ROLE OF ARTIFICIAL INTELLIGENCE IN PSYCHOLOGY

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Abstract

*This Article entitles that, the role of Artificial Intelligence in psychology states that Psychology is the study of mental processes and behaviour of individuals. It is about artificial cognitive processes required for an artificially intelligent entity to be intelligent, learning, autonomous and self-developing. In psychology there are several specialties or focuses of study. In cognitive psychology, how the brain thinks and works. This includes learning, memory, perception, language and Logic. There is also developmental psychology that considers how an individual adapts and changes during different developmental stages and what is appropriate to consider of a human based on development. Sports psychology considers how to affect individual performance and how performance affects the individual. So Artificial Psychology for the purposes of this paper contains the artificial mental process considered necessary to create intelligent, autonomous, self-evolving, artificially cognitive systems. "Real artificial intelligence" as the **simulation of** actual human behaviour is often referred to as artificial general intelligence (AGI). In AGI, machines are supposed to be built in a way that makes it impossible to distinguish them from real humans. There are three areas, in which psychology needs to play a leading role:1. User Experience (UX) in the interaction with artificial intelligence. The psychological impact of AI on humans 2. Other psychological concepts, such as emotion and empathy will have to be created in the same way as intelligence for example "Artificial Empathy" to recreate a fully functioning artificial general intelligence 3. "Mental" health of both machines and human beings.*

Keywords: Artificial Psychology, Artificial empathy, Artificial general intelligence.

Introduction

Artificial intelligence (AI), sometimes known as machine intelligence, is a scientifically developed system designed into a computer or robot that gives it human-like abilities such as learning, reasoning, problem-solving, perception, decision-making, and

speech and language skills. Psychology and Artificial Intelligence (AI) are closely related disciplines, although the organizational divisions that exist in research centres and professional practice sometimes make it difficult to integrate the two areas. Techopedia defines AI as "an area of computer science that emphasizes the creation of intelligent machines that work and react like humans". Often viewed as "our future" in the digital age, AI offers a lot of potential to permanently change our work and everyday lives while never getting rid of speculation and fear as for where the journey is going.

Artificial intelligence (A.I.) is generally defined as the property of machines that mimic human intelligence as characterized by behaviours such as cognitive ability, memory, learning, and decision making.

The term AI is typically used to describe both the "technology designed to perform activities that normally require human intelligence" and the multidisciplinary field of science concerned with understanding and developing that technology (Luxton, 2014).

From robots to software distributed across networks, AI is now a commonly used term. And while it can mean different levels of complexity and performance depending on the context and the commentator, it emulates either complex human behavior or specialized intelligent functions.

Most importantly, AI can learn without being explicitly told how to do so.Psychology, mental health in particular, is one of the more recent areas of focus for AI. As AI lengthens its reach, it is becoming increasingly crucial for psychologists, therapists, and counsellors to understand the existing capacity and future potential for the technology to transform mental healthcare.

Artificial Psychology

Psychology is the study of mental processes and behavior of individuals. Artificial Psychology is then the study of the mental processes of an Artificial Intelligence System (AIS) similar to humans [3, 4]. It is about the artificial cognitive processes required for an artificially intelligent entity to be intelligent, learning, autonomous and self-developing [4, 5]. In psychology there are several specialties or focuses of study. Take for example cognitive psychology that studies how the brain thinks and works.

This includes learning, memory, perception, language, logic [5, 6, 13, 14]. There is also developmental psychology that considers how an individual adapts and changes during different developmental stages and what is appropriate to consider of a

human based on development [17, 18, 19, 20, 21]. There is sports psychology that considers how to affect individual performance and how performance affects the individual. So Artificial Psychology for the purposes of this paper contains the artificial mental process considered necessary to create intelligent, autonomous, self-evolving, artificially cognitive systems. The AIS must mimic human processes in order to be intelligent.

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Why is psychology relevant for Artificial intelligent?

