

## Artificial Intelligence Reasoning for Mental Wellness

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**Abstract:** Artificial Intelligence (AI) is a broad and evolving field in computer programming and development, dedicated to training machines to perform tasks that typically require human intelligence. It goes beyond simple automation and explores intricate topics like consciousness and cognitive thinking. By constructing robots that think and behave like humans, researchers seek to advance our knowledge of consciousness. The link between artificial intelligence, sometimes called as artificial reasoning or AI reasoning, and human cognitive processes[1] is a vital issue. This multidisciplinary project demonstrates AI's potential for resolving complicated challenges by using it to treat complex mental health concerns. But there are still issues with things like novel interaction strategies and ideas of human-AI collaboration. In order to shed light on how artificial intelligence affects reasoning processes and its possible uses in daily activities to improve mental health, this study explores the link between AI and human reasoning. It also focuses on finding and solving issues that artificial intelligence (AI) reasoning can solve. Terms like artificial intelligence (AI), artificial emotion, cognitive reasoning, artificial superintelligence, and linguistics are essential to comprehending the complex workings of this area.

**Keywords:** Artificial reasoning, AI reasoning, Interaction techniques, Neural networks.

### 1. Introduction

Reasoning is a scientific study of human mentality and human behavior with their characteristics. It comprises study on the phenomenon of consciousness and unconsciousness of the human mind which includes our emotions as well as our thoughts. It's an academic discipline with an immense scope which is traversing the boundaries between environment and human[2] sciences. An expert practitioner or researchers who are involved in such a discipline are called psychologists. Psychologists seek understanding, developing properties of the human mind and linking the discipline with neuroscience and they also attempt to understand human behavior.

A glance at the developed history timeline of automation science and its technology demonstrate that more people are using reasoning (brain science) as well as personality control or neuroscience, and many other theories which are used to study and control the strategies and algorithms too. With idea like these, we will also derive from reasoning and other related disciplines to study, investigate, comprehend and an endeavor to develop a new field of the information science[3]. However, the

objective of the known studies is to produce a human like intelligence, including activities such as reasoning, judgment, identification, perception, pondering, designing and giving solution for a problem. The information garnered from artificial intelligence research predominantly intends on how to obtain, convey and use knowledge.

### A. Background and Context

With an emphasis on the possible applications in mental health, the project investigates the complex link between human cognition and artificial intelligence (AI) thinking[4]. Advances in artificial intelligence (AI) have spurred interest in using intelligent systems to mimic, improve, and comprehend human cognitive processes in recent years. One area where technology has the potential to be revolutionary is the junction of AI and mental health.

1. The Changing Artificial Intelligence Landscape With the advancement of technology, AI's capabilities have gone beyond simple automation. Because AI can mimic human intellect, it has created new research opportunities, particularly in the area of comprehending and mimicking cognitive processes.

2. Importance of Human Cognition in Research on human cognition which includes emotions, logic, and consciousness has drawn interest from a wide range of academic fields[5]. The goal of psychology and research is to understand the workings of the human mind, including how it responds to different stimuli and the fundamental processes that underpin decision-making.

3. Integration of AI and Human thinking which is the study that explores how AI and human thinking work

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together harmoniously. Artificial Intelligence often draws inspiration from the complex neuronal network seen in the human brain[6]. Opportunities to solve issues with human mental health arise from AI reasoning's ability to comprehend and replicate cognitive processes.

4. Cognitive Function and Mental Health which provides the enormous obstacles to people and society. The intricacy of feelings, ideas, and behavioral patterns necessitates sophisticated methods of diagnosis and therapy. While medicine and psychotherapy are examples of traditional therapeutic treatments that have proven beneficial, new technology provide exciting opportunities.

5. Emergence of Artificial Self-Reasoning which advances in data analysis and machine learning have paved the way for the creation of artificial self-reasoning. Thanks to this paradigm change, AI systems can now understand their own health, relationships, and status basically, they can now function as self-aware entities. These kinds of developments are essential to building intelligent and adaptable systems[7].

