



AI Therapist-A Virtual Aid to Mental Health

Gargi Mishra and Kriti A Ajwani*

Department of Information Technology, Bhilai Institute of Technology, Durg, Chhattisgarh, India
kritiajwani6148@gmail.com

Available online at: www.isca.in

Received 24th November 2020, revised 28th December 2021, accepted 5th February 2022

Abstract

The tempo of intrusion with technology at the tread of application and development for evolution in Neural and biological repercussions is not far, the integration intercepts the two majors Novel Mechanism and Computational Intelligence to provide virtual aid to mental health to all cohorts. The computational intelligence that contributes to the Evolution of Neural Network Systems in broadways is the paradigm for the Aid. The paper discusses extensively the requisites for the technology as a virtual Aid erratically to sustain the long-period intervention goals within an individual and techniques of avoiding further ado. Mental Health relapse over a course of time and due to costly therapeutic treatment reverting to it might not be feasible; a technology that is malleable and is persistent at any given moment due to its versatility would be more cooperative.

Keywords: Novel Mechanism, Computational Intelligence, Neural Network Systems.

Introduction

All the clinical treatment for mental health is solicitous and tenders for fewer counts of sessions with early intervention, according to the World health Organization, the mental health disorder lasts for 2 weeks, and the treatment takes for 2 weeks-2 years. Depression of recurrence type occurs every 5 years thereby increasing the chance of relapsing and pullback to the vulnerable state of the human mind. As observed by the study held in 2017 about 792 million people worldwide suffer from depression which comprises 9.3% of males and 11.9% of females, women are 3 times more likely to suffer from depression than men. Teens and people aged above 60 are more likely to suffer through depression, teen girls are suffering through anxiety and depression, with a growth rate of 2.4 million at 66% whereas boys at 44%. People aged 60 and above, comprise 16.2 million and adults about 20% and over. There are many non-profitable, governmental mental health organizations

in the country like MINDS foundation in the UK, Carter Center in Atlanta in USA, headspace Australian Organization but these organizations are lacking in middle-income and low-income countries and 76%-85% of people get access to the Therapeutic treatment¹.

Over the last few years, a virtual intervention has proved to be of great assistance, due to its Broadway techniques and skills under the novel mechanisms which contribute to longer-period intervention. The exuberance of technology development through the internet in youths-88% and teens-95% is one of the greatest aspects of the discussion. Thus, reduces the tendency from the isolation, character blots and increases the sensitivity ability to be supportive, addressing issues, and dealing. The technology development would be attractive due to pervasive computing and information processing confidentially through anonymity.

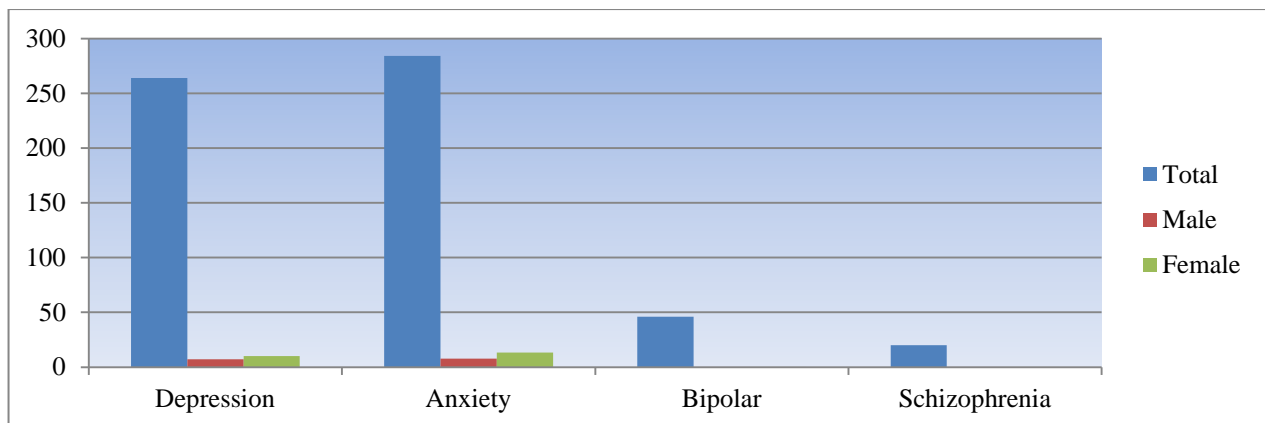


Figure-1: Different Types of Mental Health Disorder in Gender (in Millions).