Intelligence is a psychological concept. While there is no universal definition of intelligence, there are multiple models and concepts, most of which overlap on the idea that **cognitive intelligence** incorporates the **ability of thinking, sense making, problem solving** and **reasoning**, all of which are psychological concepts.

Besides cognitive abilities, there are other forms of intelligence, such as **social and emotional intelligence**. Investing limited cognitive resources in a meaningful and therefore very selective way is another "intelligent" human ability, deeply engraved in our brains. Using mental shortcuts rather than analysing all information available in decision making is not only intelligent but also inevitable in a world so full of information.

There are three areas, in which psychology needs to play a leading role:

- **User Experience (UX) in the interaction with AI** - The **psychological impact of AI** on humans.
- Other psychological concepts, such as **emotion and empathy** will have to be created in the same way as intelligence for example "Artificial Empathy" to recreate a fully functioning artificial general intelligence
- **"Mental" health** of both, machines and human beings

Just to adapt to human beings and their preferences and needs to become friends, AI will vastly have to do the same. AI needs to develop an understanding of human beings in a similar way as human beings will have to develop an understanding for AI.

AI offers a promising approach to assist and sometimes replace selected practices involved in mental health assessment and treatment (Fiske, Henningsen, & Buyx, 2019).The technology has the potential to provide new types of treatment (including virtual and augmented reality, and games) and the ability to engage with populations that are difficult to reach or engage with. Such innovative approaches can also free therapists and mental health professionals' time and resources to focus on urgent or more specialist care (Fiske et al., 2019).However, there are inevitable ethical issues. At present, there is limited guidance on the development of such tools or how to integrate them with the work of health professionals, their existing technology and tools, and regulatory frameworks.

Other considerations when implementing AI solutions include understanding and agreeing on the level of human supervision required before, during, and after engaging with clients. At a minimum, assessment or intervention must respect and protect patient confidentiality and autonomy. Yet, if risks from accidental or intentional misuse and ethical concerns are managed successfully, AI offers a practical approach to treat mental health on a large scale. It also provides the capacity to capture and analyse large amounts of data, with the potential for greater knowledge and understanding of mental health and the efficacy of treatments (Fiske et al., 2019).

How to Use AI for Psychological Testing

De Mello and de Souza (2019) explored the potential for AI tools to assist data collection, analysis, testing, and evaluation in mental health.

AI technology offers valuable tools for therapy, combining techniques such as data mining (generating new information from deep analysis of large quantities of data) and expert analysis. AI opens up the potential to diagnose existing and potential problems, test, and confirm predictions and treatments.

When used to understand the data from 707 patients with suicidal tendencies in Greater Santiago, Chile, the AI identified a series of factors associated with suicidal ideation and behavior.

The findings led to a series of preventive interventions for at-risk individuals that reduced the risk of suicide and reinforced "psychological wellbeing, feelings of self-worth, and reasons for living" (Morales et al., 2017).

In 2017, Kravets, Poplavskaya, Lempert, Salnikova, and Medintseva created a model that used fuzzy logic to emulate psychiatric diagnoses. It successfully assessed patients and tested its mental health diagnoses based on incomplete knowledge.

Appropriate AI technology provides the means to piece together fragmented information, build mental models, test their validity, and suggest treatments (de Mello & de Souza, 2019).

Artificial Intelligence in Cognitive Psychology

Cognitive psychology attempts to understand cognition's complexity through research, testing, and building models of how the human mind handles and processes complex information during attention, memory, and perception (Zivony, 2019).AI and cognitive psychology share similar aims – to understand the nature of intelligent behavior – with the former attempting to build such processes using advanced technology.And while computational modeling and AI have subtle differences, they are both valuable approaches for understanding the nature of intelligent thinking and providing insights into the growing field of cognitive psychology.