6. Ethical Implications in Mental Health AI where the Careful attention is given to the ethical implications of using AI into mental health procedures. Talks include the possible advantages like easier access to therapy as well as privacy, trust, and the human-machine interaction issues[8].

7. Motivation for Mental Health Applications where using AI reasoning to treat complicated mental health concerns is the driving force behind this initiative. The aim is to investigate the ways in which artificial intelligence (AI) might supplement conventional treatment approaches and perhaps provide novel solutions for people with disorders including depression, anxiety, PTSD, and ADHD.

8. Interdisciplinary Nature of the Project would be like taking into account the project's interdisciplinary nature, it incorporates knowledge from information science, artificial intelligence, psychology, and neuroscience. The goal of these fields' cooperation is to close the knowledge gap between artificial intelligence and human cognition[9].

#### **A. Integration of AI and Human Cognition**

Artificial Intelligence (AI) and human cognition working together is a game-changing development in technology where robots are made to not only replicate but also improve human cognitive functions. AI technologies are being created with the ability to imitate and enhance several parts of human cognition, like as reasoning, problem-solving, learning, and decision-making, in this dynamic convergence. This integration goes beyond the everyday chores of typical automation and instead

explores the rich domain of human cognition[10]. Artificial intelligence (AI) systems use sophisticated algorithms, machine learning, and neural networks to understand, process, and react to data in a way that is similar to how the human brain does cognitive tasks. The goal is to both mimic and enhance cognitive processes, which might lead to better problem-solving, creative thinking, and adaptive learning. This integration has the potential to enhance human intellect and solve difficult problems in previously unthinkable ways as AI develops. But it also brings up moral questions, calling for a careful examination of the advantages and disadvantages of this mutually beneficial partnership between AI and human intellect[11].

#### **B. Significance of Human Cognition**

The importance of human cognition may be attributed to its fundamental role in forming our perception of the world, impacting our ability to make decisions, and enabling flexible reactions to a variety of circumstances. Perception, memory, problem-solving, and emotional reactions are just a few of the cerebral processes that make up human cognition, which together account for our exceptional intellect[12]. The capacity of human mind to identify patterns and extract significant insights from complicated data is one outstanding feature. In the area of picture identification, for example, human cognition enables people to recognize objects, faces, or sceneries with ease; this is an intrinsic talent that artificial intelligence finds very difficult to replicate. Furthermore, human emotions and social intelligence are complex and necessary components of cognition. Because of this, humans are able to negotiate social relationships with empathy and comprehension qualities that are difficult for computers to mimic[13].

Human cognition is important in real-time applications, as shown by natural language processing (NLP), where comprehending humor, inferred meanings, and contextual subtleties in communication is a challenging cognitive effort. People with human cognition can easily understand the nuances of language and can adjust to different emotions and tones. Another distinctive feature of human cognition is the capacity to apply newly acquired information to unfamiliar circumstances while also drawing on prior experiences and learning from them. Tasks like autonomous driving, where human drivers can instantly analyze and react to unanticipated conditions on the road, serve as an example of this flexibility and highlight the complex nature of cognitive processes[14].

Beyond applications to particular tasks, human cognition has an impact on domains such as education, healthcare, and creativity. Teachers, for example, use cognitive processes to modify their lessons according to each student's unique learning style, taking into account the

differences in students' cognitive styles. In the field of medicine, knowledge of cognitive processes facilitates the creation of treatments and interventions for a range of mental health issues.

### C. AI in Mental Health Treatment

The use of artificial intelligence (AI) in mental health care is a revolutionary method of tackling the intricacies of psychological wellness. With AI technologies providing scalable and tailored solutions, conventional therapy approaches are being supplemented more and more. The use of AI-powered chatbots or virtual therapists in mental health applications is a noteworthy example of a real-time integration. In natural language interactions, these AI systems converse with people, offering assistance, coping mechanisms, and even crisis intervention[16]. To assist users in managing stress, anxiety, and depression, Woebot, an AI-powered chatbot, utilizes cognitive-behavioral therapy concepts in its interactions with users. Such AI-driven mental health solutions fill gaps in conventional healthcare by being accessible and available around-the-clock to a wider audience.

