatic organisms need the pH of their water body to be a certain range optimal growth and survival.

The pH of Tap water is 7.72 ± 0.02 , bore well water pH is 6.50 ± 0.02 and pH of well water is found to be 7.35 ± 0.02 . Amongst these three samples, bore well water is comparatively acidic in nature.

3. Electrical Conductance:

Conductivity is the measure of a substance or solution to conduct electric current. Presence of salts and contamination with wastewater increases conductivity of water. It is a indication of pollution. Electrical conductivity used to quickly estimate the ionic or soluble salt concentration in soils, water supplies, fertilizer solution and chemical solution. It is highly depended upon temperature.

Conductivity however is an important criterion in determining the suitability of water for irrigation. The conductance of Tap water is 0.173 ± 0.002 mS, bore well water conductance is 0.480 ± 0.002 mS and conductance of well water is found to be 0.222 ± 0.002 mS. Amongst these three samples, bore well water is comparatively high electrical conductance. The observed values of electrical conductance for others are quite low and less electrolyte.

4. Total Hardness:

Total hardness is defined as the sum of calcium and magnesium hardness in mg/L as CaCO_3 . Total hardness of water an important factor that indicates toxic effect and poisonous elements [20].

There is no adverse effect of hardness on health. Hard water is also not suitable for domestic and irrigation purposes. Total hardness of Tap water is 84 ± 1.0 mg/L, bore well water is 212 ± 1.0 mg/L and the well water is 116 ± 1.0 mg/L.

The degree of hardness of drinking water has been classified in terms of the equivalent CaCO_3 concentration as follows: Soft - 0-60mg/L, Medium - 60-120 mg/L, Hard - 120-180 mg/L, Very hard - >180 mg/L. The observed values were quiet less than the acceptable limit of 300 mg/L for tap water sample, bore well water and well water sample.

5. Chlorides:

Chloride is mainly obtained from the dissolution of salts of hydrochloric acid as table salt (NaCl), NaCO_2 and added through industrial waste, sewage, sea water etc. Surface water bodies often have low concentration of chlorides as compare to ground water. It has key importance for metabolism activity in human body and other main physiological processes. High chloride concentration damage metallic pipes and structure as well as harms growing plants. According to WHO standards concentration of chloride should not exceed 250 mg/L.

The chloride content of the tap water sample is 15.05 ± 0.02 mg/L, bore well water is 43.15 ± 0.18 mg/L and Chlorides in well water sample is 26.13 ± 0.05 mg/L.

6. Acidity:

Acidity of water is its capacity to neutralize a strong base and is mostly due to the presence of strong mineral acids, weak acids and the salt of strong acids and weak bases. Addition of wastewater having acidity producing substances increases the acidity of water. The observed acidity of tap water sample is 42.6 ± 0.015 mg/L of CaCO_3 , bore well water sample is 75.0 ± 0.3 mg/L. of CaCO_3 . While acidity of well water samples is 45.3 ± 0.3 mg/L of CaCO_3 . The value is much less than threshold value i. e. 200 mg/L of CaCO_3 . This indicates that sample of water are in safe range.

7. Alkalinity:

Alkalinity is a chemical measurement of water's ability to neutralize acid. Alkalinity is also a measure of water buffering capacity or its ability to resist changes in pH upon the addition of acids or bases. Alkalinity of natural water is due to primarily to the presence of weak acid salts, although strong bases may also contribute (i.e. OH^-) in the extreme environment. Bicarbonate represents the major form of alkalinity in natural water, so its source being the partitioning of CO_2 from the atmosphere and the weathering of carbonate minerals in rocks and soil. Other salts of weak acids, such as borate, silicates, ammonia, phosphate, and organic bases from natural organic matter may be present in small amounts.

The observed alkalinity of tap water sample is 90 ± 0.3 mg/L of CaCO_3 , bore well water sample is 198 ± 0.3 mg/L. of CaCO_3 while alkalinity of well water sample is 126 ± 0.3 mg/L of CaCO_3 . The observed values of alkalinity of tap water, bore well water and well water samples are within permissible range i. e. below 200 mg/L of CaCO_3 .

8. Dissolved Oxygen:

The amount of oxygen dissolved in water, such as a lake, river or stream. Dissolved oxygen is the most important indicator of the health of water bodies and its capacity to support a balanced aquatic ecosystem of plants and animals. Warm water released from industrial outlets, flowages or storm sewers can also reduce dissolved oxygen levels. Dissolved oxygen may play a large role in the survival of aquatic life in temperature lakes and reservoirs during summer months. Dissolved oxygen of tap water sample collected is 7.126 ± 0.015 mg/L, bore well water sample is 6.896 ± 0.015 mg/L, whereas well water sample is 7.266 ± 0.015 mg/L. It may be due to high temperature and inorganic reluctance such as hydrogen sulfide, ammonia, nitrites, ferrous ions and other oxidizable substances also tend to decrease dissolved oxygen in water.

9. Biochemical Oxygen Demand (BOD):

Biochemical oxygen measures the amount of oxygen that microorganisms consume while decomposing organic matter, it also measures the chemical oxidation of inorganic matter. BOD is a measure of organic material contamination in water, specified in mg/L. BOD is the amount of dissolved oxygen required for the biochemical decomposition of organic compounds and the oxidation of certain inorganic materials (e.g., iron, sulphites).

The observed value of BOD for tap water is 1.231 ± 0.03 mg/L, for bore well water is 0.993 ± 0.03 mg/L and for well water sample is 1.127 ± 0.03 mg/L which is within the permissible range i. e. 0.75-1.5 mg/L.

10. Total Dissolved Solids (TDS):

Total dissolved solids are the total amount of mobile charged ions, including minerals, salts or metal dissolved in a given volume of water in mg/L. TDS is directly related to the purity of water and the quality of water purification system and affects everything that consumes, lives in, or uses water, whether organic or inorganic, whether for better or for worse. Common inorganic salts that can be found in water include calcium, magnesium, potassium and sodium, which are cations and carbonates, nitrates, bicarbonates, chlorides and sulphates which are anions. They give a particular taste to water at higher concentration and also reduce its palatability.

The total solid present in tap water sample collected is 111 ± 1.0 mg/L, for bore well water is 128 ± 1.0 mg/L, while that of for well water sample is 215 ± 1.0 mg/L which is lower than threshold value of total solid content i.e. 500 mg/L.

11. Calcium hardness:

Calcium is naturally present in water. Calcium is a determinant of water hardness, because it can be found in water as Ca^{2+} ions. As per Indian Standards the calcium content of water should not be more than 75 mg/L. This has been specified in the IS 10500:- Drinking Water –Specifications.

In the study the calcium content in water sample has been found to be for tap water sample is 48 ± 0.3 mg/L, for bore well water is 116 ± 0.3 mg/L and for well water is 72 ± 0.3 mg/L. Tap water and well water possess values calcium hardness which is within the limit as per Specification. The observed values for bore well water samples are crosses the permissible range of concentration of calcium.

12. Magnesium hardness:

Magnesium is naturally present in water. Magnesium is a determinant of water hardness, because it can be found in water as Mg^{2+} ions. As per ISI the magnesium content of water should not be more than 50 mg/L.

In the study the magnesium content in water sample has been found to be for tap water sample is 36 ± 0.3 mg/L, for bore well water is 96 ± 0.3 mg/L and for well water is 44 ± 0.3 mg/L. Tap water and well water possess value of magnesium hardness which is within the limit as per Specification. The observed value for bore well water shows higher concentration of magnesium.

13. Salinity:-

Salinity which is defined as the total concentration of electrically charged ions in the water. These ions are the four major cations-calcium, magnesium, potassium and sodium, and the four common anions carbonates (CO_3), sulphates (SO_4), chlorides (Cl) and bicarbonates (HCO). Other components of salinity are charged nitrogenous compounds such as nitrates (NO_3), ammonium ions (NH_4) and phosphates (PO_4) [21]. In general the salinity of surface waters depends on the drainage area, the nature of its rock, precipitation, human activity in the area and its proximity to marine water [22]. Waters with salinity below 1% are fresh and waters with salinity higher than 1% are brackish/marine [23].

The observed value of salinity for tap water sample is 1.172 ± 0.003 mg of NaCl, for bore well water sample is 1.758 ± 0.003 mg of NaCl and for well water sample is 2.344 ± 0.003 mg of NaCl.

CONCLUSION:

The present paper deals with analysis of water quality in different drinking water resources available in Vihour village region which was carried out by taking certain important parameters like Temperature, pH, Electrical conductivity, TDS, Alkalinity, Chloride, DO, BOD, Total hardness, Calcium hardness, Magnesium hardness and Salinity. The data of physico-chemical and biological parameters clearly shows that the drinking water of Vihour village region is within the permissible range as per APHA (1989), (1992), Trivedi and Goel (1986) except few limitations in one or two parameters. Such water is suitable for drinking purpose and can be used for domestic as well as irrigation purpose.

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WIRELESS CHARGING OF MOBILEPHONE USING MICROWAVE

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Abstract

Now a days a mobile phones becoming a basic part of our life .this is one of the most important medium for the communication, the mobile phone batteries has always been problem for recharging. Mobile have to be put to recharge after the batteries has drained out. In this paper the main purpose is shown to make the recharging of mobile phones anywhere you want without charger this is done only when there is a use of microwave, themicrowave signal transmitted from transmitter using a special kind of antennas called slotted wave guide antennas at a frequency 2.45GHZ. We have to add a sensor, rectenna circuit in our mobile phone to do this job successfully. This is one of the best technologies and for this purpose we are proposing wireless charging of mobile phones by using microwaves.

INTRODUCTION

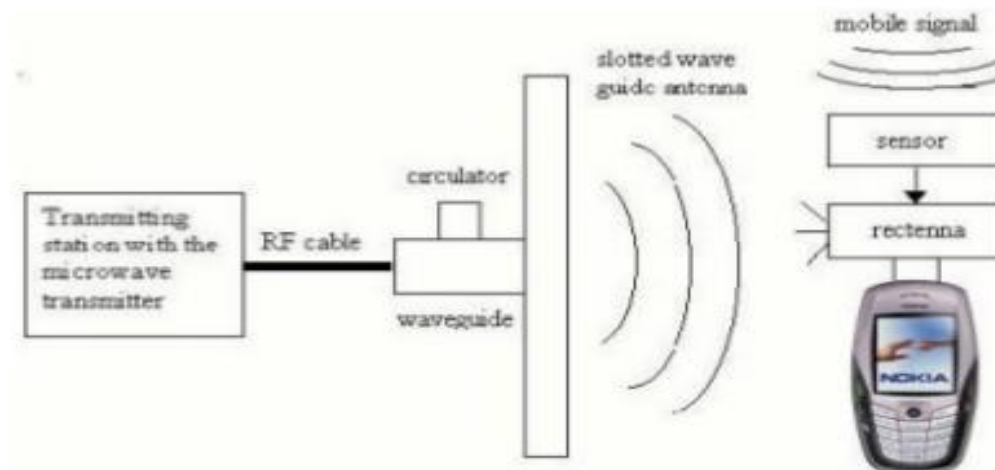
The two main concepts which are base of this technique are

1.Electromagnetic Spectrum:

Electromagnetic spectrum is a range of all possible frequencies of electromagnetic radiation. When white light is shown through a prism it is separated out into all colors this is called a vibal spectrum light. Consist of a very smallparticles are called as photons is a bundle of energy.

light is travelling at the speed of 3,00,000 km/hr.as light hit something that means it may be bounce off, and it comesinto our eyes and we can see object.

GENERAL BLOCK DIAGRAM



Microwave region

Microwave are the radio wave which has the wave length range of 1 mm to 1 meter and the frequency is 3000 MHZto300 GHZ. Microwaves have wavelength that can be measured in centimeters microwaves are good fortransmitting information from one place to another place because microwave

energy can penetrate haze, light rain and snow, clouds and smoke. Microwave radiation is still associated with energy level that is usually considered harmless except for people with pace makers.

Microwave region of the Electromagnetic Spectrum

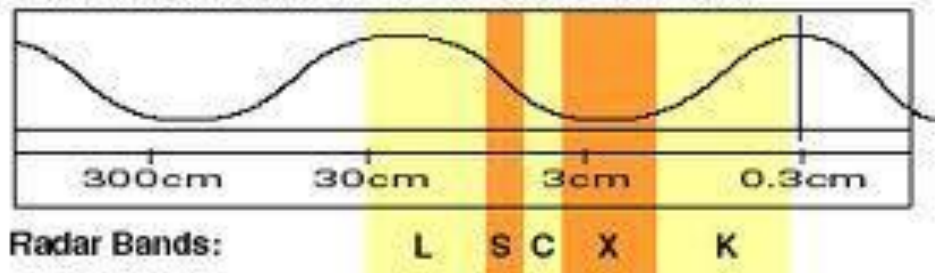


Fig. microwave region of electromagnetic spectrum

DESIGN :

The system design of wireless charging of mobile phones using microwave consist of four parts are follows

Transmitter Design

Typically a transmitter design includes generation of a carrier signal, which is normally sinusoidal, optionally one or more frequency multiplication stages, a modulator, a power amplifier, and a filter and matching network to connect to an antenna. A very simple transmitter might contain only a continuously running oscillator coupled to some antenna system. More elaborate transmitters allow better control over the modulation of the emitted signal and improve the stability of the transmitted frequency. For example the Master Oscillator-Power Amplifier (MOPA) configuration inserts an amplifier stage between the oscillator and the antenna. This prevents changes in the loading presented by the antenna from altering the frequency of the oscillator.

Receiver Design

We have to add a sensor and a Rectifier at the receiver side. The rectifier actually convert the Microwave into the DC power. Its elements are usually arranged in a mesh pattern. A simple rectenna is constructed by using a Schottky diode. Rectenna are very powerful to convert the Microwave into the electricity. Actually the size of rectenna can be reduced using the Nano technology. Another important part is the Sensor. As we know we are going to charge the phone while a person is talking. So here sensor is used to detect whether the phone is using microwaves or not.

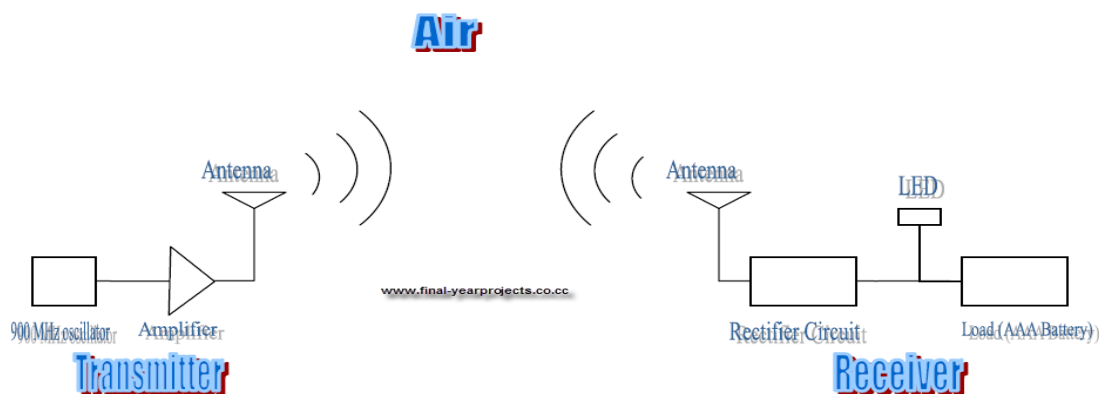


FIG: transmitter design and receiver design

THE PROCESS RECTIFICATION

Microwave energy transmitted from space to earth apparently have the potential to provide clean electrical power on a very large scale the aim of the study to make a low cost power rectifier for low & high power levels at frequency of 2.45GHz. the Schottky Diode microwave rectifying circuit has the efficiency is greater than 90%. Microwave can travel through the media but it also lose some energy.