Table-1: Different Types of Mental Disorder of Gender (in Millions).

Mental Disorder	Effect on Different Gender		
	Total	Male	Female
Depression ¹	264	7.2	10.1
Anxiety ¹	284	7.9	13.3
Bipolar ¹	46	0.25	0.029
Schizophrenia ¹	20	0.052	0.05

Table-2: Mental Health Disorder on Different Ages.

Mental Disorder	Effect on Different Ages		
	Total	Male	Female
Disorder	792	73.6	94.2

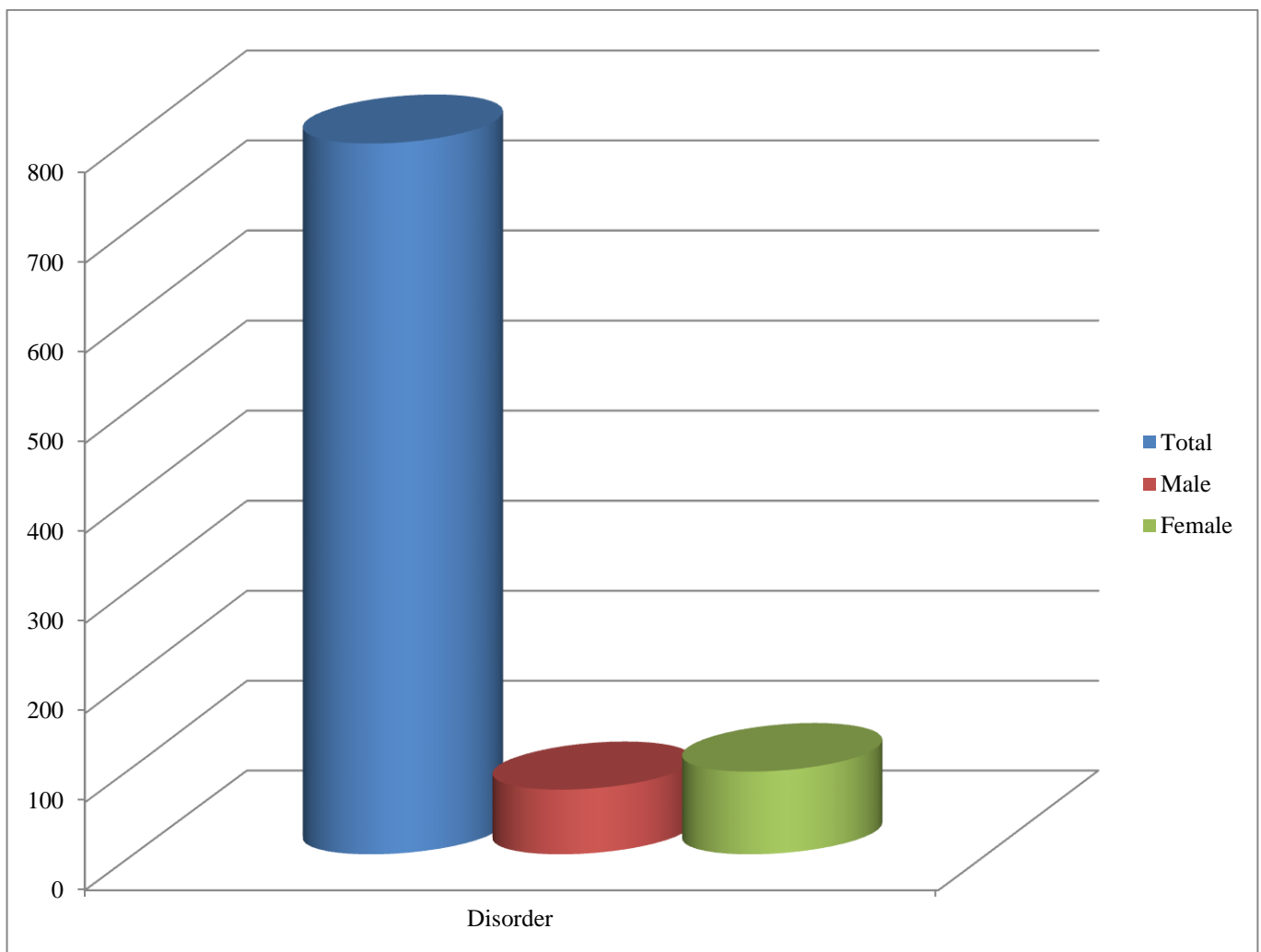


Figure-2: Mental Health Disorder on Different Ages.

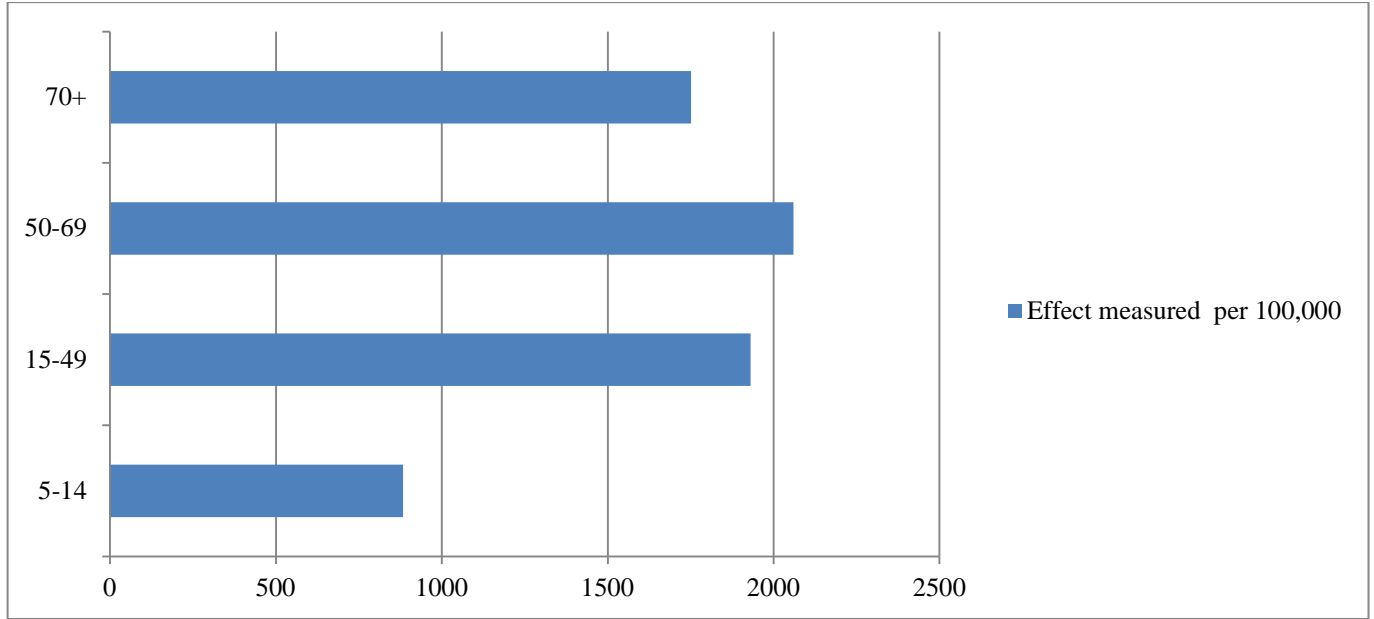


Figure-3: Mental Health Disorder in Different Age Groups².

Table-3: Mental Health Disorder on Different Ages².