Moreover, the capacity of AI to evaluate large datasets helps to improve individualized treatment plans and diagnoses. By recognizing trends in behavioral data, machine learning algorithms may help physicians diagnose mental health problems early and customize therapies to meet the requirements of each patient. For instance, wearable technology that tracks physiological markers in conjunction with AI analysis might provide insightful information about a person's mental health, allowing for prompt treatments. Artificial intelligence (AI) is used in virtual reality treatment to provide people with mental health issues with engaging and healing experiences. AI-guided virtual reality settings provide safe venues for exposure therapy, assisting people in facing and overcoming certain traumas or anxieties. These applications demonstrate how artificial intelligence (AI) has the potential to transform mental health care by offering individualized, accessible, and affordable therapies that support conventional therapy methods. The potential for improving global well-being via the combination of AI and mental health care is significant as technology progresses.

### D. Symbiotic Relationship

The idea of a cooperative and win-win collaboration in which humans and artificial intelligence (AI) both bring special skills to the table to accomplish common goals is known as a symbiotic connection. A striking illustration of this synergy in action may be seen in the healthcare industry, namely in the area of medical diagnostics. AI algorithms with machine learning skills can quickly and accurately assess large datasets of medical images, such MRIs and X-rays. This helps with early illness

identification and gives medical practitioners insightful information that improves the diagnosis procedure. AI and healthcare professionals work together symbiotically to improve diagnosis skills and enable more accurate and timely therapies.

Moreover, AI-powered virtual assistants like Siri and Google Assistant represent a mutually beneficial partnership in the context of personal productivity. These artificial intelligence (AI)-powered assistants fit in with users' everyday routines effortlessly, offering task assistance, query resolution, and tailored suggestions. Users gain from AI's efficiency and ease, and as the technology learns from human interactions over time, it becomes more responsive and adaptive. This dynamic partnership serves as an example of how AI augments human talents, streamlining and facilitating everyday chores. Humans and AI work well together in a variety of sectors, including industry, banking, and education. AI-powered learning tools in the classroom optimize students' learning experiences by customizing course material to each student's requirements. AI algorithms are used by financial organizations to improve security and efficiency via fraud detection and risk assessment. AI-driven automation systems in manufacturing operate in tandem with human laborers to enhance production processes, resulting in increased accuracy and efficiency.

### E. Complexity of Mental Health

The complex interactions between several elements that affect a person's psychological well-being are included in the complexity of mental health. Artificial intelligence (AI) solutions like chatbots and conversational agents are attempts to tackle this complexity in the field of mental health. For example, ChatGPT, which is fueled by OpenAI's language model, contributes to the provision of information and help about mental health issues. With ChatGPT, users may have text-based discussions about their feelings, ask for guidance, or access resources. The difficulty stems from the complexity of mental health disorders, which are influenced by a variety of variables including personal experiences, cultural settings, and the ever-changing nature of emotions. AI, which includes sentiment analysis and natural language processing, aims to provide scalable and easily available assistance in order to manage this complexity. But it's crucial to understand the complex and unique nature of mental health, realizing that while AI technologies may be a useful help, receiving full treatment often necessitates a human-centered, holistic approach.

### F. Motivation for Mental Health AI

The urgent need to address the expanding worldwide mental health problem and provide people easily accessible help is the driving force behind the integration of Artificial Intelligence (AI) into mental health services.

In this regard, ChatGPT, which is driven by OpenAI, is a novel strategy. The driving force is to use AI to provide scalable, real-time help to anyone looking for advice, information, or a supportive chat about mental health. ChatGPT functions as a virtual assistant that can have sympathetic conversations, give information, and suggest coping mechanisms. The goal of using these AI technologies is to close the gap in mental health services, particularly in light of the stigma and resource constraints that may discourage people from pursuing conventional forms of care. Although ChatGPT is not a substitute for expert mental health treatment, its availability as an additional resource highlights the need to employ AI to broaden the accessibility of mental health services, lower entry barriers, and promptly help people in need. By using AI technology, the ultimate objective is to contribute to a more holistic mental health ecosystem.