So our key objective is to rectify the circuit our objective is to rectify the waves at the low cost. And also we have to make the detection more sensitive.

As we know that bridge rectification is more efficient than the single diode. And we use the shotky diode to get the better impedance.

COMPONENTS OF WIRELESS POWER TRANSMISSION SYSTEM

Microwave generator

The microwave generator is the one which generates the microwave of preferred frequency. It generates the microwave by the interaction of stream of electrons and magnetic field.

Transmitting Antenna

There are many types of slotted wave guide antenna available. An electrical current passes through the antenna, inducing a magnetic field, which oscillates at the given frequency. The variations in the current create slight variations in the radio frequency. These radio waves radiate outward from the antenna in a "beam" according to the antenna's design.

Rectenna

A rectenna is a rectifying antenna, a special type of antenna that is used to convert microwave energy into direct current electricity. They are used in wireless power transmission system that transmits power by radio waves. In recent years interest has turned to using rectennas as power sources for small wireless microelectronic devices.

ADVANTAGES

Wireless methods are always advantageous than cumbersome, untidy wiry networks.

1. You can have a lot of options if the facility of wireless charging of mobile phones is somehow implemented.
2. Charge the phone by Bluetooth so low risk of electrical shock or shorting.
3. The need of different type of chargers by different manufacturers is totally eliminated.

DISADVANTAGES

The transmitter and receiver also should be very powerful devices as the distance increases the charging is very slower.

1. Wireless transmission of the energy cause some drastic effects to human body ,because of its radiation.
2. It is more costly practical possibilities are not yet applicable in this field.

CONCLUSION

This paper successfully show a novel method of using the power of the microwave to charge the mobile phones without the use of wired chargers. A novel use of the rectenna and a sensor in a mobile phone could provide a new dimension in the revelation of mobile phone.

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CLOUD COMPUTING AND BIG DATA: INNOVATION OPPORTUNITIES AND CHALLENGES

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Abstract:

Cloud computing -- a consumer/delivery model where information technology (IT) capabilities are offered as services billed based on usage -- has brought big data analysis to the masses by giving businesses access to vast amounts of computing resources on demand. As the technology continues to advance, the question for many businesses is how they can benefit from big data and how to use cloud computing to make it happen. Big Data has emerged in the past few years as a new paradigm providing abundant data and opportunities to improve and/or enable research and decision-support applications with unprecedented value for digital earth applications including business, sciences and engineering. Big Data presents challenges for digital earth to store, transport, process, mine and serve the data

Keywords: big data, cloud computing, big data issues.

Introduction-

Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. The cloud model promotes availability and is composed of five essential characteristics: on-demand self-service, broad network access, resource pooling, rapid elasticity and measured service; three service models: Cloud Software as a Service (SaaS), Cloud Platform as a Service (PaaS) and Cloud Infrastructure as a Service (IaaS); and four deployment models: private cloud, community cloud, public cloud and hybrid cloud). The cloud computing model offers the promise of massive cost savings combined with increased IT agility. In addition, cloud computing democratizes big data – any enterprise can now work with unstructured data at a huge scale.

It was the emergence of cloud computing which made it easier to provide the best of technology in the most cost-effective packages. Cloud computing not only reduced costs, but also made a wide array of applications available to the smaller companies.

Big Data refers to the flood of digital data from many digital earth sources, including sensors, digitizers, scanners, numerical modeling, mobile phones, Internet, videos, e-mails and social networks. The data types include texts, geometries, images, videos, sounds and combinations of each. Such data can be directly or indirectly related to geospatial information. The evolution of technologies and human understanding of the data have shifted data handling from the more traditional static mode to an accelerating data arena characterized by volume, velocity, variety, veracity and value. The first V refers to the volume of data which is growing explosively and extends beyond our capability of handling large data sets; volume is the most common descriptor of Big Data

Cloud Computing and Big Data

Cloud computing provides fundamental support to address the challenges with shared computing resources including computing, storage, networking and analytical software; the application of these resources has fostered impressive Big Data advancements.

Just as the cloud is growing steadily, we are also noticing an explosion of information across the web. Social media is a completely different world, where both marketers and common users generate loads of data every day. Organizations and institutions are also creating data on a daily basis, which can eventually become difficult to manage. Take a look at these [statistics](#) on Big Data generation in the last five years;

- 2.5 quintillion bytes (2.3 Trillion Gigabytes) of data are created every day.

- *40 zettabytes (43 Trillion Gigabytes) of data will be created by 2020.*
- *Most companies in the US have at least 100 Terabytes (100,000 Gigabytes) of stored data.*

These high volumes of data present a challenge to the cloud environment. How to manage and secure the essence of this data rather than just stacking it?

It seems like cloud computing and big data are an ideal combination for this. Together, they provide a solution which is both scalable and accommodating for big data and business analytics. The analytics advantage is going to be a huge benefit in today's world. Imagine all the information resources which will become easily accessible. Every field of life can benefit from this information.

ADVANTAGES:

Agility:

The traditional infrastructure of storing and managing data is now proving to be slower and harder to manage. It can literally take weeks to just install and run a server. Cloud computing is here now, and it can provide your company with all the resources you need. A cloud database can enable your company to have thousands of virtual servers and get them working seamlessly in only a matter of minutes.

Affordability:

Cloud computing is a blessing in disguise for a company that wishes to have updated technology under a budget. Companies can pick what they want and pay for it as they go. The resources required to manage Big Data are easily available and they don't cost big bucks. Before the cloud, companies used to invest huge sums of money in setting up IT departments and then paid more money to keep that hardware updated. Now the companies can host their Big Data on off-site servers or pay only for storage space and power they use every hour.

Data processing:

The explosion of data leads to the issue of processing it. Social media alone generates a load of unstructured, chaotic data like tweets, posts, photos, videos and blogs which can't be processed under a single category. With Big Data Analytics platforms like Apache Hadoop, structured and unstructured data can be processed. Cloud computing makes the whole process easier and accessible to small, medium and larger enterprises.

Feasibility:

While traditional solutions would require the addition of more physical servers to the cluster in order to increase processing power and storage space, the virtual nature of the cloud allows for seemingly unlimited resources on demand. With the cloud, enterprises can scale up or down to the desired level of processing power and storage space easily and quickly.

Big Data analytics require new processing requirements for large data sets. The demand for processing this data can raise or fall at any time of the year, and cloud environment is the perfect platform to fulfill this task. There is no need for additional infrastructure, since cloud can provide most solutions in SaaS models.

Challenges to Big Data in the Cloud environment:

Just as Big Data has provided organizations with terabytes of data, it has also presented an issue of managing this data under a traditional framework. How to analyze the large sum of data to take out only the most useful bits? Analyzing these large volumes of data often becomes a difficult task as well.

In the high speed connectivity era, moving large sets of data and providing the details needed to access it, is also a problem. These large sets of data often carry sensitive information like credit/debit card numbers, addresses and other details, raising data security concerns.

Security issues in the cloud are a major concern for businesses and cloud providers today. It seems like the attackers are relentless, and they keep inventing new ways to find entry points in a system. Other issues include ransomware, which deeply affects a company's reputation and resources, Denial of Service attacks, Phishing attacks and Cloud Abuse.

Globally, 40% of businesses experienced a ransomware incident during the past year. Both clients and cloud providers have their own share of risks involved when making an agreement on cloud solutions. Insecure interfaces and weak APIs can give away valuable information to hackers, and these hackers can misuse this information for the wrong reasons.

Some cloud models are still in the deployment stage and basic DBMS is not only tailored for Cloud computing. Data Acts is also a serious issue which requires data centers to be closer to a user than a provider.

Data replication must be done in a way which leaves zero room for error; otherwise it can affect the analysis stage. It is crucial to make the searching, sharing, storage, transfer, analysis, and visualization of this data as smoothly as possible.

The only way to deal with these challenges is to implement next-generation technology which can predict an issue before it causes more damage. Fraud detection patterns, encryptions and smart solutions are immensely important to combat attackers. At the same time, it is your responsibility to own your data and keep it protected at your end while looking for business intelligent solutions that can ensure a steady ROI as well.

Research challenges

As we know that cloud and big data technologies work very well together. Even though the partnership between these two technologies have been established, both still pose some challenges.

Concerning the existing problems, we define some of the possible advances in the next few years:

- Security and Privacy can be resolved using data encryption. However, a new generation of systems must ensure that data is accessed quickly and that encryption does not affect processing times so badly;
- Big Data variety can be addressed by using data standardization. This, we believe, is the next step to minimize the impact of heterogeneity;
- Data governance and data recovery plans are difficult to manage and implement, but as Big Data become a de facto technology, companies are starting to understand the need of such plans.;
- New and secure QoS (quality of service) based data uploading mechanisms may be the answer to ease data uploading onto the cloud;
- Scalability and elasticity techniques exist and are broadly used by several Big Data vendors such as Amazon and Microsoft. The major concern relies upon developing fully automatic reactive and proactive systems that are capable of dealing with load requirements automatically.

CONCLUSIONS :

With data increasing on a daily base, big data systems and in particular, analytic tools, have become a major force of innovation that provides a way to store, process and get information over petabyte datasets. Cloud environments strongly leverage big data solutions by providing fault-tolerant, scalable and available environments to big data systems.

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MIND READING COMPUTER

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ABSTRACT

Mind reading is a way to detect or infer the other's mental states. The simplest way for mind reading can be done by simply seeing and understanding the facial expression. For example a smile can give us an expression of happiness. But now it may be possible that not only one human can understand other's mental states but also a computer might understand the mental states of a person. The goal in building mind reading machines is to enable computer technologies to understand and react to people's emotions and mental states. This paper describes the ways how a computer might infer the mental state of a person and thus becomes the mind reading computer. This paper emphasize on the ways by which a computer might infer the mental state, one method is by facial expression analysis (FEA) and the second one by using a futuristic headband. The mental states expressed on the face are combined with facial expressions and head movements. One of the software of mind reading identifies twenty-four features of the face and along with them, it tracks the facial expressions with the real world time. To identify the smile and raised eyebrow gestures, the movement, shape, and color are analyzed. The combination of a movement and a gesture like a smile helps in knowing the mental states.

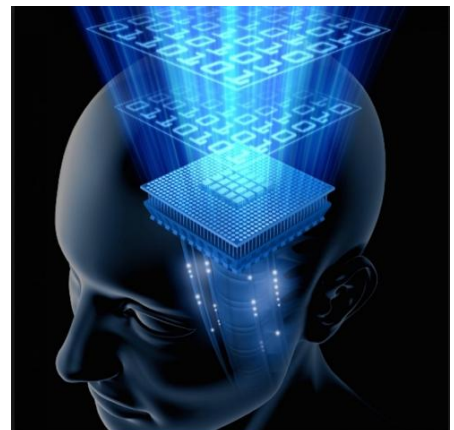
INTRODUCTION

Mind reading computer may be defined as a machine that infers the human being's mental states. The understanding of a human's thoughts is one of the most complex tasks. No one knows what a person would do in the upcoming second by executing his present thoughts or what would a person thought about any other person or what would a person desires and many more. But a mind reading computer could give answer to all these questions. Mind reading computer infers the thoughts of a human being based on various technologies for example by scanning the facial expressions along with head gestures and by identifying the volume and oxygen level inside the blood which is flowing in the vicinity of the brain. The ability of mind reading by a computer can provides us many applications in the field of medical, crime and one's life also. People employ a variety of nonverbal communication cues to infer underlying mental states, including voice, posture and the face. The human face in particular provides one of the most powerful, versatile and natural means of communicating a wide array of mental states. One subset comprises cognitive mental states such as thinking, deciding and confused, which involve both an affective and intellectual component.

MIND READING & NECESSITY OF MIND READING:

Mind reading may be defined as the inferring of the human thoughts, emotions and desires etc. First simplest step of mind reading is by simply understanding the facial expression given by the person as people express their mental states mostly through facial expressions and gestures. No matter whether they are interacting or not. Our mental states shape the decisions that we make, make us react the way we react in a particular situation and thus affect our performance.

All over our thoughts are the causes of all the things that are happening. Imagine what happened if we have a computer that can reads mind and after predicting the mental states , if there is any wrong intention possess by any person we can prevent it. And what happened if a wrong intention can be changed into good one by a computer. A computer that can reads and moulds the emotions into the



required one, especially in case of a criminal; here no need for a stringent punishment rather a computer is required that can change the mind and hence make the better world than it is now. However, this technology by computer, to change the mind according to a desire is not established now. But in future it might be developed some day. So for all this mind reading computer is just the basic step. Also consider a situation where we are surrounded with mobile phones, online services and cars and the all these systems can read our minds and react accordingly. It makes life so easy as by just thinking we can order our system to work accordingly. Moreover it becomes a boom for a physically handicapped person because he will able to drive a car, access online services and mobile phones just by thinking. All we can do is to give a mind reading machine that will be able to read mind by scanning the facial expression.

Why Mind Reading?

The mind-reading computer system presents data or information about the mental state of the people easily just like the keyboard or mouse presents the data or information on the given instructions. Just imagine a future and we are surrounded by all the devices, vehicles and the internet services, people will know our mood and react to us depending on our mood. This helps the car manufacturing technology because in these days car producers are working to make a car that can analyze the mental state of a driver that whether the driver is angry, drowsy or distracted and much more. In this project, further improvements are going on and these will help to know the mental state of the person depending upon the body postures and gestures. The projects are going on to support the avail of mind reading even in the online shopping.

How does it work?

In the working of mind reading, the technology called functional near-infrared spectroscopy (fNIRS) is used and this measure the amount of oxygen level and blood around the brain of the person i.e. subject. Also by wearing a headband and it transmits the light into the tissues of the head, the light is absorbed by the blood-filled tissues and active tissues. The results of the above are compared by using an MRI, after wearing the functional near-infrared spectroscopy sensors the subject will be asked to count the squares to do other work or task. After this, the subject will be asked to tell the complexity of the task and this rating will be compared with the results of the functional near infrared spectroscopy system.

Futuristic head:

The mind reading actually involves measuring the volume and oxygen level of the blood around the subject's brain, using technology called functional near-infrared spectroscopy (fNIRS). The user wears a sort of futuristic headband1 (see fig 1) that sends light in that spectrum into the tissues of the head where it is absorbed by active, blood-filled tissues. The headband then measures how much light was not absorbed, letting the computer gauge the metabolic demands that the brain is making.



Figure 1: Block diagram of the automated mind reading system

Brain Chip:

It is an independent processor linked to the neurocomputer built to house an artificial intelligence. The artificial intelligence program has access to the sensory data and information in the neurocomputer, and can “read” surface thoughts of the owner. Having a (or several) as advisor/secretary/partner is becoming more and more common, although most people rely on an external artificial intelligence system and a wireless neural connection. It is not uncommon for users to get a motoric shunt to give the artificial intelligence the ability to control the body. Chips with monitoring artificial intelligence are sometimes used for or behavior correction in Landfall.

Scientists successfully implants chips that control Brain allowing thoughts, memory and behavior to be transferred from one brain to another brain. In a scene right out of a George Orwell novel, a team of scientists working in the fields of “neural engineering” and “Biomimetic MicroElectronic Systems” have successfully created a chip that controls the brain and can be used as a storage device for long-term memories. In studies the scientists have been able to record, download and transfer memories into other hosts with the same chip implanted. The advancement in technology brings the world one step closer to a global police state and the reality of absolute mind control.