Age Group in Years	Effect measured per 100,000
5-14	882.95
15-49	1930.2
50-69	2059.43
70+	1751.15

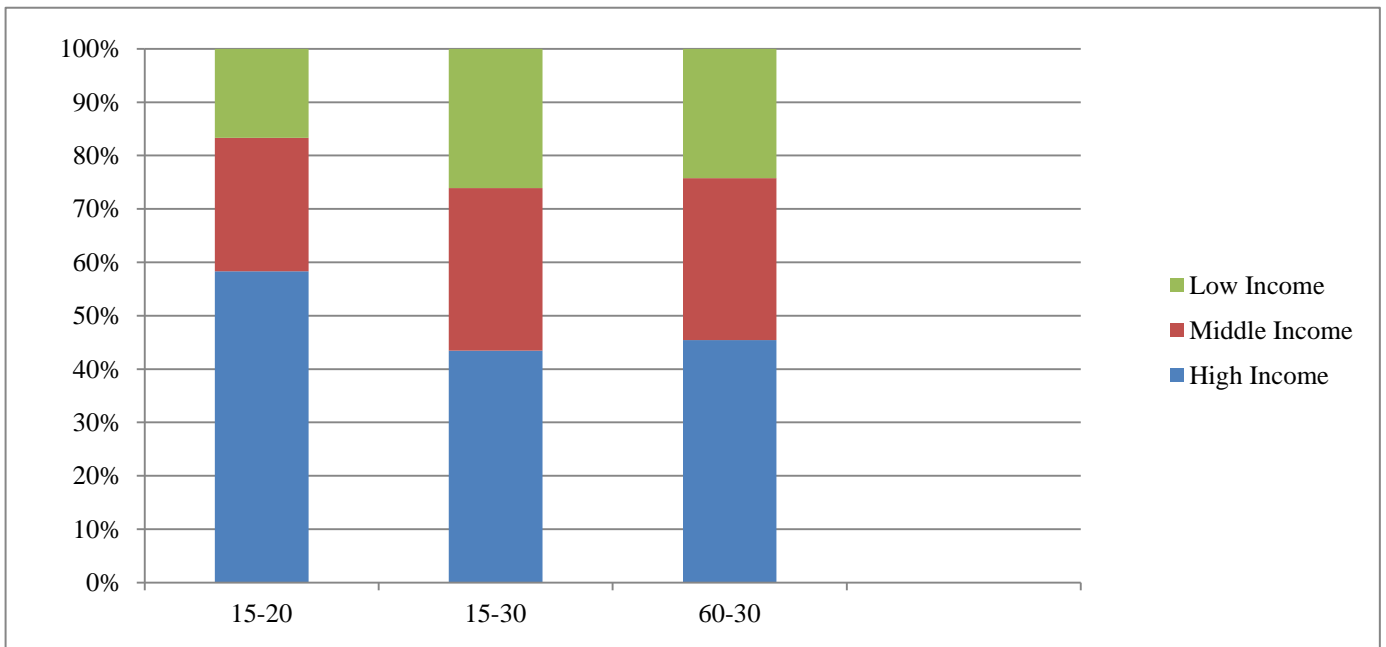


Figure-4: Global suicide rate by age in Different Income Countries in 100,000¹.

Equation: Relapse rate³ is the rate at which enunciates the success rate from an Antipsychotic therapy. It is calculated through Chi-square Statistics⁴ for a population going with the therapy and which relapses by p-values and degree of freedom – $\chi^2(1, Total)$.

Table-4: Global suicide rate by age in Different Income Countries in 100,000¹.

Age Group in Years	Level Income Countries		
	High Income	Middle Income	Low Income
15-20	7	3	2
15-30	20	14	12
60-30	15	10	8