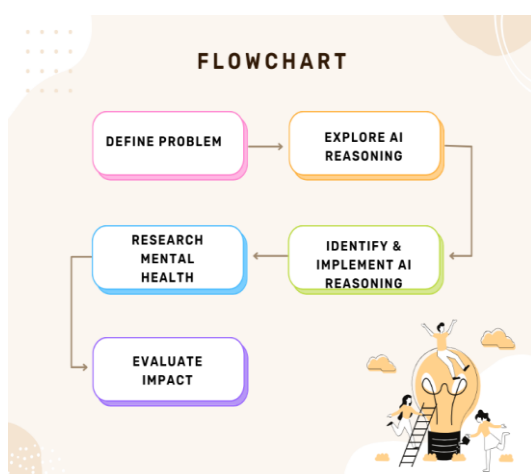


Fig 1: FLOW CHART

## 2. Artificial Intelligence and Human Rationalization

### A. Relationship between AI and Human Rationalization

Every day, the blue dot examines one billion new stories and reports of plant and animal ailments in many languages using machine learning and natural language processing. The sort of computing known as artificial intelligence provides robots the capacity to behave. AI and human thought are closely related ideas. The basis for field system research: AI and human cognition are intricately intertwined. The network of neurons in the human brain serves as the basis for AI research. Reasoning will continue to be an important tool in the universe of artificial intelligence in the future for supporting individuals in adapting to change and vulnerability. As the world grows increasingly more innovative, so does the need for human-based direction and communication.

### B. Artificial Self Human Reasonalization

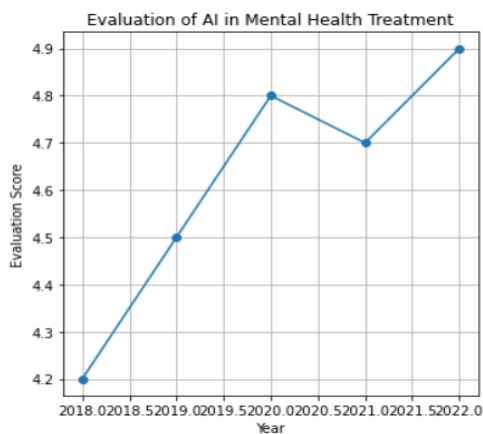
Progress in machine learning and data processing is pushing the study of artificial self-reasoning. System-level thinking is made possible by connected components within the complicated structure of artificial intelligence. Because of this growth, AI today has the unique potential to grasp its status, health, and the intricate relationships between its components. Above and beyond typical algorithms, the system becomes self-aware, able to grasp how each element influences the entire. Beyond basic processing, artificial self-reasoning allows the system to analyze its own functioning, spot issues, and make dynamic modifications. This paradigm change enhances overall performance, reliability, and efficiency. The introduction of advanced self-evaluation systems indicates the beginning of a new age in which robots are adaptable and capable of handling difficulties on their own. This invention is a step toward completely autonomous and intelligent gadgets and provides extensive applications.

### C. Artificial Intelligence relating to human reasoning

We must consider how thinking relates to artificial intelligence as we build these cutting-edge technologies as humans are very skilled at comprehending their motivations, actions, perceptual, and cognitive capacities and limits. AI has to do with issue diagnosis, testing, and therapy confirmation. Utilizing research methods from artificial intelligence and information science, they examine human thinking to get insight into the human psyche. According to BT's director of customer insight and future, psychologists are now working on teaching computers to become more sociable and friendly. It makes an effort to understand complexity by studying, evaluating, and creating models of how the human brain interprets, manages, and processes complicated information while keeping an eye on the medium and speaker. AI and cognitive reasoning share similar theories on how to comprehend the nature of intelligent behavior: by using cutting-edge technology and historical facts.