**Eye Language Interpreter:**

We pursue Baron-Cohen’s research on a Language of the Eyes to develop an automated eye language interpreter International Journal of Computer Applications Technology and Research Volume that recognizes eye expressions off image sequences and interprets them as mental states. We are interested in being able to recognize a limited set of complex mental states that go beyond the 6 basic emotions. We use the Facial Action Coding System (FACS) developed by Ekman & Friesen to identify expressions of the eye.

Advantages of mind reading computer :

The use of mind reading has many advantages and some of it is as follows:

- It can be implemented on the wheelchair and the wheelchair can be moved through the mind control. It permits the people who cannot use the normal wheelchairs and other wheelchairs easily due to their disability.
- This will aid the spacewalking astronauts and physically disabled persons.
- This type of system can send instructions to the rover on the other planets and also aid injured astronauts to control devices.
- This can be availed to exchange information on sly, people can avail them on crowded buses without the problem of being overheard.

Disadvantages of Mind Reading:

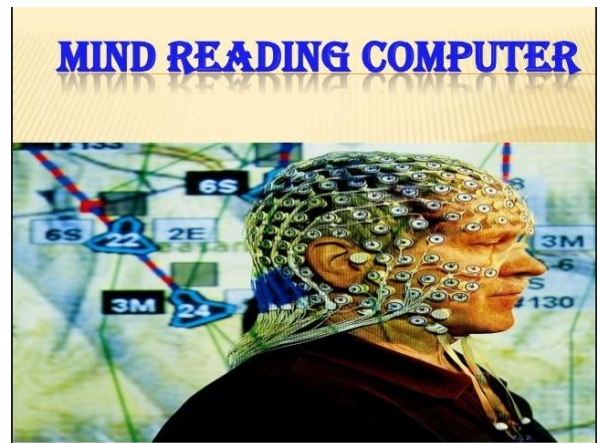
- Before implementing the systems the scientist needs to train the systems about all the patterns to predict the result.
- Because of this scientific development, the scholars are questioning on the theories of criminal justice of the system.

Mind-reading program translates brain activity into words:

Algorithms translated the brain activity associated with hearing 'Waldo', 'structure', 'doubt' and 'property' into recognizable words. Scientists have picked up fragments of people's thoughts by decoding the brain activity caused by words that they hear. The remarkable feat has given researchers fresh insight into how the brain processes language, and raises the tantalizing prospect of devices that can return speech to the speechless. Though in its infancy, the work paves the way for brain implants that could monitor a person's thoughts and speak words and sentences as they imagine them. Such devices could transform the lives of thousands of people who lose the ability to speak as a result of a stroke or other medical conditions.

Mind reader computer can communicate with the patients in coma:

Computer which can read mind and could be helpful to communicate with the people who are in coma. This can be called a Computer Mind reader[14]. A team of researchers from the University of Western Ontario were using the neuroimaging technique to read human thoughts brain activity while giving the specific answer in Yes or No. In their study they asked very simple questions to the participants and told to concentrate only on the response either Yes or No. They were asked questions like “Are you married?”, “Do you like ice cream?” and answers the question which were asked in scanner by only concentrating upon the word they want to speak. By analyzing the activity of their brain they were able to decode the answers perfectly for every single person and for this time window is attached for communication with the brain computer interfaces answers in between 3 min of scanning. This technique is used to talk with the patients who are not able to response because of unconscious state of their mind.

**Mind reading computer can be used for police and military purpose:**

A science fiction fantasy – the “Thought Police” – where the government reads people’s memories and thoughts and then rehabilitate them through torture before they ever even commit a crime based on a statistical computer analysis showing people with certain types of thoughts are likely to commit a certain type of crime in the future. We already pre-emptively invade nations and torture alleged terrorist suspects with absolutely no due process of law, so the idea of pre-emptively torturing a terrorist suspect before hand to prevent them from committing an act of terrorism in the future really isn’t that far fetched of an idea.

Who developed mind reading computer :

It might seem the stuff of science fiction, but a **mind-reading** device is being **developed** by scientists which can eavesdrop on your inner-voice. Researchers at the University of California, Berkeley, have **developed** a machine and **computer** programme which converts **brain** activity into sounds and words.

CONCLUSION:

This paper describe mind reading computer that infers mental states from facial expressions along with head gestures in real time video. The mental state is recognized by comparing the present real time video with the preinstalled videos which contain different expressions for different mental state. This technology is helpful to people who has been abnormal condition of there mental state .who lost there past due to some accidental cases ,this mind reading technology is overcome there problem in some manner. Mind reading computer understand emotion of peoples from there expression and mental states . The technology, which monitors brain activity, could help people analyse complex information and make critical decisions.

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MOBILE NETWORKING IN THE INTERNET

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1. Introduction

This issue of Mobile Networking and Applications presents research papers probing the effects of mobility on the Internet. In fact, there are so many different aspects to Internet mobility that no single journal issue or book could possibly describe all of them. Thus, we will have to be content with presenting a representative selection of articles that, in their diversity, give a good hint at the larger picture. At the same time, these articles provide new directions and lead the way towards solving the interesting and new problems raised by mobility.

It is the purpose of this introductory article to briefly mention a larger cross-section of the fresh ideas and proposals for solutions of the problems raised by mobile networking, than could be represented by articles for publication in this journal issue. Thus, this paper will touch on current topics in many areas of networking. From cryptography to routing, from billing to expanded techniques for automatic configuration, mobility changes the way we think about computing, and invalidates some of the design assumptions upon which current network protocols and products have been built.

This article intends to provide an overview of the variety of network protocols and associated technologies at all levels that must be considered when providing solutions for mobile computer users.

2. Overview

In this paper, we organize the description of mobile networking generally according to a classical layered model of network functions. Each layer, from physical to application, is affected in various ways in the new operating environments encountered by mobile computer users. Although the reduced size and weight of mobile computers has some effect on their system architecture, these effects are not dominant because of the terrific advances in system miniaturization, display technologies, and communications. There are many mobile computers envisioned that will not have hard disks, and many without keyboards, but these more restricted devices are not principal drivers for the mobile networking techniques explored in this special issue, or within this paper. Conversely, many of the techniques and protocols developed for more general purpose mobile computers can be adapted as needed for the special or restricted case.

The variation in the capabilities of the communication devices is one of the main differentiators between mobile computers.

As mobile computers become smaller and cheaper, it becomes more feasible to use them as commodity devices without any personality, much as one might treat a pad of paper. In this scenario, it becomes important to temporarily allow the notepad computer to operate on behalf of the user, and to have all the authorization proper for that user. This can be easily done by allowing the mobile computer to acquire authorization rights and capabilities from information encoded on a smart card owned by the user. It's easier and more convenient to carry around a smart card in one's wallet or purse, as long as a suitable computer is available when needed that can acquire the rights and privileges of the cardholder.

3. Physical layer considerations

At the physical layer, the main objective is to detect the signals between the two endpoints of a communications link. Many different media and channel coding schemes have been proposed, for instance:

Analog cellular telephone;

TDMA(Time division multiple Access);
 CDMA(Code Division Multiple Access);
 Short range radio.

There are a number of variations for each of the above channel types.

For the purposes of higher-level protocols, each channel encoding scheme can just as well be considered as a new physical medium.

The new wireless media becoming available are among the primary drivers for the interest in mobile computing. Thus, it is appropriate to understand the nature of wire-less communications, and the contrast between wireless and wired media.

✚ For wired media, there is typically:

Well defined broadcast range; Low bit error rate;
 High bandwidth;
 Symmetric connectivity.

✚ For wireless media, there is typically:

Point-to-point communication only, poorly controllable boundaries for broadcast range;
 Variable (time and distance dependent) bit error rate; Low to medium bandwidth;
 Possibly asymmetric connectivity.

These characteristics make protocol design for wireless communications systems challenging. For instance, one result of the way wireless broadcast works (when it is available at all) is that eavesdropping is more difficult to detect and prevent.

4. Link layer considerations

A great deal of attention has been paid to methods for establishing links between mobile computers and base stations or access points. One typical method is the creation of telephone links; the popularity of this method rests largely on the widespread availability of the physical media which can be used. Cellular telephones using various technologies can provide good coverage within the United States, parts of Asia, and Europe, although no single technology so far provides sufficient breadth of coverage.

The following operations are among those sometimes included at the link layer:

- Handoffs;
- Security
- Compression;
- Encryption;
- Elimination of the hidden terminal problem;
- Retransmission of garbled data

4.1. Handoffs

Central to the concept of seamless mobility is the process of establishing links at each new connection point. When-ever this process requires the transfer of state information from the old connection point (e.g., base station) to the new one, a handoff has to occur. There are numerous methods for performing handoffs, as numerous as the kinds of state information that has been designed for mobile nodes, as well as the kinds of network entities that maintain the state information. Often, authentication has to be performed to ascertain the identity of the mobile node.

4.2. Compression

Compression is often desirable because it reduces band-width requirements, and that can be very important for many low-speed wireless media. However, use of compression at the link layer is problematic in some circumstances, because the best compression is almost always achievable at higher level protocol levels, especially the application layer.

4.3. Security

A number of encrypting link layer devices and products have been introduced, especially for use in military applications. Link-layer security introduces further requirements for control of features by applications for reasons entirely different than were important for controlling the use of compression. Among the link layer parameters that may need to be specified or controlled are:

Whether security features are to be used at all; the key to be used for encryption;

The encryption algorithm (and mode);

Whether the data must be encrypted for privacy, or merely authenticated.

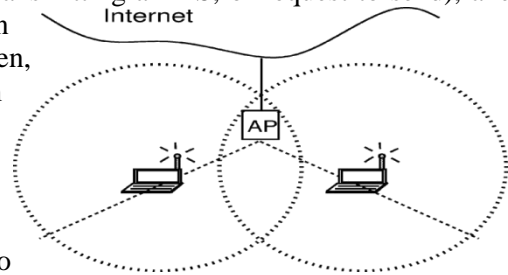
The use of security features at the link layer has the effect of requiring additional processing, which uses more power and which can significantly degrade transmission speed on high-speed wireless links. Even when the transmitter can handle encryption at high speeds, the receiver must decrypt at the same speed. Fortunately, there are encryption algorithms which allow relatively speedy decryption by the mobile wireless receiver, which may have limited power or processing capabilities.

4.4. Hidden terminals

The overall wireless bandwidth available to all mobile computer users can be improved by increasing the number of cells (where a cell is considered to be the range of coverage of a base station connecting the mobile node to the rest of the network), reusing the frequencies in each cell, and reducing the number of mobile computers per cell. Reducing the number of mobile computers per cell is typically accomplished by making the cells smaller, so that the access points in the cell are within range of fewer wireless computers. The way that frequencies are used in each cell has to be managed carefully so that neighboring cells do not interfere with each other.

Having multiple computers in a cell can give rise to the hidden terminal problem illustrated in figure 1, a difficulty encountered in the use of wireless communications. In the figure, two laptop computers with radio links to an access point AP (say, a base station) may try to communicate with the access point simultaneously. Each computer can hear the access point, and cannot directly detect any interference on the wireless medium. Nevertheless, the access point will likely be unable to receive the transmission from either laptop.

Typically, a sender asks to transmit its data (e.g., by transmitting a RTS, or request to send), and then waits until the intended receiver grants permission (e.g., CTS, or clear to send). The intended receiver, then, does not issue the CTS while it is receiving data from some other sender. It is better to have a separate channel for transmitting RTS that will not interfere with data packets. In any case, the sender should make sure not to send RTS packets too often, compared with reasonable transmission times for data packets that might be coming to the intended receiver from other transmitters.



4.5. Retransmission

As mentioned above, wireless media often find application in situations where error-free transmission cannot be guaranteed. Problems arise when the wireless stations begin to move apart from each other, introducing fading effects as the received signal power decreases. When signal power becomes about the same as power in the channel from other sources (co-channel interference), data errors occur. Noise can overwhelm the received signal power for other reasons. For instance, a wireless receiver can move through an area which has some obstacle preventing the reception of signal from a transmitter, but soon afterwards might emerge from behind the obstacle. Alternatively, a noise source can traverse the area between the transmitter and the receiver. All of these can disrupt the flow of data between wireless nodes, and cause failures at higher level protocols. In order to combat temporary corruption or loss of signal, and the consequent bit errors detected by wireless receivers, the link layer can be designed to supply acknowledgements for packets received, or to transmit requests for retransmissions when packet losses are detected.

4.6. Error correction

As error conditions on a wireless link get better or worse, the number of bits employed for error correction could be decreased or increased to enable error-free reception. When the bit-error rate is relatively high, it is better to enable errors to be fixed directly rather than requesting retransmission of packets as discussed above. However, predicting the number of error-correction bits needed to assure error-free reception is not easy.

5. Network layer considerations

The Internet Protocol (IP) offers a convenient de-sign point for introducing the necessary protocol operations for supporting node mobility. By now, the network layer operations for mobility support are well understood, and are specified in Mobile IP, a freely available standard. To understand Mobile IP, it is first necessary to understand IP. For the purposes of this paper, and the other papers in this special issue, IP may be considered to offer the following functions:

Identifying each network;

Identifying each node on a network;

Forwarding packets to the correct next hop when they arrive at an intermediate node (router) which is not the final destination;

Fragmentation and reassembly as needed;

Triggering mechanisms for resolving IP addresses into lower-level (link layer, or MAC) addresses;

Generating appropriate control and status information for handling exceptional link conditions.

For the purposes of handling node mobility, the forwarding function is the main thing in IP that needs change. Minor modifications are also needed to the means by which error information is propagated through the network. Lastly, resolving the IP address of a mobile node to a MAC address by way of ARP (the Address Resolution Protocol [49]) presents a delicate design problem because ARP results are usually cached, and the cached information goes stale as soon as the mobile node moves away.

5.1. Reducing registration frequency

One criticism that has been lodged against the base Mobile IP protocol is the need for possibly frequent reregistration as the mobile node moves about from place to place. Such reregistration's can cause dropped packets if the mobile node is far away from its home network and route optimization is not in use by the foreign agents. Moreover, in the situation where, say, thousands of mobile nodes are reregistering upon emergence from a densely traveled major tunnel for automobile traffic, the control traffic from the registration protocol may overwhelm local resources.

For this reason, there has been interest in finding ways to enable local processing for Mobile IP messages by the foreign agents, to reduce network traffic, possibly the number of registration attempts, the registration time, and consequently the time for which pending registration state information has to be maintained. One method is to allow the mobile node to use a multicast address for its care-of address. Then, any foreign agent belonging to the associated multicast group will receive all packets for the mobile node; the designated foreign agent serving the mobile node will actually deliver the decapsulated datagrams to the mobile node. There is some additional control protocol to allow one of the foreign agents to be designated as the one currently serving the mobile node, and to allow new foreign agents to assume the designated function as needed when the mobile node moves. If the foreign agents were organized as an anycast group [38] the packet would only have to be delivered to one of the foreign agents. That foreign agent would then have to forward the packet to the designated foreign agent, with correspondingly higher requirements for transmitting control information, but greatly reduced storage requirements for most of the foreign agents in the anycast group compared to the case or the multicast group.

Another idea is to arrange the foreign agents into a hierarchy. Then when the mobile node moves, it can restrict its registration messages to stay within the hierarchy as long as it can determine that its new point of attachment is in the same hierarchy as its previous point of attachment. The common ancestor is the nearest foreign agent that can handle the reregistration, and no further ancestors need to be aware of the mobile node's movement. The particular case when an administrative domain has a "gateway" foreign agent with many subordinate foreign agents may initially be a popular design point.