Computational modeling involves "programming computers to model or mimic aspects of human cognitive functioning" (Eysenck & Keane, 2015). Artificial intelligence's underlying processes, on the other hand, typically bear no resemblance to the mechanisms used by the human brain.Rather than attempt to develop computational models that help us understand human intelligence, the AI designer's goal is to produce an outcome that appears intelligent. Such processes do not need to be functionally similar to those of a human.However, there is one particular model that appears to bridge the gap between the two approaches.

Connectionism was originally inspired by the network of neurons that exists within the brain. "Connectionist models typically consist of interconnected networks of simple units exhibiting learning" and model cognition with no explicit rules (Eysenck & Keane, 2015).While the brain may be described as a highly complex neural network, and connectionist models have successfully modeled specific human-like processes (such as face recognition), the jury is still out regarding whether such models explain human cognition. However, deep neural networks, inspired by cognitive psychology theories and methods, have had some success in explaining how children learn labels for objects and offer a great example of the benefits of combining knowledge and expertise from multiple disciplines (Ritter, Barrett, Santoro, & Botvinick, 2017).

According to Sukhnidh Kaur,(2020), 'Thinking' involves the conscious cognitive processes of the human mind such as processing information, engaging in problem-solving, decision making and reasoning. It is the longstanding goal of AI mechanisms to replicate the processes of thought to eventually replicate thought itself. Thinking allows humans to interpret the world around them and make analyses and predictions based on this understanding and AI aims to do exactly that. Alan Turing's 'Turing Test' is a test of a machine's ability to exhibit intelligence in behaviour on an equivalent or superordinate level relative to that of humans. In his work 'Computing Machinery and Intelligence,' he replaces the question 'Can machines think?' with 'Are there imaginable digital computers which would do well in the imitation game?' Given the difficulty in giving a concrete definition of the word 'thinking', the latter question, Turing believes, is one that is truly capable of being answered, while the former may be considered 'too meaningless to deserve discussion.' (Turing, 1950)

While human intelligence can be plainly defined as the 'capacity to acquire and apply knowledge', intelligence in AI includes usage of algorithmic coding for eventual self-programming, leading to the ability to decode and interpret data and make predictions based on it. In this sense, AI may indeed be termed as 'intelligent'. However, thinking in AI includes the ability of a machine to write and code its own programs and interact with humans in a complex fashion. 'Artificial General Intelligence' or AGI refers to the ability of the AI mechanism to not only work in the context of a specific assigned task that it is trained for but to go beyond that by adapting to a variety of situations and reprogramming itself accordingly, and AGI is now the primary universal objective of AI developers.

One can say that AI mechanisms move towards a better imitation of the human biological neuron networks, psychology and thinking every day by mimicking human cognitive processes. This, however, remains devoid of conscience and emotional ability that is a part and parcel of the human psyche. Hence we may conclude that machines can think if the definition of the terminology is manipulated to suit the capabilities of technology. There is still, however, a scope for AI to make further strides through advancements in technology, keeping in line with the concept that the future may always be uncertain.

Artificial Intelligence Based Psychology Apps

The use of AI in psychology remains a relatively new field, the ubiquity of smartphone technology means that many of us have hardware within easy reach to run the increasing number of AI-inspired psychology apps

1. **Woebot:** Woebot, a 2019 Google Play Award winner, encourages the user to think through situations using tools inspired by Cognitive-Behavioral Therapy (CBT).

   The mood tracker then shows the positive changes made over days and weeks. Find the app in the Google Play Store .and Find the app in the Apple App Store.

2. **BioBase:** Bio Base uses AI to compile and track stress over several weeks through a series of intelligence function tests. The app identifies times when stress was highest and offers pre-emptive deep-breathing exercises. Find the app in the Google Play Store.

3. **Youper**: Youper provides a personalized emotional health assistant to help treat stress, anxiety, and depression. The app uses techniques from several therapies, including CBT and mindfulness, to monitor and improve mental health through a series of brief conversations.Find the app in the Google Play Store. And also find the app in the **Apple App Store**.