The imitation of human intellect is known as artificial intelligence. Only a portion of human intellect can be replicated, expanded, and replaced by artificial intelligence as it exists now. Artificial intelligence entails learning new things and developing our mental faculties. The cognitive processes include reasoning, recalling details, making decisions, and resolving conflicts. The children's expressed emotions are modeled by drawing on their prior knowledge. The dismantling of the occupational system is just one use of artificial intelligence.

### Research and Mental Health evaluation

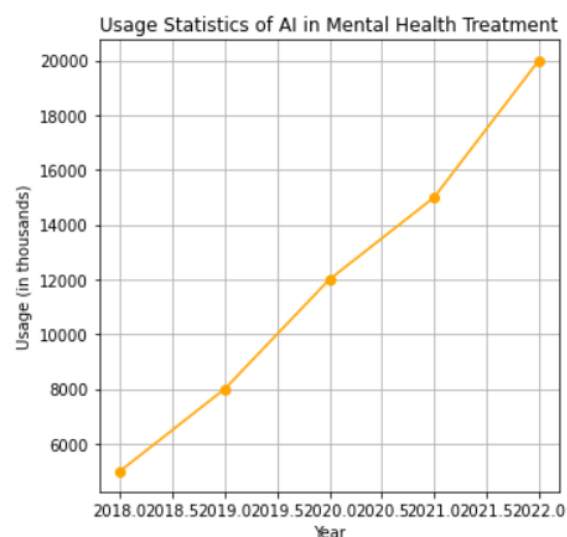


**Fig 2:** Graph for evaluation

The artificial intelligence (AI) assessment graph for mental health therapy shows the efficacy of AI solutions over a five-year period, from 2018 to 2022. The evaluation ratings are shown on the y-axis; higher scores indicate a more favorable review. The values range from 0 to 5. The matching years are shown on the x-axis.

A positive trend can be seen in the graph, which shows a steady rise in assessment ratings over time. The assessment score began at 4.2 in 2018, indicating a favorable response. There was a progressive improvement in the following years, as scores increased to 4.5 in 2019, 4.8 in 2020, 4.7 in 2021, and a high of 4.9 in 2022. This increased trend indicates that the effectiveness of AI in the treatment of mental illness is becoming more widely recognized and valued.

The favorable assessment ratings indicate that patients and healthcare providers, among other users and stakeholders engaged in mental health, see AI treatments as becoming more useful and significant. The graph's increasing tendency suggests that AI technologies are always being improved and refined, which might result in a wider acceptance of these technologies in the field of mental health. This favorable assessment may be ascribed to AI's capability for data-driven insights, its ability to provide prompt and individualized treatment, and its involvement in resolving accessibility issues often connected to conventional mental health care. Overall, the graph shows a favorable trend for the use of AI in mental health therapy, emphasizing the benefits of the technology and its room for future development.



**Fig 3:**Graph for AI Mental health evaluation

The orange line in the graph's use data subplot shows the evolution of AI adoption in mental health therapy over a five-year period (2018 to 2022). The number of exchanges, consultations, or engagements made possible by AI systems in the field of mental health is shown by the y-axis, which indicates use in thousands.

The orange line's rising trend indicates a steady and appreciable rise in the use of AI-driven solutions for mental health issues. 5000 people used AI in 2018, which is indicative of the first use of these technologies. The use data after then indicates an ongoing increase tendency, with 20,000 encounters by 2022.

The increasing numbers of use indicate that AI technologies are becoming more widely accepted and integrated into mental health settings. As AI is used more widely in mental health therapy, consumers will continue to find the technology useful and successful, which will lead to a positive association between rising use and assessment ratings (as seen in the left subplot). The description highlights the potential influence of technology in reaching and helping a bigger audience over time and stresses the significance of AI in satisfying the growing need for mental health care.

### 3. Challenges and Opportunities

1. Considerations for Ethics: There are ethical questions about permission, privacy, and the proper use of sensitive personal data when integrating AI into mental health treatments. It may be difficult to strike a compromise between protecting user privacy and offering AI-driven help that works well.