5.2. Route optimization

Aside from the basic operations provided by Mobile IP, extended operations allow for mobile-aware correspondent nodes to send their data directly to the mobile node instead of going through the home agent. This route optimization [34,47] is accomplished by sending the mobile node's care-of

address to correspondent nodes, in so-called binding updates. Therefore, this technique can only work for such nodes that are able to process the protocol messages containing the necessary information; today's product computers cannot. Route optimization messages have almost the same need for security that registration messages do in base Mobile IP, since bogus binding updates sent to correspondent nodes allow the same sort of malicious traffic redirection that bogus registrations sent to a home agent would allow. Privacy considerations dictate that the dissemination of binding updates be controllable by the mobile node, since they carry information describing the mobile node's current location.

5.3. Smooth handoffs

Recent investigations have considered the advisability of buffering at the foreign agent, as part of a process of smooth handoffs. The paper in this issue by Caceres' and Padmanabhan is one of the first published in this area, and shows that substantial speedups can be obtained with minimal buffering strategies. Additional improvements can be obtained by integrating buffers with regionalized registrations. Handing off the buffered packets can be made secure by establishing security relationships using the binding up-date mechanism specified for use with smooth handoffs in route optimization.

Application of route optimization is also of particular interest. If foreign agents are enabled to maintain binding cache information for a mobile node, then they can improve the robustness of communications with that mobile node even after the mobile node moves away to a new point of attachment. When a foreign agent knows the mobile node's new care-of address, it can forward all packets for the mobile node to that new care-of address. For example, this would help with packets in flight sent to the mobile node during the time it is trying to complete its registration process, which might otherwise be lost. Note that this smooth handoff is even more important when there are correspondent nodes that are maintaining binding cache information for the mobile node acquired by use of route optimization protocol messages.

Smooth handoff is expected to need binding cache information only for some hundreds of milliseconds, the amount of time it takes for mobile nodes to complete a new registration and to update correspondent nodes with new binding cache entries. After this time, the previous foreign agent can drop the binding cache entry for the mobile node. Moreover, establishing the binding cache entry has reduced (but nontrivial) security requirements. Replay attacks would generally be ineffective, since the cached information has such a short lifetime and a foreign agent would not accept a new binding for any mobile node not already in its visitor list.

Providing any security at all for binding updates sent to a foreign agent by a mobile node may be problematic, because the mobile node and the foreign agent are not expected to have any security relationship before the time of the mobile node's registration. There are a number of methods defined by which a mobile node and foreign agent can establish the necessary security relationship. The methods defined attempt to use existing security relationships whenever available, but allow use of Diffie-Hellman key exchange as a last resort. The possibility of a man-in-the-middle attack, which frequently plagues Diffie-Hellman exchange protocols, is controlled by using the home agent as a Key Distribution Center (KDC) and allowing it to authenticate the extension containing the newly created key for the new security extension between the mobile node and the foreign agent.

5.4. Source routing

Many early approaches to Mobile IP attempted to make use of IP's loose source route (LSR) option. This seems an attractive possibility, because packets sent to a mobile node can be delivered directly to the mobile node by a foreign agent if the foreign agent is specified as part of the loose source route. Moreover, if the mobile node sends a packet to a correspondent node and includes the care-of address in the source route, the correspondent node can use the source route to return packets to the mobile node, achieving a cheap form of route optimization. Since IP specifies that higher-level protocols should reverse source routes, such source routing approaches accomplish mobile networking without creating any new protocol.

However, the gains offered by source routing approaches are, unfortunately, only illusory. In the first place, as with any such remote redirection as indicated by source routes requiring reversal by the

receiver, authentication is required, and nodes reversing source routes do not typically perform any such authentication operations. Thus, malicious nodes could impersonate mobile nodes by sending bogus source routes. Because of the opportunity for foul play, most In-ternet routers do not forward source routed traffic, so that the whole approach is, in practice, unworkable. Moreover, even if the routers were configured to handle source routes, and the end nodes were configured to require authentication before reversing source routes, the performance penalty at the routers proves unacceptable for handling source routes. All of these factors combine to exclude source routing approaches from consideration as a solution for mobile net-working in today's Internet.

5.5. Mobile IPv6

IP version 6 (IPv6) [16,23] is a new network layer protocol designed to increase the address space available for nodes within the Internet, and to improve rout ability for packets using IPv6 addresses. As part of the design process, many deficiencies of the current version of IP (also called IPv4) have been fixed. Support for mobile networking has been laid out as a mandatory requirement for IPv6 [11], and the design for Mobile IP has been modified to take advantage of IPv6's superior capabilities.

All IPv6 nodes are able to autoconfigure an IPv6 address appropriate for their current point of attachment to the Internet moreover there are plenty of IPv6 addresses available, so foreign agents are no longer needed to support mobility. Furthermore, since all IPv6 nodes are required to support authentication and privacy protection at the network layer, binding updates can be supplied in a secure fashion to the correspondent nodes that need them. This means that route optimization fits naturally within the framework offered by IPv6, and does not have to be done as an up-grade to a huge installed base as with IPv4. Since future Internet nodes are expected to be capable of mobility [24], this represents a significant reduction in the network load to be sustained by the IPv6 Internet.

In order to send packets to the mobile node, a routing header (the IPv6 equivalent of source routing) is used by any sender that has the mobile node's care-of address. On the other hand, whenever a packet arrives at the home agent instead of going directly to the mobile node, it can be assumed that the sender does not have the care-of address of the mobile node. In this case, the home agent does not insert a source route to complete the delivery of the packet to the mobile node. Instead, the home agent is required to use encapsulation. Thus, the mobile node can tell whenever it needs to send a binding update to any of its correspondents. Moreover, when the mobile node moves to a new care-of address, it assumes that each of its active correspondent nodes should receive a new binding update. The mobile node can find active correspondent nodes by checking its TCP protocol control blocks; but this only works for TCP traffic.

5.6. Vertical IP

Recent experiments at University of California at Berkeley (UCB) have shown the feasibility of using Mobile IP to assist mobile nodes when switching between heterogeneous physical media. This is important in many applications, for instance when a mobile node moves from a high-speed wireless LAN in an office environment, to a wide-area wire-less connection, as with cellular telephones. The main considerations are handling discovery mechanisms in the dis-parate media, and making policy decisions about when it is best to change from one medium to another. For instance, one would like to maintain a high-speed and cost-free connection to the local wireless LAN as long as possible, until the error rate becomes too high for comfort, and correspondingly to switch back to the wireless LAN as soon as possible upon re-entering the campus or office environment where it is available. Other considerations such as security, proxy availability, route selection, or latency may also come into play. A good example of the work in this area is the paper in this issue by M. Stemm and R. Katz.

5.7. Multicast

Multicast protocols have, in the past, not been designed for the case of mobile nodes. In Mobile IP, a mobile node can pretend to be on its home network and receive tunneled packets, joining multicast groups through the tunnel. It can also attempt to join local multicast groups on the foreign network, but this leads to possibly poor performance in re-constructing the multicast routing tree after each movement, and possibly violates some of the implied semantics of mul-ticast. These design points and many others are explored in the paper by Chikarmane et al. in this issue.

5.8. Tunneling

Mobile IP depends upon tunneling. But, tunneling also plays a part in other protocol operations of interest to mobile nodes. For instance, access to enterprise computing resources for mobile users often depends upon establishing a tunnel through the firewall protecting the enterprise computing environment from malicious abuse by external Internet attackers. In fact, there seems to be a gradual convergence of efforts in the areas of mobile networking, virtual private networks (VPNs), and dial-up access to local or remote points of attachment to the Internet. One relatively new effort in this area is the Tunnel Establishment Protocol (TEP) [12], which takes as its initial design point the fact that Mobile IP is, among other things, a way to establish a tunnel between two points. For Mobile IP, the tunnel endpoints are the home agent and the care-of address, but this can be generalized. In fact, the previous ideas developed for hierarchical foreign agents carry over to TEP, and help motivate a way to establish multi-segment tunnels across multi-level security domains.

When Mobile IP was specified, IP-within-IP seemed to be the most suitable candidate for a default tunneling algorithm. Recent developments call for re-examination of that decision. Now, newer tunneling protocols such as L2TP [37] are receiving widespread deployment, and this author believes that they may represent another opportunity for offering the benefits of mobile computing to a new population of mobile users.

5.9. Network address translation

Network address translation is becoming a feature with wide deployment within the Internet. The basic idea is that a collection of nodes can use private IP addresses in a network which is attached to the global Internet by way of a network address translation (NAT) [55] unit, which “hides” the other nodes’ IP addresses. As data traverses the NAT unit towards the nodes using the private addresses, the network layer (IP) addresses in the IP header are translated from externally known IP addresses to the privately known addresses of the other nodes.

This technique spells trouble for Mobile IP, because a care-of address on the “inside” of the NAT unit does not make sense to a home agent on the “outside”. Until the NAT boxes can be programmed in detail about how to translate tunnel addresses, and the addresses inside Mobile IP Registration Requests and Replies, it seems unlikely that Mobile IP can work across NAT boundaries. This is not at all trivial to do, considering Mobile IP’s need for authenticating the registration messages; changing any of the internal fields would destroy the authentication data. More-over, since NAT (typically) depends on port numbers, and IP-within-IP does not have a port number to use, there is a basic design incompatibility. To overcome this problem, the NAT device should probably also be the foreign agent.

6. Transport layer considerations

Supporting mobility at the transport layer usually means modifying the Transmission Control Protocol (TCP) [1]; other commonly available transport control protocols have not been investigated nearly as often. TCP provides for congestion control, reliable delivery, and sequenced reception of datagrams by the destination.

Providing for mobility by modifying TCP cannot be considered as a complete solution for mobile networking. In fact, modifying the User Datagram Protocol (UDP) to support mobility does not make very much sense, because UDP doesn’t keep track of any state relevant to the source or destination nodes. Neither the mobile node’s IP address nor anything else about it is used by UDP to identify the state of the data communication, so nothing can be done by UDP to help improve the forward progress of communications to or from a mobile node. RTP is not as widely deployed as TCP or UDP, and makes up only a tiny percentage of the total data flowing in the Internet, so that there has been much less consideration given to the transmission of data by mobile nodes using RTP.

TCP, however, offers many interesting possibilities. Careful coordination between the mobile node and TCP running at a base station can provide the following benefits:

Reduced retransmission delays; Smooth handoffs; Improved throughput.

For data streams to or from a mobile node, which flow through a base station, several investigators have proposed breaking the data stream into two parts which are handled separately; both substreams can be terminated at the base station. Some approaches [3,4,63] suffer from the problem of providing TCP ACKs to correspondent nodes, for pack-ets that are never actually delivered to the mobile node. This violates the well-understood end-to-end semantics of TCP, and requires very careful handling, or perhaps even making modifications to application software.

Going a step further, it is possible to equip TCP at the base station with the power to transfer internal state related to the mobile node to a new base station, whenever the mobile node moves from place to place. Providing for mobility in this way shares some features in common with Mobile IP. In the first place, it is often presumed that only the mobile node or the base station can be modified to provide the mobility support. As the mobile node moves to a new point of attachment to the Internet, it must notify the previous intermediate TCP connection point about its new location, so that all necessary TCP control information can be modified or transferred. This can be considered as a variation on Mobile IP's registration procedure, and carries with it all the same requirements for authentication (and, in certain applications, privacy).

6.1. Snooping

When a base station is the last hop from the wired Inter-net to a wireless mobile node, the base station can improve end-to-end performance by retransmitting lost TCP packets only over the wireless link, while still maintaining TCP's end-to-end semantics. These retransmissions are invisible to the remote connection endpoint, and are comparable in effect to retransmissions performed at the link layer 4.5. As the base station delivers packets over the wireless link to the mobile node, it buffers the packets until the mo-bile node sends the expected TCP acknowledgement. If the acknowledgment does not come (in time substantially shorter than the end-to-end round-trip-time (RTT)), or, if the mobile node sends another TCP acknowledgement (a dupack), the base station can retransmit the lost packet and avoid end-to-end timeouts and retransmissions. This ap-proach of snooping and buffering offers big performance improvements [5].

Unfortunately, recent security protocols preclude inspec-tion of the relevant packet contents (e.g., TCP sequence numbers) by base stations. It seems unlikely that the mo-bile computer user would wish to share its privacy keys with every base station (or foreign agent) that it establishes a connection with. There do not appear to be any simple approaches to this problem, so that performance increases available from snoopy base stations will be lost for the du-ration of encrypted data transmissions.

6.2. Errors vs congestion

TCP, as commonly implemented, offers advanced features for controlling Internet congestion. The primary observation about such control algorithms, is that control traffic has to be minimized or nonexistent after congestion occurs, because there is a high probability that any control packets would be dropped, and besides that they add to the congestion anyway. TCP's slow start performs as needed to reduce congestion, by first throttling the data transmission of the connection, and then slowly building back up to an efficient transmission rate.

The problem comes when errors are mistaken as evidence of congestion. Packets which are lost or garbled will effectively not be delivered to TCP, and may trigger the slow-start mechanism. This is bad, because packets with corrupted data should be retransmitted right away, and should not cause such a slowdown in the data rate. Thus, the effect of errors due to wireless media is magnified by slow-start. Poor interactivity and reduced throughput are the likely results. It would be better if TCP could be modified to detect whether a lost packet was the result of con-gestion or instead was lost because of bit errors.

One theory suggests that packets lost due to congestion tend to be lost in long contiguous sequences, and that packet loss because of bit corruption occurs more randomly, inter-mingled with error-free packet reception. It remains to be seen whether TCP can be modified to make the determination about causes for errors, and whether the determination can be exact enough to produce improvements in the over-all response of TCP packet-loss algorithms in real Internet operational environments.

6.3. Asymmetry

Satellite communications with mobile nodes can provide an important type of wireless connectivity to the Internet. In many cases, the communications path is then asymmetric, for mobile nodes that do not transmit data back to the satellite. The mobile node might use a telephone or other land line to maintain end-to-end connectivity with other Internet nodes, relying on the satellite link only for down-loading bulk data (for instance, video information). The data rate available on the satellite downlink is typically far greater than the reverse link from the mobile node back to the Internet. Thus, both the data rate and the routing path are different.

TCP was not constructed to work well with such asymmetric data rates. When the asymmetry is too great, the mobile node cannot supply ACKs back to the source of TCP data fast enough, and the supply of data to the down-link operates at far below capacity. Most solutions to this problem require changes to the Internet node providing data to the mobile node. As with route optimization, solutions in this class will take a long time to deploy, and will probably only happen as satellite communications become important for the general operation of the Internet.

7. Middleware

For the purposes of this paper, we will define middle-ware to be the software which does not directly handle application protocol needs, but on the other hand fulfills, in a generic way, an intermediate or ancillary role in providing network services or environment to network applications.

Nomadic computer users, by definition, change their locality and thus need to periodically re-establish their link and connectivity to the Internet. Since the parameters of such connectivity typically depend upon the characteristics of the current point of attachment, nomadic users require that their connectivity be parameterized by those relevant characteristics. This introduces many problems that are not very well satisfied by existing solutions for network connectivity.