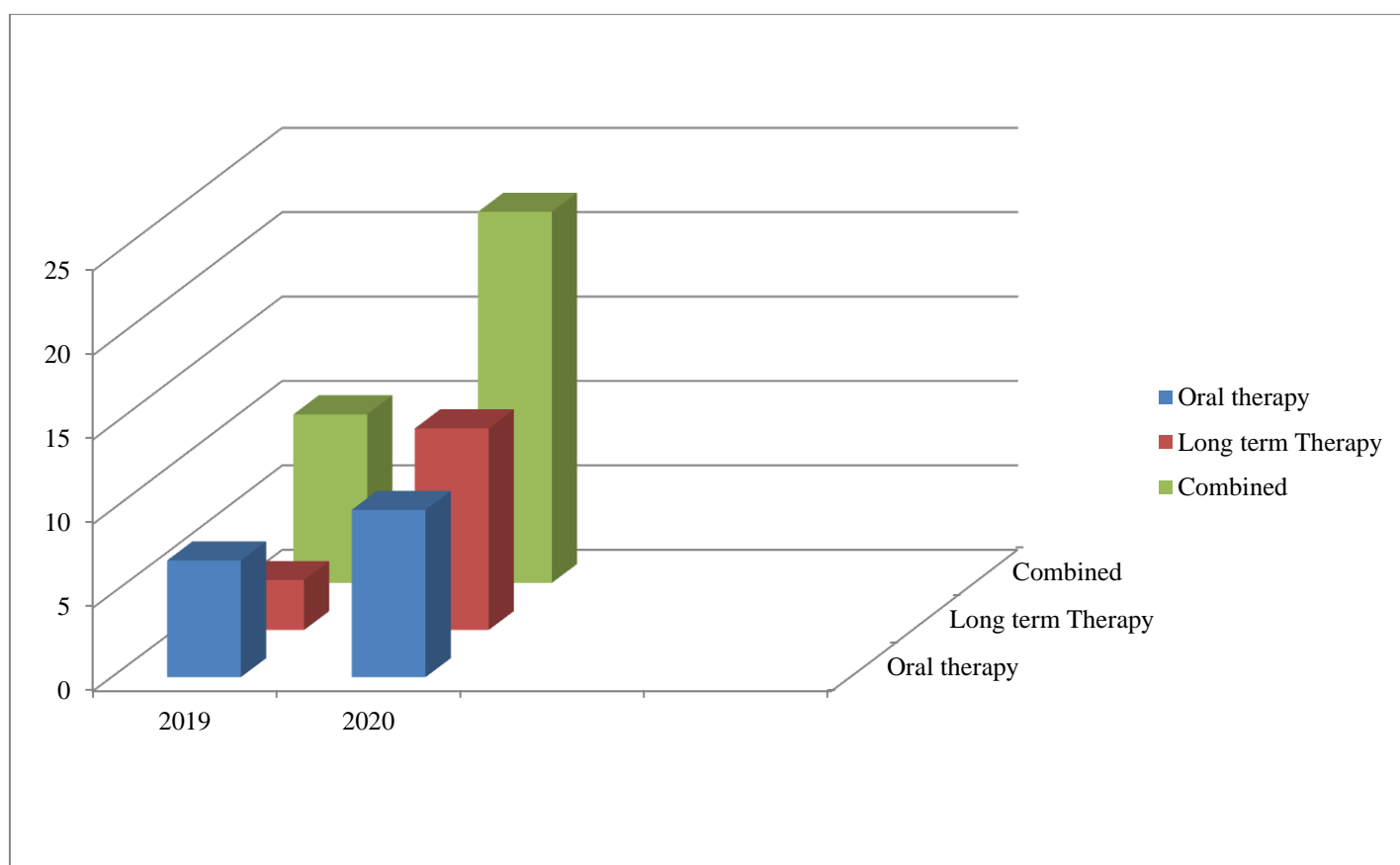


Figure-5: Experiment on Relapse rate over the years (With N=32 patients)⁵.

Table-5: Experiment on Relapse rate over the years (With N=32 patients)⁵.

Year	Type of Therapy		
	Oral therapy	Long term Therapy	Combined
2019	7	3	10
2020	10	12	22