4. **Replika:** Replika is an AI-powered chatbot that provides an emotional connection and virtual friendship to support people going through depression, anxiety, or troublesome times. Find the app in the Google Play Store and also app in the Apple App Store.

5. **Tess:** Tess is a web-based mental health chatbot that uses AI to offer the user wellness coping strategies. It promotes resilience through text-based conversations via Facebook messenger, SMS, and web browsers rather than an App.

Applications of Artificial Intelligence and psychology

1. Psychotherapy endows a sense of control in patients gripped with emotional conflicts which allow them to handle their reflexes and regain composure through conscious and behavioral alterations. These transformational changes can be brought about by improving their listening skills, observational capacities, creating awareness, making them more attentive and intervening. Conventional psychotherapy calls for one-to-one sessions during treatment. Considering the increased access to information technology in our normal living, the thought of human interaction being replaced by IT tools came to existence. Specialized tools and techniques are employed through the course of therapy which not only alters but also accentuates their cognitive and effective understanding. The idea of amalgamating these two broad ambits - the complexities

of psychology and dynamism of artificial intelligence has gained momentum in recent times.

2. both AI and psychology have a common axis: **understanding the processes that give rise to intelligent behavior**. In the case of psychology, the study focuses on human beings and we talk about mental processes. In the case of AI, the study focuses on machines and we talk about information processing in general, psychology focuses on three main axes of the person: **cognition, emotion and behaviour**. From the point of view of "weak AI", machines do not think, although they process information, they do not feel either, although they can identify emotions, and they have behaviour, which is determined by the output of their algorithms.

So, psychology deals with biological organisms, while AI deals with artificial cognitive systems. But deep down, both types of minds face the same essential challenge: adapting to the environment and solving problems efficiently even in situations of uncertainty, ambiguity, and noise**.** Based on this analogy between intelligent biological and artificial systems, research in both disciplines is interrelated: Knowledge of the human mind can contribute to the design of more intelligent artificial system. The use of computational models can contribute to research on the functioning of the human mind.

In other words, the use of *bio-inspiration* in AI implies that the **design of some artificial systems is based on the dynamics observed in the human cognitive system** or other species. At the same time, hypotheses about how the human mind works can be tested, at least partially, using computational models based on Artificial Intelligence. This **parallelism between "artificial minds" and "natural minds"** is not the only link between the two disciplines.

For example, from the point of view of the possible practical application of Artificial Intelligence in the area of psychology, there are multiple possibilities such as

1. Intelligent systems based on **Machine Vision** for: Emotions facial expression training and Detection of situations of risk to health.

2. Intelligent systems based on **Natural Language Understanding** for: Early detection of psychological problems and Automatic detection of personality traits.

3. Intelligent systems based on **Voice Signal Processing** for :Identification of mood and level of physiological activation and Detection of symptoms of anxiety and depression.

4. Intelligent systems based on **Pattern Recognition on sensor data** for: Automatic detection of a person's behaviour. And Automatic detection of falls, accidents or assaults.

This technology is applied in different areas of psychology such as **talent management, education, psychotherapy, neuropsychology or prevention in mental health**.

Conclusion

In conclusion, artificial intelligence will become more valuable to humans than its capabilities. It will become a part of our daily lives. This new technology where a robot that can learn and develop skills on its own. Artificial intelligence will surpass humans on an IQ level and become better than humans at many skills or knowledge. Artificial intelligences are designed to learn on their own and resemble a human brain and physical and mental properties. Humans will continue to make new discoveries and discover new things. Artificial intelligence will never be able to accomplish that, however they may assist a human by providing theories. The future is unknown, artificial intelligence and humans will be able to work together on many different topics in Psychology. Artificial intelligence can comprehend human Psychology through algorithms. In a future where artificial intelligence (AI) is universal, psychology will stay an asset for helping individuals adapt to vulnerability and change. As the world turns out to be progressively more innovative, so does the requirement for human-based advising and connection.

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