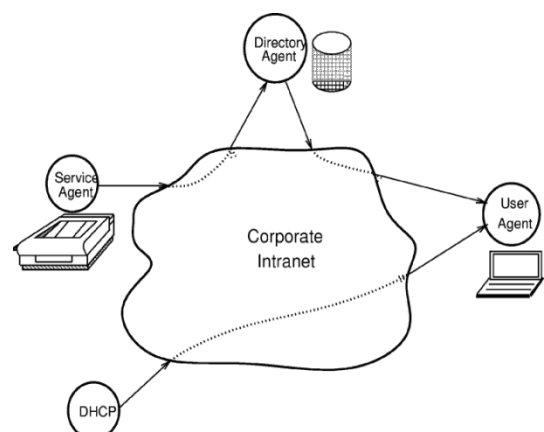
For instance, Mobile IP can be understood as a protocol to allow parameterization of the IP address of the mobile node's current point of attachment (i.e., to allow for variable care-of addresses). But, Mobile IP is not invoked by application software, and usually is considered to operate at the network layer; thus it is not middleware. DHCP, on the other hand, could (theoretically) be invoked by applications to obtain application-specific parameters, like server IP addresses that can be used by the client application to initiate a transaction. Thus, DHCP could be considered as middleware.

In this section we list a few potential candidates for middleware functions that are likely to become more important as computers become more mobile.

7.1. Service location

When a nomadic user arrives at a new computing environment, it is likely, and probably typical, that the user will be unaware of basic configuration details about local network services. For instance, there may be a dozen local printers, each with varying capabilities, and each possibly useful at various times to the nomadic user. It would be nice if the user could resolve service needs automatically, dynamically, and based only on the nature of those needs, independent of local naming conventions or network topology.

This ability to dynamically resolve service needs, which is a matter of convenience now, is likely to become a necessity in the service-oriented network of the future. There is likely to be an increased emphasis on accessing data across the network, as the Internet becomes more fully deployed. Consequently, when the network is viewed as a universal (and robust) resource, applications will begin to make use of network resources as a matter of course, much as Web applications now often assume multimedia capabilities which were quite rare and expensive ten years ago. If a typical computer hosts applications which together make use of dozens or



hundreds of disparate network re-sources and services, then typical users are quite unlikely to be willing to reconfigure these applications at each new point of attachment. The number and diversity of network services will make manual configuration obsolete, and the ease and speed of network reattachment offered by wireless communications will make even hard-coded profile-based reconfiguration seem quite awkward.

Service Location Protocol (SLP) [61] enables simple service requests from user agents to be resolved by receiving service replies which contain URLs from service agents. The user agents act on behalf of the application needing service, and the service agent acts on behalf of the network-attached service. The protocol for user agents and service agents is lightweight and places minimal load on the communications medium, as appropriate for typical nomadic computing platforms.

User agents can obtain the necessary service handles directly from service agents, or alternatively they can query a nearby Directory Agent (DA) for the information. These relationships are illustrated in figure 2, where the printer is shown represented by a service agent. In the configuration shown, the User Agent discovers the Service Agent using DHCP [39].

SLP offers other features for convenience and scalability not relevant to this article.

7.2. DHCP and dynamic DNS

The Dynamic Host Configuration Protocol (DHCP)¹ is likely to play a prominent role in the deployment of future mobile computers. DHCP fulfills the basic requirement for allocation of an IP address to a node which needs to begin communications at its new point of attachment. Today, DHCP is not typically employed by mobile computers, but is seeing use with portable computers. When a computer is attached to a LAN, for instance, it can call DHCP to get its IP address, along with a default router, the domain name server for the local network, and various other bits of useful information. This works for mobile computers, too, but each time the connection is made the mobile computer typically needs to be restarted.

Even if the computer could work without restarting, there are severe difficulties with establishing connections to a mobile computer that relies only on DHCP for its network attachment. For one thing, most communications with the mobile node start with its domain name (often, its Fully Qualified Domain Name (FQDN)). Each new IP address would require updating the IP address resolution for that mobile node's domain name unless, all communications with the mobile node are to be initiated by the mobile node. On the other hand, updating DNS is an operation that can be performed only with very tight security. If a bogus update were ever accepted for the mobile node's domain name resolution, all communications depending on that resolution would be disrupted and possibly hijacked. Such security operations are tricky and are only now becoming standardized.

Moreover, there remains a problem with DNS caching. Whenever the resolution of a mobile node's domain name is cached at an intermediate name server, that cache will be stale as soon as the mobile node moves to a new point of attachment. Thus, as more and more mobile nodes are deployed, misusing DNS for this purpose will cause a proportionate increase in the already huge amount of traffic taken up for name resolution. Combatting the problem by disallowing DNS resolutions to be cached only adds to an already worrisome problem in today's Internet.

Supposing that the appropriate security measures can be taken, supplying new resolution information for each new point where the mobile node attaches to the Internet does not preserve existing communications. And, as wireless cell sizes decrease (see section 3), this will be viewed as increasingly inconvenient until finally it is just unacceptable.

If, on the other hand, the mobile node uses Mobile IP, and is equipped to use DHCP as a mechanism for obtaining a (co-located) care-of address, it can maintain its existing home address resolution for its FQDN. This allows simplified communication with the mobile node at all times, as well as enabling the node to preserve its ongoing communications at each new point of attachment. In this mode of operation, the mobile node can also make use of the de-fault router configuration delivered to it by DHCP. Since no beacons may be expected from any foreign agent, the mobile node with a co-located care-of address may be de-signed to substitute pings to the default router instead of detection of agent advertisements. DHCP can also be used to get information about SLP directory

agents at the same time that the care-of address and default router information is obtained, as illustrated in figure 2.

8. Security

Security is an increasing concern in the design of mobile networking protocols and systems. As seen in the discussion about Mobile IP, authentication is critical to authorizing operations indicating the mobile node's new point of attachment. As another example, we have seen how the link layer can be augmented to supply encryption; the need for encryption is increased because of the frequently untrustworthy nature of the mobile computer's surroundings. Privacy takes on added importance, when the mobile user does not wish to divulge his or her current whereabouts.

Modern approaches to authentication and encryption use cryptographic approaches. The algorithmic results are made unforgeable by including secret keys (possibly with some additional unique data, such as a timestamp, to avoid matching any previously authenticated data) along with the data to be authenticated or hidden. Distribution of the secret key is a difficult problem in today's Internet.

Other security measures common in today's Internet affect mobile networking. Firewalls, which are installed to protect an enterprise computing environment from external intrusion and/or disruption, make it more difficult for mobile workers to make use of their office computing environment. Border routers that enforce forwarding policies based on the source address of packets (as opposed to the traditional reliance only on the destination address), make it difficult for mobile nodes to use their home address in foreign domains. This ingress filtering can force even further detours in the routing path between a mobile node and its correspondent nodes.

9. Ad hoc networking

Suppose for the moment that the needs for wireless services and connectivity could be supplied to a population of mobile users while they are within range of foreign agents or base stations connected to the Internet. Next, imagine that the same users met together at a conference which did not offer wireless connectivity to the Internet. These users might still need to communicate data files to each other, browse each other's Web pages, transact electronic mail, or use any of the many network applications which have motivated the tremendous growth of the Internet. They would find that their mobile networking software was useless without the needed infrastructure, and might even seriously get in the way.

These users need a way to deliver packets between wire-less stations without infrastructure routers. If all the wire-less nodes are within range of each other, this is not difficult. Mobility poses no problem, unless two nodes that need to communicate have moved out of range from each other. Otherwise, any necessary routing functions must be performed by the mobile nodes themselves. Intermediate mobile nodes could cooperate to forward data from source to destination.

Ad hoc networking is a name given to the creation of such dynamic and multi-hop networks that are created by the mobile nodes as needed for their communication purposes. The mobile nodes can do this in many ways. Most solutions involve running routing protocols on the mobile nodes. Routing protocols have the advantage that they are inherently multi-hop. Their dynamic behavior requires careful attention, however, because the typical rate of change in an ad hoc network is likely to be substantially greater than that for the topology of the Internet, for which most routing protocols are engineered. There are numerous routing protocols proposed and in use within the Internet today, and each of them could be potentially modified and applied to the creation of ad hoc networks.

The two main kinds of routing algorithms in use today are link state algorithms, which provide each node with a complete representation of the network topology, and distance vector algorithms.

Ad hoc networking presents interesting challenges for traditional client/server applications. For one example, consider whether DNS might be accomplished in an ad hoc network. First, there is no clearly defined way for the ad hoc nodes to discover which node or nodes are offering domain name resolution. Even without that problem, the non-hierarchical nature of ad hoc addressing does not map well into the standard hierarchical domain conventions of DNS. The trouble is the defining characteristic of the ad hoc network, which is that the IP addresses of the nodes are assumed to be

unrelated to each other. If, instead, the IP nodes somehow acquire IP addresses dynamically and perform some sort of aggregation, their relative movement would soon make the initial aggregation ineffective. Besides that, it is difficult anyway to cause the nodes to dynamically select IP addresses which are unique across the ad hoc network. Various client/server applications present other difficulties.

10. Conclusion

Mobile computing opens the door to a fresh examination of practically every area of network protocol engineering. The areas discussed in this article, and the articles in this special issue, are only a sampling of the kinds of new re-search results being reported. It is my sincere hope that this special issue will pique the interest of new researchers, and provide a better overall understanding of the problem areas needing more attention and new solutions.

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IMPORTANCE OF MATHEMATICS IN OUR LIFE

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Mathematics is a methodical application of matter. It is so said because the subject makes a man methodical or systematic. Mathematics makes our life orderly and prevents chaos. Certain qualities that are nurtured by mathematics are power of reasoning, creativity, abstract or spatial thinking, critical thinking, problem-solving ability and even effective communication skills.

Mathematics is the cradle of all creations, without which the world cannot move an inch. Be it a cook or a farmer, a carpenter or a mechanic, a shopkeeper or a doctor, an engineer or a scientist, a musician or a magician, everyone needs mathematics in their day-to-day life. Even insects use mathematics in their everyday life for existence. Snails make their shells, spiders design their webs, and bees build hexagonal combs. There are countless examples of mathematical patterns in nature's fabric. Anyone can be a mathematician if one is given proper guidance and training in the formative period of one's life. A good curriculum of mathematics is helpful in effective teaching and learning of the subject.

I will discuss the use of mathematically rich games to develop in students certain skills and processes that are important in their daily and future workplace life. For example, students will learn through these games how to pose relevant and important questions when faced with a problem, how to formulate conjectures to solve the problem. What strategies or heuristics to use, and how to monitor their progress and their own thinking. The context is very real for these students because the outcome, whether they win or lose, matters to them. (Electronic Proceedings of international Conference on Education: Redesigning Pedagogy: Culture Knowledge and Un)

Use in Kitchen – While preparing food, we always measure the different ingredients so as to cook the desired quantity only. This is possible only because of the mathematics. If we were not aware of the numbers, it would not have been possible to measure, make adjustments and cook tasty food. So you can say that our day begins with the concept of maths.

Shopping – When going for shopping, we prepare a list of items we require, calculate the amount of money needed for it etc. All this calculation is based on numbers which come from mathematics. Without the numbers, you cannot decide how much you need to pay to the vendor and how much you have saved. So in the case of shopping too, you are surrounded by the world of mathematics.

In the field of banking – This is the sector where a number of concepts of mathematics are applied and therefore the experts need to have a good understanding and command of the subject. Handling the transactions of the bank is not simple and you need to have some knowledge of mathematics in order to maintain your account, deposit and withdraw money etc. If you wish to take a loan, you need to have an idea about the interest you will have to pay and what will be the monthly premium that you would need to pay. In short, the banking sector is completely related to maths and so even the customers need to be familiar with it.

Traveling – Everyone loves to travel but there is a lot more to it than the enjoyment. While planning your vacation, you not only have to decide the place where you wish to go but book your hotel, tickets etc. All this requires budget planning and a sense of understanding of mathematics so that you can accomplish the different tasks successfully. From the traveling distance to its cost, bus tickets, hiring cabs etc all requires maths.

Thus from the above examples, you might have got a clear idea that there is no such area where the concept of mathematics is not used. You just cannot do without this subject and that is why

it is essential to keep your basics right to perform the everyday of life. So have fun with the number and enjoy.

Mathematics is one of the most important subjects of our life. No matter to which field or profession you belong to, its use is everywhere. That is why it is necessary to have a good understand of the subject. Though the basics of mathematics start form school but its usage continues till we become adults and thus it can be said that maths has become an integral part. Imagining our lives without it is like a ship without a sail.

Mathematics is in Principle inexpensive. As the old joke says, a mathematician needs only paper, a pencil, an easy chair and a waste basket. Also, the criterion for success in mathematics, is by and large universally accepted. This make mathematics an attractive ‘investment’. Moreover, a mathematical result is valid forever. It may fall out fashion, or fall outside the current area of application, but even the oldest known mathematical formulae – such as that for solving quadratic equations, known 2400 years ago by Babylonians, Chinese and later the Greeks before being crystallized into its present form in 1100 AD by a Hindu mathematician called Baskhara- are the bread and butter of present- day elementary mathematics. Alas, the downside is that the results are usually not immediately applicable and therein lies the risk. Who wants to ‘invest’ in something that may not lead to applications for several hundred years? The good news is that the distance between theory and application is becoming shorter and shorter.

Experience says learning mathematics can be made easier and enjoyable if our curriculum includes mathematical activities and games. Maths puzzles and riddles encourage and attract an alert and open- minded attitude among youngsters and help them develop clarity in their thinking. Emphasis should be laid on development of clear concept in mathematics in a child, right form the primary classes.

If a teacher fails here, then the child will develop a phobia for the subject as he moves on to the higher classes. For explaining a topic in mathematics, a teacher should take help pictures, sketches, diagrams and models as far as possible. As it is believed that the process of learning is complete if our sense of hearing is accompanied by our sense of sight. Open-ended questions should be given to the child to answer and he/she should be encouraged to think about the solutions in all possible manners. The child should be appreciated for every correct attempt. And the mistakes must be immediately corrected without any criticism.

It is clear that mathematics is heavily used in large industrial projects and in the ever-growing electronic infrastructure that surrounds us. However, mathematics is also increasingly infiltrating smaller scale circles, such as doctors, reception rooms. Sailboat design and of course all kinds of portable devices. There has also been a change in the way mathematics penetrates our society. The oldest applications of mathematics were probably in various aspects of measurement, such as measuring are, price, length or time. This has led to tremendously successful mathematical theories of equation, dynamical systems and so on. In today’s world, we already know pretty accurately for example the make-up of the human genome, yet we are just taking the first steps in understanding the mathematics behind this incredibly complex structure of three billion DNA base pairs. Our understanding of the mathematics of the whole universe of heavenly bodies, even going back in time to the first second of its existence, is better than our understanding of the mathematics of our own genes and bodies.

What is the difference between the hereditary information encoded in DNA and the information we have about the movements of the heavenly bodies? Is it that we have been able to encapsulate the latter into simple equations, but not the former? Or is it perhaps that the latter has a completely different nature than the former, one that makes it susceptible to study in terms of equations, while the former comes from a world governed by chance and algorithms, a world of digital data, where the methods of the continuous world do not apply?

Another well-known instance of mathematics in society is cryptography in its various guises. There exist numerous situation in which data must be encrypted such that it can be publicly transmitted without revealing the content. On the other hand, sometimes a party may find it vitally important to break a code that another party has devised for its protection. Some companies want to

examine the data of our credit card purchases in order to have access to our shopping patterns. Some governments want to do the same with regard to what they deem less innocuous patterns of behavior. Cryptography is a typical example of the mathematics of the digital world. Digital data has become important in almost all fields of learning, a natural consequence of advances in computer technology. This has undoubtedly influenced the way people look at fields of mathematics such as number theory, that were previously thought to be very pure and virtually devoid of applications, good or bad. Now suddenly everybody in the possession of big primes has someone looking over their shoulder.