Relapse rate = $\chi^2(1,32) p=0.005 \Rightarrow 0.0256$

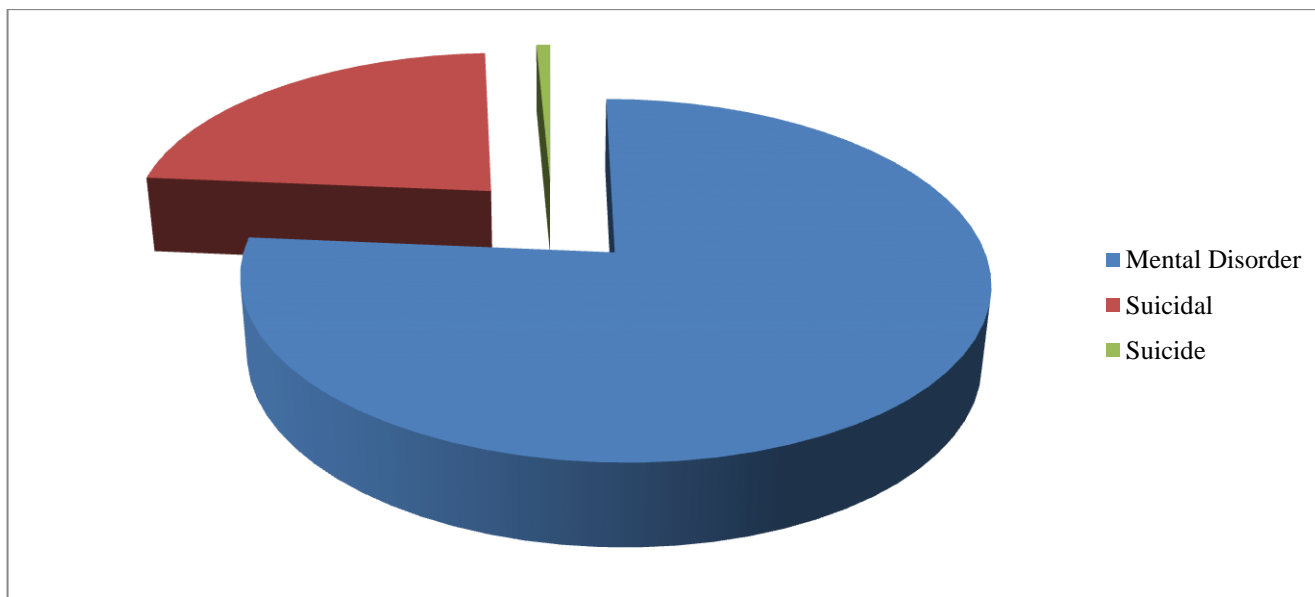


Figure-6: Different effects on Psychiatrist (in 1000)⁶.

Table-6: Different effects on Psychiatrist (in 1000)⁶.

Effects	Psychiatrists (in 1000)
Mental Disorder	420
Suicidal	126
Suicide	4

Methodology

The Goal of adopting technology is to serve and assist the people suffering from mental health as an obstacle that creates dysfunction in their lives. It focuses on making the technology useful and interactive chiefly, training and learning is the primacy of AI. Speculative learning helps in training the model to advance its knowledge. AI Learning is based on unsupervised learning which tentatively collects pairs of inputs and outputs to train itself for predicting the output for fresh inputs. AI majorly learns through knowledge and feedback⁷ they are classified as-

Knowledge Based Classification is – i. Inductive Learning: The model infers a basic rule from datasets of input-output twins. Algorithms such as knowledge based inductive learning (KBIL) are a broad illustration of such AI training model. It concentrates on perceiving inductive hypotheses on a dataset with the help of inductive hypotheses on a dataset with the help of background information. ii. Deductive Learning: The AI Model starts with norms and infers new rules that are more efficient regarding factors of a prime AI algorithm. Explanation-Based Learning (EBL) and Relevance-Based Learning (RBL) are examples of deductive techniques.

Feedback Based Classification is – i. Unsupervised Learning: This technique of learning manifests through pattern without

any external feedback clustering is a vintage model of such kind. ii. Supervised Learning: These use external feedback for learning purposes that maps inputs to output observation. Linear regression is an example. iii. Semi-supervised Learning: Here The learning model makes use of a set of curate, labeled data and tries to infer new labels/attributes on new data sets. They are majorly middle ground between Supervised and Unsupervised learning, iv. Reinforcement Learning: The learning model uses rewards and punishment to reinforce different types of techniques.