2. Bias and Fairness: AI models may carry over biases from training sets, which might lead to unjust or uneven treatment. It may be difficult to guarantee that AI algorithms are impartial and culturally aware, particularly

when it comes to mental health and the need to take a variety of viewpoints and experiences into account.

3. Inadequate Human Contact: Even while AI may be a useful tool, it lacks the human touch and intuitive knowledge that mental health practitioners have. It's difficult to strike a balance between AI's efficiency and human interaction's empathy.

4. Limited Generalization: AI models may find it difficult to make broad generalizations about a range of demographics, cultural settings, and mental health issues. It is difficult to modify AI systems to meet the demands of each unique user and to address certain mental health issues.

#### **Possibilities:**

1. Enhanced Accessibility: By removing financial and geographic obstacles, AI in mental health therapy offers the chance to deliver mental health help to a larger population. AI-driven interventions are more accessible to those who would otherwise find it difficult to ask for assistance when they are accessible remotely.

2. Tailored Care Programs: AI has the capacity to find patterns in large datasets and evaluate them, making it possible to create individualized treatment regimens. Care is more successful when mental health therapies are customized to each patient's requirements.

3. Prompt Identification and Action: Artificial intelligence (AI) algorithms may help discover possible risk factors and analyze behavioral patterns to aid in the early diagnosis of mental health concerns. Preventing the worsening of mental health issues requires early intervention.

4. Insights Driven by Data: Large-scale datasets may provide insightful information when they are collected and analyzed in mental health research. Researchers and practitioners may improve treatment tactics by using AI-driven data to get a better knowledge of mental health patterns.

5. Available 24/7: AI-powered mental health technologies are always available to help and intervene. This guarantees continued support outside of regular business hours and attends to the urgent needs of those who are experiencing a crisis.

6. Reducing Stigma: By offering a private and convenient platform for getting help, AI in mental health may help de-stigmatize mental health issues. This normality promotes asking for assistance without worrying about being judged.

#### **4. Case study and Implementation**

##### **Case Study: Tailored AI-Powered Treatment Programs**

#### **Context:**

An AI-powered mental health clinic used algorithms to schedule treatment sessions. The objective was to examine patient data, spot trends, and provide individualized treatment programs for those with illnesses like depression and anxiety.

#### **Implementation:**

Data from behavioral patterns, treatment results, and patient evaluations were analyzed by AI algorithms. Machine learning models found relationships between certain treatments and favorable results. The clinic used this data to design unique treatment programs for every patient.

#### **Findings:**

**Better Treatment Outcomes:** Because personalized therapy plans were designed to cater to each patient's unique requirements, preferences, and responsiveness, the treatments produced better results.

**Optimized Resource Allocation:** By concentrating on therapies with a track record of success derived from data-driven insights, the clinic was able to optimize resource allocation.

**Enhanced Patient Engagement:** When patients felt their therapy was tailored to their particular needs, they reported being more engaged with it.

#### **Problems:**

**Data Quality:** It was difficult to guarantee the dependability and correctness of patient data. The clinic improved the quality of input data by using data validation procedures. **Interpreting Nuanced instances:** Deep comprehension of unique situations was necessary to comprehend nuanced instances, which was a barrier for AI systems. In such cases, clinicians offered further insights.

#### **5. Conclusion and Future Work**

Research in the domain of artificial intelligence is now concentrated on speech and image integration for interaction. It is often defined as technology that allows robots to carry out tasks that need human intellect, while cognitive reasoning researches the ways in which humans think and the ways in which the human brain retains and processes information. Understanding intellect and human behavior is a common term for both. Because neural networks resemble the human nervous system, researchers are emphasizing on them. When emotions and mental illness overpower the human brain, its complexity increases. This research investigates the use of AI thinking to treat mental illness. In endeavoring to discover the connection between AI and pondering, this study provides a brief discussion of both. In addition, the effect

that AI thinking has on people's mental health is crucial. As was already indicated, using AI-reasoning to treatment is not only beneficial but also costly. Additionally, it is established that there is a distinction between how AI thinks about reasoning techniques and processes and how they are really put into practice.

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