This infiltration is quite remarkable and elevates mathematics to a different position from that which it previously occupied. Mathematics is no longer is no strange otherworldly subject, practiced by a few curious geniuses but for most people best left alone. The spread of microprocessors into every conceivable aspect of our everyday life has brought heavy-duty computing into our homes, into our classrooms and into scientific laboratories of all kinds. Naturally it is unnecessary for everyone to understand all this computing, which can take place in microseconds without our noticing. But it means that anyone who refuses to acknowledge the role of mathematics will see the changing technosphere as something strange and in the worst case as something irrational or even frightening. A very good way to understand and come to terms with an important aspect of modern life our ever-growing dependence on interpreting digital data is to have a basic knowledge of mathematics.

Basic knowledge: what does this means and how is it attained? Clearly, this takes us into the realm of mathematics education. Strictly speaking, education is not an application of mathematics , but it is nevertheless of increasing importance to the mathematical world. Evert time the OECD s PISA (Programme for international Students Assessment) results arrive, some people ask why some countries always seem to score highly in the mathematical skills of 15 year-olds. Without attempting to answer this difficult question, one must admit that it is important and that maths education will face huge challenges in the future, not least because of the infiltration of mathematics into all levels of society. This infiltration clearly has to do with the revolution triggered by the development of computers over the last fifty years. Has this revolution arrived in schools, and in maths education? Most students now own a computer with an internet connection. This is used for games, chatting, text processing and surfing, but do they use the computer for mathematics? Are mathematical modeling (ambitious problem solving) or algorithmic thinking (expressing mathematics in such a way that the computer can handle it) taught at school? There is much that can be done here, in curricula, in textbooks and in everyday life at school.

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VIRTUAL SMARTPHONE OVER IP

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Abstract—

The number of smart phone users and mobile application offerings are growing rapidly. A smart phone is often expected to offer PC-like functionality. In this paper, we present Virtual Smartphone over IP system that allows users to create virtual smart phone images in the mobile cloud and to customize each image to meet different needs. Users can easily and freely tap into the power of the data center by installing the desired mobile applications remotely in one of these images. Because the mobile applications are controlled remotely, they are not constrained by the limit of processing power, memory and battery life of a physical smart phone.

INTRODUCTION

The number of smart phone users and mobile application offerings are growing rapidly. Smart phones are often expected to offer PC-like functionality, which requires powerful processors, abundant memory and long-lasting battery life. However, their hardware today is still very limited and application developers are forced to take these limitations into consideration. A number of service providers such as Dropbox and Zumodrive provides online storage services to smart phone users in attempt to alleviate the limitations of smart phone storages. However, to the best of our knowledge, there is still no service that offers full computation resources to smart phone users. In this paper, we propose Virtual Smartphone over IP, which provides cloud computing environment specifically tailored for smart phone users. It allows users to create virtual smart phone images in the cloud and to remotely run their mobile applications in these images as they would locally. The motivation is to allow smart phone users to more easily tap into the power of the cloud and to free them from the limit of processing power, memory and battery life of a physical smart phone. Using our system, smart phone users can choose to install their mobile applications either locally or in the cloud, as illustrated in Figure 1.

Running applications remotely in the cloud has a number of advantages, such as avoiding untrusted applications from accessing local data, boosting computing resources, continuing to run applications on the background and opening up new ways to use smart phones. This paper presents the design and implementation of Virtual Smartphone over IP. Section II describes the basic design of our system and Section III describes a proof-of concept prototype that we have implemented. Section IV discuss the possible applications of our system and Section V reports the results of our experiments that demonstrate how we can leverage the performance of mobile applications in the cloud. Section VI discusses the related work in the research community and Section VII concludes this paper.

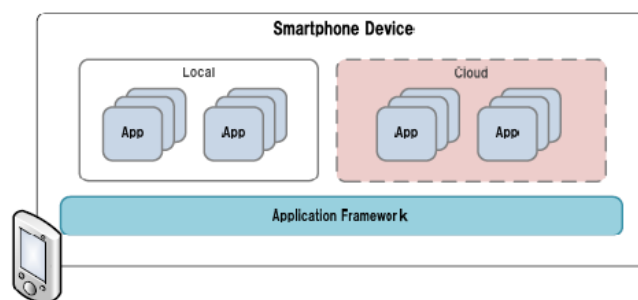


Figure 1. Basic concept of our system

BASIC DESIGN

Our Virtual Smartphone over IP system adopts an architecture similar to ones commonly used by server hosting providers. As illustrated in Figure 2, the system is composed of a number of external Smartphone clients, a front-end server, a virtual Smartphone farm, a management server and a network file system (NFS).

- Virtual Smartphone farm is the most important component of our system. It is a virtualization Environment that hosts a collection of virtual Smartphone images, each of which is dedicated to a Smartphone user.
- The front-end server admits service requests from Smartphone users across the Internet and establishes remote sessions to the appropriate virtual Smartphone images. The front-end server also allows Smartphone users to create, configure and destroy virtual Smartphone images. Once a remote session is established, the user can install and run mobile applications on one of these images instead of his own physical Smartphone.
- The network file system is used by virtual smart phones for all persistent file storage, in much the same way that an SD card holds data for physical smart phones. Since the NFS is easily scalable, it practically provides each virtual Smartphone unlimited file storage.
- the management server is used to manage the virtual Smartphone farm. Typical operations of a management server include the creation of virtual images in bulk and troubleshooting individual images. Users control their virtual Smartphone images through a dedicated client application installed on their Smartphone. This client application receives the screen output of a virtual Smart phone image and presents the screen locally in the same way as conventional thin-client technology. Since we expect most users to access their virtual Smartphone images through an unstable network such as 3G, the image must continue to run on the farm and be in the same state when the user is connected again after the user is disconnected in an unexpected Manner.

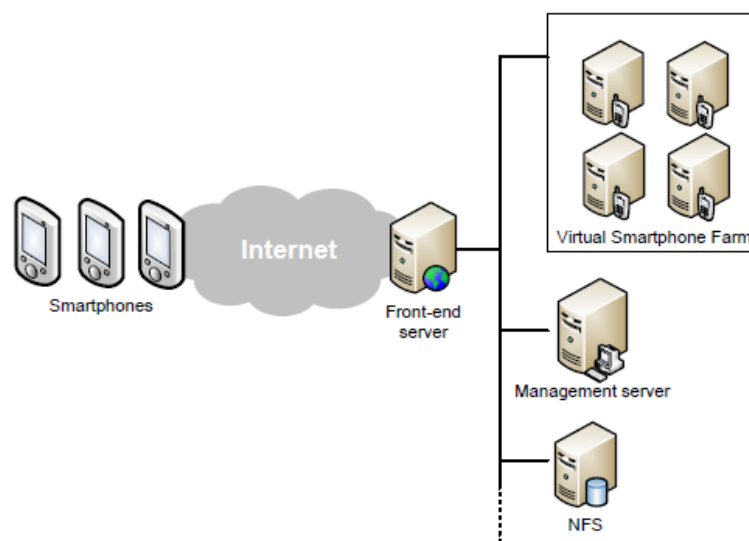


Figure 2. Overall system architecture

CONCLUSION

In this paper, we presented Virtual Smartphone over IP system that allows smart phone users to create virtual images of smart phones in the cloud and access these images remotely from their physical smart phone. The prototype we implemented integrates the remote environment with the local environment and allows users to run remote applications as they would locally. Through our prototype, mobile applications installed in the cloud can access sensor readings on the physical smart

phone. Our prototype also boosts the performance of mobile applications by providing virtually unlimited computing resources at user's fingertips, without draining the device battery.

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Prem Chand Ka Aslub-e-Nigaarish

پریم چند کا اسلوب نگارش

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Abstract

پریم چند سے قبل ۱۷ویں اور ۱۸ویں صدی میں نثر مرصع و مسجع کا رواج عام تھا۔ خیال کی پیشکش سے زیادہ آرائش زبان کو فوقیت حاصل تھی۔ اس عہد کی تحریر کردہ رومانی داستانوں، تمثیلی قصوں، ناول و دیگر نثری تخلیقات میں عربی و فارسی الفاظ، شاعرانہ صنعتوں، طول بیانی، استعارہ سازی، قافیہ پیمانی کے استعمال کو بروئے کار لایا گیا۔ یہ اردو نثر غیر نثری تھی کیوں کہ اس وقت شاعری کے مقابلے نثر نے ترقی کے زینے طے نہیں کیے تھے۔ اسی لیے نثر ابھی صحیح صورت میں سامنے نہیں آئی تھی شعریت کی موجودگی و لسانی طمطراق کی وجہ سے یہ نثر جاگیر دارانہ سماج کی آئینہ دار تھی لیکن اسے عوامی سطح پر بھی اہمیت حاصل تھی۔ ابہام کی وجہ سے یہ نثر دیر پا ثابت نہ ہو سکی اور زوال کا شکار ہو گئی۔

اس کی وجہ یہ تھی کہ ۱۹ویں صدی کی ابتدا سے ہی اردو نثر کا مکتوب نگاری، ناول، انشائیہ، تنقید، ** سوانح و علمی مضامین کی طرف رجحان تیز ہونے لگا اور اس صدی کے اواخر تک اس نے اپنی واضح صورت اختیار کر لی۔ اس جدید اردو نثر کے فروغ میں فورٹ ولیم کالج کے ادیبوں میر امن دہلوی، حیدر بخش حیدری، للوال جی کے ساتھ غالب، سر سید، نذیر احمد، حالی، رتن ناتھ سرشار اور رسوا کی خدمات کو فراموش نہیں کیا جاسکتا۔ اسی جدید نثر کو پریم چند نے بھی اپنی کہانیوں میں خیالات و نظریات کی پیشکش کا وسیلہ بنایا۔ ابتدا میں پریم چند نے بھی اپنی کہانیوں، ”دنیا کا سب سے انمول رتن“ اور شیخ مخمور“ میں داستانوں کو استعمال کیا لیکن پریم چند اپنے پیش روؤں کے پیر و کار نہیں بنے۔ پریم چند کا اختصاص یہ تھا کہ ان کہانیوں میں تشبیہات و استعارات، تمثیلی خیال آرائی، فارسی آمیز و مشابہتی زبان کا استعمال کیا لیکن قافیہ پیمانی اور طوالت سے گریز کیا جو مرصع و مسجع نثر کا طرہ امتیاز تھا۔ بہر حال اس داستانوں کو بہت جلد پریم چند نے ترک کر دیا۔ وہ اس بات سے باخبر تھے کہ کہانی کا مجموعی تاثر اسلوب پر منحصر کرتا ہے۔ زبان ہی تجربات و احساسات کے اظہار کا ذریعہ ہوتی ہے۔ وہ

”اس نظریے کے حامی نظر آتے ہیں کہ: ”بات معنی خیز ہو اور زبان سیدھی سادی۔“ اسی لیے پریم چند نے جہاں اپنی کہانیوں میں حقیقی زندگی کی ترجمانی کی وہیں اسی مناسبت سے زبان کا انتخاب بھی کیا۔ ویسی زبان کے استعمال پر توجہ دی جسے ہر طبقہ بہ آسانی سمجھ سکے۔ ترسیل و ابلاغ کا مسئلہ پیدا ہوئے بغیر ملک کی صورتحال سے قارئین کو باور کرایا جا سکے۔ ان کا ماننا ہے کہ ترسیل کے بغیر تخلیقات کی اہمیت ضمنی رہتی ہے۔ جیسا ”ادب کی غرض و غایت میں رقمطراز ہیں ہم ادب کو محض تفریح اور تعیش کی چیز نہیں سمجھتے، ہماری کسوٹی پر وہ ادب کھرا اترے گا جس میں تفکر ہو، آزادی کا جذبہ ہو، حسن کا جوہر ہو، تعمیر کی روح ہو، زندگی کی حقیقتوں کی روشنی ہو، جو ہم میں حرکت، ہنگامہ اور بے چینی پیدا کرے، سلانے نہیں، کیوں کہ اب اور زیادہ سونا موت کی علامت ہوگی۔“

زمانہ ۱۹۳۶ مضمون بشمولہ ادب کی غرض و غایت/پریم چند ص ۲۰۵۔
پریم چند نے اپنی کہانیوں میں صرف موضوعات کے سلسلے سے ہی نہیں بلکہ اسلوب کے تعلق سے بھی تجربات کے دروازے واکھے۔ جدید ادبی زبان کی تشکیل و تعمیر پر زور دیا اور آج تک یہ زبان فکشن کے

لیے موزوں و مناسب تسلیم کی جارہی ہے۔ اس زبان میں ابہام نہیں بلکہ اظہار کی قوت موجود ہے۔ اس کا جائزہ افسانہ طلوع محبت کے اس اقتباس سے لیا جا سکتا ہے
اس نے سر کی کے دروازے سے جھانک کر دیکھا۔ بھوندو نہ تھا۔ اس کا گدھا آ رہا تھا۔ بنتی آج اس ”
بدبخت گدھے کو دیکھ کر ایسی خوش ہوئی، جیسے انپا بھائی میکے سے بتاشوں کی پوٹلی لیے تھکا ماندہ
”چلا آ رہا ہو۔

پریم چند کے نمایندہ افسانے/قمر رئیس ص۔۳۰
ان کی زبان میں جہاں معنویت، اثر انگیزی، بے تکلفی اور بے ساختگی ہے وہیں تشبیہات و استعارات میں
بھی تصنع و بناوٹ کے بجائے وہ سادگی ہے جو خیالات کی پیشکش میں معاون و مددگار ثابت ہوتے ہیں۔
اس ضمن میں یہ اقتباس دیکھئے

”مس پدماحسن میں اندرا سے جدا ہے۔ اس کے حسن پر رعب، تمکنت ملاحظت اور کشش ہے۔ اندرا کے ”
حسن میں نزاکت اور انکسار۔ ایک چنبیلی کا پھول ہے۔ سادہ اور نازک۔ اس کا حسن اس کی نزاکت اور
”سادگی میں۔ دوسرا سورج مکھی ہے۔ خوش رنگ اور نظر فریب۔
”افسانہ : ”وفا کی دیوی

محاوروں، کہاوتوں لوک گیتوں میں بھی عوامی رنگ ہے۔ یہ عوامیت کسی ایک خطے تک محدود نہیں
بلکہ شہری اور دیہاتی دونوں خطے کی بولیوں سے جڑے ہوئے ہیں۔
”بینی مادھو سنگھ نے شہادت دی بہو بیٹیوں کی یہ عادت اچھی نہیں کہ مردوں کے منہ لگیں۔“
”افسانہ : ”بڑے گھر کی بیٹی

پریم چند کی کہانی کا ایک ایک جملہ ماحول و کردار سے مناسبت رکھتا ہے۔ وہ کرداروں کی گفتگو و
لہجے میں صوتیاتی تاثرات کو قائم رکھنے میں بھی محتاط نظر آتے ہیں۔ جس کے سبب ان کے اسلوب میں
نیا پن اور رنگا رنگی آجاتی ہے۔ صوتیاتی تاثرات کا جائزہ اس طرح لیا جاسکتا ہے :-
بھگت نے چونک کر سر اٹھایا، چڈھا بابو کے لڑکے کو؟ وہی چڈھا بابو ہیں نہ، جو بنگلے میں رہتے ہیں،”
”پورب طرح
”افسانہ: ”منتر

پریم چند کی اردو کہانیوں میں مقامی و ہندی بولیوں کے مختلف الفاظ ملتے ہیں۔ جیسے یوگ، بھوجن، تیگ،
ستیا گرہ، بلیدان وغیرہ۔ اسی طرح ہندی تخلیقات میں سنسکرت کے علاوہ اردو الفاظ بھی ملتے ہیں۔ ایسا اس
لیے ہے کہ ان کے عہد میں لسانی تنازعات کے سلسلے سے یہ ایک اہم بحث تھی کہ اردو ہندی یا
ہندوستانی تینوں زبانوں میں سے کسی ایک کو سرکاری درجہ عطا کیا جائے۔ گاندھی جی نے اس لسانی
مسئلے کے حل کے لیے ہندوستانی زبان کے استعمال پر زور دیا۔ پریم چند چون کہ گاندھی جی کے ہم خیال
تھے اس لیے انہوں نے ہندی تخلیقات میں اردو اور اردو تخلیقات میں ہندی الفاظ کا استعمال کیا لیکن ان کی
ہندی و اردو تخلیقات کے اسلوب کے سلسلے سے یہ غلط فہمی رہی ہے کہ دونوں زبان کی تخلیقات
اسلوبیاتی سطح پر مماثلت رکھتی ہیں۔ جس

میں صرف چند مروجہ الفاظ کے استعمال کا فرق ہے اور کچھ بھی نہیں۔ ایسا کہنا درست نہیں کیوں کہ پریم
چند کی ہندی و اردو کی کہانیوں میں لفظوں کے انتخاب کے ساتھ ساتھ فقروں کی ساخت اور ادبی مزاج
کے اعتبار سے امتیازات واضح طور پر نمایاں ہیں۔

پریم چند کے اسلوب کی ایک خوبی اختصار نویسی بھی ہے۔ جو فقرے جملے و عبارت ان کی کہانیوں میں
ملتے ہیں۔ اس میں اختصار سے کام لیا گیا ہے۔ ساتھ ہی پریم چند کی ہندی یہ ہے کہ انہوں نے صرف
سماج کی خارجی پہلوؤں کو موضوع نہیں بنایا بلکہ کرداروں کی نفسیاتی پیچیدگیوں و تضادات کو فنی
سطح پر پیش کیا۔ ہمیں زندگی کی ان حقیقت سے روشناس کرایا جہاں تک ہماری رسائی ممکن نہیں تھی۔
پریم چند کے اسلوب میں جو طنز ہے اس میں برجستگی نشتریت مزاج پھبتی کے ساتھ ساتھ ہمدردانہ و
مخلصانہ رویہ بھی کار فرما ہے۔ پریم چند انگریزوں اور جاگیردارانہ سماج کے کھوکھلے آدرشوں و ظلم و

جبر جو ہندوستان کے غریب عوام کو ہر اعتبار سے پسماندہ کر چکی تھی اس سے وہ مطمئن نہیں تھے۔ یہی وجہ ہے کہ وہ طنز کے ذریعہ سماج کے ان کریہہ پہلوؤں کا پردہ چاک کرتے ہیں اور ایک مہذب سماج کی تشکیل چاہتے ہیں جس میں ہندوستان کا مظلوم طبقہ آزادی کی سانس لے سکے۔ افسانہ ”شطرنج کی بازی“ کا یہ اقتباس دیکھئے

اندھیرا ہو گیا تھا، بازی بچھی ہوئی تھی۔ دونوں بادشاہ اپنے اپنے تخت پر رونق افروز تھے۔ ان پر ”حسرت چھائی ہوئی تھی گویا مقتولین کی موت کا ماتم کر رہے تھے۔ چاروں طرف سناٹے کا عالم تھا۔ کھنڈر کی بوسیدہ دیواریں اور خستہ حال کنگورے اور سر بہ سجود مینار ان لاشوں کو دیکھتے تھے اور ”انسانی زندگی کی بے ثباتی پر افسوس کرتے تھے۔ جس میں سنگ و خشت کا ثبات بھی نہیں۔

شطرنج کی بازی، پریم چند کی کہانیاں مرتبہ جوگندر پال ص-۱۱۹ اس اقتباس میں تہذیبی زوال کا نقشہ کھینچا گیا ہے۔ جس میں تلخی کے ساتھ ساتھ عبرت کا پہلو بھی موجود ہے۔ پریم چند نے افسانوں کے علاوہ اپنے ناولوں ’اسرار معابد‘، ’کشنا‘، ’روٹھی رانی‘، ’ہم خرما و ہم ثواب‘، ’جلوہ ایثار‘، ’بازار حسن‘، ’گوشہ عافیت‘، ’نرملہ‘، ’غین‘، ’چوگان ہستی‘، ’پردہ مجاز‘، ’میدان عمل‘، ’گودان‘ اور ’منگل سوتر‘ کے توسط سے بھی غریب مفلوک الحال ہندوستانی عوام کی دکھتی رگوں پر مرہم رکھنے کی بھرپور کوشش کی ہے۔ غرض کہ پریم چند نے جہاں اپنے ناولوں میں عوامی زندگی کے مسائل اور دیہاتی عوام کو کردار کی شکل میں پیش کیا وہیں موضوع و کردار کے ذریعہ عوامی زبان و اسلوب کا بھی استعمال ہے۔

پریم چند کے اسلوب کے متعلق عزیز احمد کہتے ہیں کہ

ان کے اسلوب کی بڑی خوبی اس کی سادگی ہے۔ ان کی زبان حتی الامکان آرائشوں سے پاک ہے۔ زبان ”کہانی یا اصلاحی مقصد کی خدمت کرتی ہے اور اس کی حیثیت محض ثانوی ہے۔ ان کی زبان قصہ کا تسلسل برقرار رکھنے میں بڑی مدد دیتی ہے۔ طرز تحریر میں وہ اردو اور ہندی کے اسالیب کو ایک دوسرے سے قریب لاتی ہے۔“

ترقی پسند ادب/عزیز احمد ص-۲۴۸

اختر انصاری نے اپنے مضمون ”اردو نثر کے اسالیب اور پریم چند“ میں کہتے ہیں کہ

پریم چند کے اسلوب کا جائزہ لیتے وقت ہماری نظر اس کے جزوی پہلوؤں کے بجائے سب سے پہلے ”اس کے ایک مجموعی وصف پر پڑتی ہے۔ وہ مجموعی وصف یا جامع و ہمہ گیر خصوصیت اس کا جمہوری و عوامی انداز ہے۔ اسی ایک مادی خصوصیت کی بنا پر پریم چند کا اسلوب اور ان کا طرز ایک خاص طرز ہے۔ بلکہ اگر غور کیا جائے تو یہی وہ چیز ہے جس نے پریم چند کے منفرد اسلوب کو نہایت ”درجہ منفرد بنا دیا ہے۔“

منشی پریم چند شخصیت اور کارنامے ”ڈاکٹر قمر رئیس۔ ص-۳۰۳

Conclusion

حاصل کلام یہ کہ پریم چند اردو افسانہ کا ایک ایسا منفرد نام ہے جس نے موضوعاتی اور اسلوبیاتی سطح پر اپنی انفرادیت درج کرائی اور ایک بڑے حلقے کو متاثر کیا اور شاید یہی وجہ ہے کہ آج بھی پریم چند کے موقف اور اسٹائل کو اپنانے میں لکھنے والے فخر محسوس کرتے ہیں اور یہ سلسلہ بنوز جاری ہے۔ گویا پریم چند نے اردو فکشن کو اسلوبیاتی سطح پر نئی زندگی عطا کی۔

References :-

- 1 زمانہ ۱۹۳۶ مضمون بشمولہ ادب کی غرض و غایت/پریم چند ص-۲۰۵
- 2 پریم چند کے نمائندہ افسانے/قمر رئیس ص-۳۰
- 3 شطرنج کی بازی، پریم چند کی کہانیاں مرتبہ جوگندر پال ص-۱۱۹
- 4 ترقی پسند ادب/عزیز احمد ص-۲۴۸
- 5 منشی پریم چند شخصیت اور کارنامے ”ڈاکٹر قمر رئیس۔ ص-۳۰۳

जागतीकी करणातील शहरांची आर्थिक व पायाभूत सुविधा आणि वाहतुक व्यवस्था प्रश्न

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प्रस्तावना :

शहरे ही आर्थिक विकास आणि नवनविन कल्पनांचे मुख्य इंजीन आहे. सध्या देशातील लोकसंख्येपैकी एक तृतीवांश लोकसंख्या शहरीभागात राहते. या लोकसंख्येचा जी.डी.पी. मधील वाटा ३/५ पेक्षा अधिक आहे. देशाच्या शहरीकरणाच्या अर्थ व्यवस्थेसाठी ही बाब अत्यंत महत्वाची आहे. कारण या उद्योग क्षेत्राशी २६९ उद्योगामधील अंतर संबंध गुंतलेले आहे. शहरी करणाचा विकास हा थेट रोजगार निर्मिती, जिडीपी आणि अर्थ व्यवस्थेतील वापराचा कल यावर परिणाम करणारा आहे.

शाश्वत शहरीकरण आणि विकास हा सामाजिक आणि आर्थिक स्तराबरोबरच गुणवत्तापूर्ण जीवनावर प्रभाव टाकणारा एक घटक असल्याचे जागतीक समुदायाने मान्य केले आहे. शहरीकरणमध्ये गृहनिर्माण, सेंदाई आराखडा (२०१५) आणि पर्यावरण बदलावरील पॅरीस करार (२०१६) यात मान्य केले की, शहरीकरणाचा शाश्वत विकास आणि आपत्ती प्रतिबंधक गृह निर्माण अत्यावश्यक आहे. शाश्वत विकासाची उद्दीष्ट्ये यातील अकरावे उद्दीष्ट्ये शहरीकरणाकरीता आर्थिक व पायाभूत सुविधा हे शहरातील मानवी जिवनमान सर्वसमावेशक, सुरक्षित, संवेदनाक्षम आणि शाश्वत असावे. भारताने शहरीकरणाकरीता सामाजिक व आर्थिकस्तर उंचवण्यासाठी पायाभूत सुविधा यांचे महत्व ओळखने आणि २०२२ पर्यंत स्मार्ट सिटी मोहिम हाती घेतली.

शहरीकरणाच्या पायाभूत सुविधा व आर्थिक मागणी पुरवठा व प्रश्न :-

शहरीकरणाच्या विकासातील आव्हाने स्विकारण्या करीता अनेक योजनांची अंमलबजावणी पुर्व गुंतवागुंतवीची प्रक्रिया दिर्घ आहे. या प्रक्रियेमध्ये जमीन रुपांतरित करणे, इमारत आराखडा अभ्यास यासाठी शासन मान्यता, बांधकामासाठी परवानगी व विविध खात्याकडून मिळवावी लागणारी 'नाहरकत प्रमाणपत्रे' या प्रक्रियेमध्ये दोन वर्षांचा कालावधी खर्च होतो.

बाह्य पायाभूत समस्या आणि संपर्क यंत्रणेचा आभाव कमी करण्याकरीता राज्य सरकाराने याबद्दलची दखल घेतली आहे. त्या अनुषंगाने पावले उचलेली आहेत. ही प्रक्रिया सोपी, सुलभ करणे, धोरण आखणे, प्रक्रियेत बदल करणे इत्यादी उदा. जमीन एकत्र करणे किंवा अधिक घनता असलेले प्रकल्प उभारणे अशी पावले मध्य प्रदेश व महाराष्ट्र शासनाने उचलेली आहे. जीपीएस प्रणालीवर आधारित वस्तुनिष्ठ प्रगती पाहणी प्रणाली कनार्टा सरकारने सुरु केली आहे.

सन २०२२ पर्यंत शहरीकरणामधील गृहनिर्माण प्रकल्प कल्पना प्रत्यक्षात प्रगतीपथावर आली आणि कालबद्ध पध्दतीने पूर्णत्वास गेली. शहरीकरणामध्ये काही महत्वपूर्ण बाबींवर सुध्दा लक्ष केंद्रीत करावे लागत आहे. उदा. पाणी समस्या, आरोग्य रक्षणाची काळजी, आरोग्य वाहतुक व्यवस्था, शिक्षण, विज पुरवठा, त्याच प्रमाणे चांगले वातावरण यांची सुध्दा दखल घेतली पाहिजे. समाजाला चांगल्या स्थितीत राहता यावे तसेच शाश्वत विकासासाठी काळजी घ्यावी लागेल. शहरीकरणामध्ये झोपडपट्टीची वाढ होवू न देता चांगला परिसर निर्माण करणे आणि सभोवतालचे आरोग्य जपणे हे महत्वाचे आहे.

आरोग्य सुविधा प्रश्न आणि जल स्रोत स्वरूप :-

भारतातील सर्वच शहरामध्ये पाणी पुरवठा खंडीत, कमी दाबाने होणारा व खराब दर्जाचा असल्याचे सर्वत्र दिसून येते. शहरी लोकसंख्येचा भार त्याच बरोबर सातत्याने वाढत जाणारी शहरे यांना पाणी पुरवठा करणे एक शहरासाठी आव्हान होत आहे. जमीन, पाणी आणि हवा यामध्ये होणारे प्रदुषण आजारांना निमंत्रण देत आहे. उदा: डेंगू, मलेरिया, चिकन गुनिया, माकड गुनिया, डायेरिया, स्वाईन फ्ल्यू, अस्थमा यासारखे विकार यांची दिवसेंदिवस वाढ होत आहे. आरोग्य सेवा तोकडी पडत आहे. भारत सरकारच्या शहरी विकास मंत्रालयाने केलेल्या अभ्यासात असे दिसून आले की, १४ वर्षा खालील २३ दशलक्ष मुले अपुऱ्या आरोग्य सेवेमुळे धोक्याच्या कक्षेत येणारी आहे. ८ दशलक्ष मुले ही शहरामधील निकृष्ट पाण्यामुळे धोक्याच्या कक्षेत आहे. देशातील बालमृत्यूदर दर हजारी ४२ इतका असून ग्रामीण भारतापेक्षा तो जरी कमी असला तरी सुंस्कृत समाजाला ही बाब स्विकारार्ह वाटणारी नाही.

अनेक वेळा मोठे अंतर कापून शहराला पाणी पुरवठा करण्यात येतो. अनेक वेळा पाईप लाईन फुटल्यामुळे पाणी वाया जाते. त्यामुळे अपुरा पाणी पुरवठा, अपुरी देखभाल यामुळे पाणी पुरवठ्याच्या व्यवस्थेत तांत्रिक नुकसान होते. सदोष मीटर पध्दती, अनबील्ट वॉटर कंडम्पशन तसेच पाणी चोरी यामुळे व्यापारी तुट येते. साऱ्याचा एकत्रित परिणाम फार मोठ्या प्रमाणावर महसुलावर होतो. ही सर्व पाणी पुरवठा समस्येची कारणे आहेत. त्याचबरोबर शहरांना नैसर्गीक धोका असतो तो पुर परिस्थिती निर्माण होण्याचा, त्यामुळे पाण्याची पाईप लाईन गंजण्याचा आणि

पाणी प्रदुषण होण्याचा पाणी व्यवस्थापनामध्ये या सर्व बाबी एकमेकांशी निगडीत आहेत. सरकारचे पाणी प्रकल्प फायद्यापेक्षा तोट्याची जास्त झाली आहेत. म्हणूनच विकेंद्रीत अशा पाणी व्यवस्थापनाकडे लक्ष देणे गरजेचे आहे.

मलनिस्सारण स्वरूप व प्रश्न :-

मलनिस्सारण क्षेत्राचे (सेवांचे) जाळे कोणत्याही अडथळ्याविणा, कोणत्याही गळती शिवाय विशिष्ट मार्गातून जमा करून मार्गस्थ होणे गरजेचे आहे. अशा तऱ्हेने आपण पाण्याचा अपव्यय तर थांबवूच त्याचप्रमाणे उत्तम तऱ्हेने ठिकवून ठेवू शकू. एकुण वातावरणातही यामुळे चांगली सुधारणा होवू शकते. दुर्दैवाने भारतातील परिस्थिती मात्र कल्पनेपेक्षा एकुणच पाणी पुरवठ्याची परिस्थिती गंभीर आहे. याच अनुषंगाने मलनिस्सारण सुध्दा पुर्णतः अपुरी आहे. आपल्या देशात पाणी पुरवठ्याची सेवा मिळते ती खंडीत स्वरूपाची व निकृष्ट दर्जाची असते. त्याचा नकारात्मक परिणाम आरोग्यावर होतो. म्हणूनच खालील बाबींकडे लक्ष वेधने गरजेचे आहे.

१. भारतातील ५१६१ शहरांपैकी ४८६१ शहरामध्ये पुरेशा मलनिस्सारणाच्या सोयी नाही.
२. बंगलोर, हैद्राबाद, कलकत्ता, दिल्ली, भोपाळ इत्यादी शहरामधील ५०% अधिक राहत्याघरामध्ये मलनिस्सारणाची जोडणी केली नाही. शहरी करणाच्या प्रकल्पामध्ये गृह संकुलामधील १८% गृहसंकुलामध्ये शौचालयाच्या सोयी नाही. त्यांना उघड्यावर आधार घ्यावा लागतो. रस्त्याच्या जाळ्यापैकी २०% पेक्षा कमी रस्ते स्टार्म वॉटर ट्रेनने झाकलेले आहे.

इस. २०५० पर्यंत शहरामध्ये स्वच्छ पाण्याचा पुरवठा, पिण्याच्या पाण्याचा पुरवठा, औद्योगिक वापरासाठी पाण्याच्या पुरवठेची मागणी प्रचंड प्रमाणात वाढणार आहे. वाया जाणाऱ्या पाण्याची निर्मिती एक समस्या आहे. यावर प्रक्रिया केली जात नाही. त्यामुळे असलेल्या मर्यादित पाण्याच्या स्रोतांना देखील धोका पोहचत आहे. औद्योगिक वापरासाठी लागणाऱ्या दैनिक वापर हा जल प्रक्रिया संच उभारून भागविणे गरजेचे आहे. सर्वेक्षणानुसार असा अंदाज व्यक्त केला जात आहे की, पाण्यावर प्रक्रिया न केल्यामुळे दुषित पाण्याच्या समस्येमुळे पाण्यातून होणाऱ्या आजारावरती १५ अब्ज अमेरिकन डॉलर खर्च करण्यात आले आहे. सीआयआय २०१० च्या अहवालानुसार मलनिस्सारण प्रणाली तसेच शौचालय सुविधा मिळविण्यावरही भाष्य केले आहे.

घनकचरा प्रश्न व व्यवस्थापन :-

शहरीकरणामध्ये शहर सुंदर व स्वच्छ करण्यासाठी घन कचरा व्यवस्थापनाची अत्यंत महत्त्वाची गरज असून खुप कार्याला वाव असलेला विषय आहे. इतर देशाच्या मानाने आपल्या कडे अत्यल्प दराने हे काम करून घेतले जाते. भारतामध्ये घरगुती कचरा, स्थानिक स्वराज्य संस्थांच्या बाबतीतील असो कोणीही ओला कचरा-सुका कचरा असा फरक करण्याचा त्याच प्रमाणे विघटनशील कचरा वेगळा करण्याचा प्रयत्न करीत नाही. या सर्वांचे

फायदे व तोटे अजुनही भारतीय मानसिकतेमध्ये आले नाही. कचरा आगारातून कचरा गोळा केलेल्या कचऱ्यावर प्रक्रिया केली जात नाही. तर नियमांचे सरळसरळ उल्लंघन केले जाते. महानगर पालिकेमध्ये सन २००० मध्ये अस्तित्वात आलेली नियमावली आहे. पण त्याची अंमलबजावणी मात्र फारच कमी प्रमाणात दिसते. खरे तर फार मोठ्या प्रमाणात म्हणजेच भारतामध्ये तयार होणारा सुमारे ६०% कचरा हा विघटनशील आहे. त्यापासून कंपोस्ट करण्याच्या अनेक विविध संधी आपल्याकडे आहे. आपल्या कडील जीवन शैली बदलत आहे. विशेषतः मोठ्या शहरामध्ये त्याचा परिणाम असा होत आहे की, पॅकींग केलेल्या वस्तु वापराकडे लोकांचा कल वाढत आहे. त्यामुळे []चरा संचयनाचे प्रमाण १.३ % इतक्या प्रमाणात वाढत आहे. विघटनशील कचरा औद्योगिक देशाच्या तुलनेत कितीतरी पटीने अधिक आहे. भारत सरकारने ०२ ऑक्टोबर २०१४ रोजी 'स्वच्छ भारत अभियान' सुरु केले आणि ०२ ऑक्टोबर २०१९ पर्यंत स्वच्छ भारत करण्याचे उद्दिष्ट ठेवले आहे.

स्वच्छतेचा हक्क :-

जगातील ४०% लोकांकडे स्वच्छतेची मुलभूत सुविधा नाही. संयुक्त राष्ट्राने सन २०१० मध्ये स्वच्छ पाणी व सुरक्षित स्वच्छता गृहाचा मानवी हक्कात समाविष्ट केला आहे. हा हक्क भारतीयांना लागू होणे गरजेचे आहे.

स्वच्छतेचा अनेक देशांना आर्थिक खर्चाचा बोजा वर्ष २००१ ते २०१४

अ.क्र.	आर्थिक वर्ष २००१ ते २०१४	प्रचार प्रसिध्दीवर झालेला देशपातळीवरील खर्च (रू. लाखात)	देशात वैयक्तिक शौचालय बांधलेली एकुण कुटूंब संख्या
१.	सन २००१-२००२	३८२.३७	६३८६६०
२.	सन २००२-२००३	५५९.४६	५९६३८०
३.	सन २००३-२००४	३३४४.९८	६१३७०१०
४.	सन २००४-२००५	३४६३.३६	४५८२२८३
५.	सन २००५-२००६	४२४४.५५	९१७१४०७
६.	सन २००६-२००७	६२२३.७२	९७००३८०
७.	सन २००७-२००८	७७५९.५३	११५२७८९०
८.	सन २००८-२००९	८५२६.७८	११२६५८८२
९.	सन २००९-२०१०	११४८५.३९	१२४०७७७८
१०.	सन २०१०-२०११	११५१२.९७	१२२४३७३१

११.	सन २०११-२०१२	१०९४८.२५	८७९८८६४
१२.	सन २०१२-२०१३	१२५८१.४४	४५५९१६२
१३.	सन २०१३-२०१४	२०८३७.७७	४९७६२५४
१४.	सन २०१३- ३१/१०/२०१७	४०१२.३३	१४२३९१२
	एकुण खर्च	१०६२८२.९	९८०२९६५३

संदर्भ www.mdws.n**स्वच्छतेतून आर्थिक विकास :-**

स्वच्छतेची मुलभूत सुविधा नसल्याने अनेक देशांना आर्थिक खर्चाचा बोजा सहन करावा लागतो त्यामुळे वार्षिक आर्थिक विकासावर त्याचा परिणाम होतो. संयुक्त राष्ट्रांच्या जागतीक बँकेच्या पाणी व स्वच्छता विभागाच्या अहवालानुसार भारताला वर्षाकाठी ५३.८ दशलक्ष अमेरिकन डॉलर आर्थिकभार अस्वच्छते मुळे सहन करावा लागतो. सहाजीकच त्याचा परिणाम भारतीय देशांतर्गत उत्पन्नावर होत असतो. स्वच्छतेच्या सुविधेची पूर्तता केल्यास आर्थिक विकासाला चालना मिळू शकते.

महा शहर वाहतूक व्यवस्था व स्वरूप :-

शहरी वाहतूक व्यवस्थे संबंधी विचार करतांना या शब्दाची व्याप्ती मोठ्या प्रमाणात दिसून येईल शहरांतर्गत प्रवाशी तसेच माल वाहतुकीसाठी लोक जी साधने वापरतात त्यामध्ये पादचारी सायकली, रिक्शा या सारखी खाजगी वाहने उदा: मोटार कार, मोटार सायकल, सार्वजनिक वाहतुकीच्या संदर्भात महामंडळाची बस, रेल्वे, सार्वजनिक, खाजगी वाहतुकीची भागीदारी उदा. टॅक्सी इत्यादींचा समावेश होतो.

शहरी वाहतुकीमध्ये २२% इतके प्रमाण सार्वजनिक वाहतुकीचे आहे. याची तुलना कमी उत्पन्न असलेल्या देशाशी होते. यामध्ये फिलीपाईन्स, व्हेनेझुएला, इजिप्त इत्यादी देश तसेच अधिक उत्पन्न असलेल्या देशामध्ये ४०% हुन अधिक लोक सार्वजनिक वाहतुकीचा फायदा घेतात. यामध्ये दक्षिण आफ्रिका, दक्षिण कोरिया, ब्राझिल इत्यादी देशांचा समावेश होतो. सार्वजनिक वाहतुकीचा वापर लक्षात घेता यामध्ये फार मोठ्या प्रमाणात घसरण दिसून येते. १९५१ साली ११% इतका वापर असलेली संख्या २००१ साली १.१% इतकी घसरलेली आहे. ५ लाख लोक संख्या असलेल्या भारतातील ८५ शहरांपैकी, फक्त २० शहरामध्ये फक्त २००९ साली सार्वजनिक बस व्यवस्था सुरु होती.

रस्त्याची घनता (चौ.कि.मी.) सिंगापूर ९.२, कुरीताबा ९.७, सेअल २१.८, जोहान्स बर्ग १० चेन्नई ३.८ नवी दिल्ली १९.२ भारतीय रस्ते व रोडचा विचार करता गुणवत्ता नसलेले खराब रोड, यामुळे भारताचे सार्वजनिक

वाहतुक व्यवस्था यामुळे मोठे आव्हान उभे राहिले आहे. अर्थ व्यवस्थेचा विचार करता सार्वजनिक वाहतुकीची व्यवस्था अडथळ्याची ठरत आहे. लोकांच्या आरोग्यावर व जीवनावर परिणाम करत आहे. लोकांना प्रवासामध्ये अनेक तास व्यतित करावे लागतात. अपघातामध्ये जीव गमवावा लागतो. हवा प्रदुषणामध्ये जीव गमवावा लागतो हवा प्रदुषणामध्ये वाढ या सर्वांचा एकत्रित परिणाम खराब वाहतुक व्यवस्थेमुळे दिसून येतो. शहरी लोकांच्या उत्पादन शक्तीवर याचा स्पष्ट परिणाम झाला.

देशामध्ये शहरी भागामध्ये वाहतुकीचे वैशिष्ट्ये म्हणजे अधिक घनता असलेल्या शहरामध्ये ही व्यवस्था साहज्यभूत व परिणामकारक ठरू शकतो. शहरातील गरीब व मध्यमवर्गीय लोकांना परवडणाऱ्या किमतीमध्ये तीचा उपयोग होवू शकतो कोणत्याही देशाच्या अर्थव्यवस्थेमध्ये सार्वजनिक पायाभूत सुविधावर अवलंबून राहावे लागते. विशेष करून शहरी वाहतुक व्यवस्थेवर अधिकच अवलंबून राहावे लागते. या व्यवस्थेमुळे लोकांना शिक्षण, रोजगार, इ. महत्वाच्या क्षेत्रांना जोडणारी व्यवस्था आहे. पुढील भविष्यामध्ये लोकांना मिळालेल्या संधीत वाढ होऊन पुढील मिळणाऱ्या शिक्षणाचा व रोजगाराचा विचार ते करू शकतात.

धन संपत्तीसह निरोगी आयुष्य आणि समृद्धीसह स्वस्थ हवे असेल तर भारतीयांनो शहराकडे चला असा संदेश भारतीय पंतप्रधान देतात. ही शहरे त्याची कार्यक्षमता व परिणामकारकता या दृष्टीने शहरी वाहतुक व्यवस्थेच्या परिणाम प्रवाशाच्या आरोग्यावर तसेच सुरक्षिततेवर होतो. वाहतुक व्यवस्थेमधून उध्दभवणारे अपघात आणि सुरक्षिततेच्या दृष्टीने घडणारे गुन्हे यांचा वाहतुक नियोजन आणि व्यवस्थापन यांच्याशी संबंध आहे. शहरी क्षेत्रामध्ये परिस्थितीचा विचार करण्याजोगा आहे. वाहनांनी होणारे प्रदुषण हे हवा प्रदुषणामध्ये मोठ्या प्रमाणात भर घालतात.

शहरांना आर्थिक व्यवस्थेचे इंजीन असे म्हणतात. देशात नविन उपक्रम राबवण्याचे व नागरिकांना उत्तम जीवनमान द्यावयाचे आहे वाहतुक व्यवस्थेत सुधारणा उत्तम गृहनिर्माण व्यवस्था व्यापारी आस्थापने यांचाही विकास करावयाचा आहे. अपुऱ्या पायाभूत सुविधांचा अभाव, सार्वजनिक व्यवस्था, अर्थव्यवस्थेवर ताण, पर्यावरणीय प्रश्न, नागरी सुविधा घसरण, रस्ते अपघाताचे बळी, हवा, पाणी, प्रदुषण हे प्रश्न शहरासमोर आ वासून तयार आहे. नियोजनबद्ध वाहतुक असेल तर शहरीसुविधामध्ये वाढ व अर्थव्यवस्थेवरील ताण कमी करण्यात येईल.

ही प्रमाणात, भारतातील खराब सार्वजनिक वाहतुक व्यवस्थेचे प्रत्यक्ष परिणाम विविध धोरणांवर देखील दिसतात सार्वजनिक वाहतुक व्यवस्थेवरील करांचा भार खाजगी वाहनाच्या तुलनेत २.६ पट अधिक आहे. शहरी विकासावरील संसदीय स्थायी समितीने (२०१०) अतिदाट वस्तीवरील वैयक्तिक वाहनांवर टोल टॅक्सच्या स्वरूपात कॅंजेक्शन टॅक्स शिफारस केली आहे.

निष्कर्ष :- २०२२ पर्यंत 'सब का साथ सबका विकास' पंतप्रधानाचे स्वप्न प्रत्यक्षात उतरेल, शहरीकरणाचा विकास हा प्रत्यक्ष रोजगार निर्माता करणारा एक घटक आहे. शहरीकरणाच्या पायाभूत सुविधा तसेच आजची आव्हाने त्यामध्ये आरोग्य सुविधा व जलस्रोत जनतेचा सहभाग असेल तर त्याची अंमलबजावणी योग्य पध्दतीने नियोजन व्हायला लागेल. त्यासाठी त्याचा प्रत्यक्ष फायदा मिळेल शहरीकरणामध्ये मलनिस्सारण तसेच घनकचरा प्रकल्प यामध्ये नगरविकासाची भूमिका महत्त्वाची आहे. शहरी विकास मंत्रालयाने अनेक योजनांच्या माध्यमातून व्यापक कृती आराखडा तयार करून पुरक व्यवस्था निर्माण करावी भारतीय गणतंत्राच्या ६९ व्या वर्षीसुद्धा शहरीकरणामध्ये फारसा बदल झालेला दिसत नाही. भारतीय गणराज्याच्या ७५ व्या वर्षात पायाभूत विकासाचा संकल्प केला पाहिजे. आरोग्याच्या दृष्टीने वाहतुक व्यवस्थेचा विचार करता शहरीक्षेत्रामध्ये परिस्थिती विचार करण्याजोगी आहे. वाहनांनी होणारे प्रदुषण हे हवा प्रदुषणामध्ये मोठ्या प्रमाणावर भर घालत आहे.

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