The technology uses unsupervised learning called as cognitive based Therapy⁸ through step by step process as follows – i. Cognitive based therapy- This Mental health treatment has proved to be a terrific in terms of anxiety, depression as it identifies patters of disorder distinctively. It works on building constructive mind set when subjected to mental health disorder of a patient. It makes optimistic patterns and routines to groom the disorder. It predominantly deals the root or the seed of the sickness. It identifies the disdain thought process of an individual and twirls into morally acceptable perception it helps fight an individual’s dark or negative side. It sets goals and targets for an individual to practice and built a pragmatic frame of reference to life. ii. InformationProcessing⁹ -The Chat bots¹⁰ indulges the patient to prompt, their state of mind, notions,

fondness, dislikes, and inculcates to logistics just as the Google Assistant and Siri¹¹. The information processing is the cognitive development in psychology, precisely the algorithms are accounted to execute along to Link stimulus such as temper, whimsical, gloomy. It analyzes the mind's machinery that develops the mechanism for processing information; it is cognitive like the human that stores information in different units according to the access. Information is the building block of the technology and the security of the information is another as confidentiality is the first and foremost characteristic of the technology. iii. Comprehension through Computational Intelligence Apprehending-The information provided by the user or the patient is the supreme instrument for mending and it should not only be right but righteous because therapy is as constructive as it's destructive. Computational Intelligence¹² absorbs a unique trait neural Network interaction; it tends to use bio-genetic algorithms as it commonly means soft computing. The methodology inspires to resolve complex real word problems that are near to the human way of tackling an issue such as therapeutic act. It uses embedded techniques that are logical approaches that involve a biologically inspired algorithm called swarm intelligence, in the context of cellular robotic systems. iv. Automated Inference with Pervasive Computing^{13, 14} -The computed techniques ensures the technology to be interactive. The novel feature of the technology makes it less tedious and more interactive, by keeping appointments, targets for achieving, and suggestions to keep up a healthy state of mind. It formats the information and elicits through Computational Intelligence also the legit information is crucial for the intervention. Discovering a new world through a pseudo-human algorithm can be a diving board that facilitates user engagement. The recommendation uses an identical concept of cookies on a website that distinguishes a patient with its history of impulse and behavioral change that gradually contributes to the therapy.

Further to Grasp the Upfront of the technology, the growth of the patient can be categorized and tagged under the goals being intended for an individual's that describes the intervention stages¹⁵ as - i. Surmounting - Where one copes with the pain and opens up about the issues to get as it resolved and indulge in developing a habit of having an optimistic approach or perception. ii. Repress – At this stage the individual applies the technique being suggested by AI and restrains the subconscious mind or other factors to ruin a mental peace. iii. Reinforcing – This stage is the last stage where an empathetic person has achieved goal and is able to develop a mental peace within.

Advantages¹⁶: i. Availability of the Aid erratically- One true benefit is that the one can easily avail this facility at any point of time when needed. This technology is quite ubiquitous as these days phone or device accessibility is quite simplistic the individual needs to log in through their credentials and they can access this virtue. ii. Information processing is confidential – All the history of the patient is kept restricted. As the technology process a data to provide a predicted output we can

add a feature of processing and protecting data on the client side without meddling of structures and authority to ensure anonymity. iii. Cost-Effective - The technology provides service at an affordable rate for all income packages can be ensured for different categories which include age groups, gender and an individual going through a particular mental disorder Default functions that are available for free of cost just to comfort the person. iv. Intervention on Mental Health-It provides intervention on mental health as long as it is necessitated by providing flexibility to that is ensured by technology. The technology can be calibrated to train and test the model for its accuracy and precession and hence guaranteeing on relapsing rate or the disorder to completely disappear from the individual. v. Prevents Emotional Strain-This prevents emotional strain helps caused to the Specialists as the psychological stress not only for the forbearer but the physician as well attending numerous patients with different disorder can actually harm their mental health and in turn would destroy their mental peace.

Disadvantages¹⁷: i. Confidentiality compromise: The ensured confidentiality doesn't imply the information on the client site cannot be hacked. There are numerous cases of day to day intrusion of attackers on data which hurts integrity of the model and harms to meddle with an individual with data retrieval. ii. Hepatic Tenderness- It does not fulfill the hepatic tenderness necessary for comprehension at the end a Chat bot cannot be as empathetic as a human and it might not comprehend a human behavior when subjected to different scenarios. There is a possibility of grooming an individual to malformation of wits. iii. Tracking of Mental Health-There is no tracking of the progress of mental health. As the technology has to process data on the client side the tracking becomes difficult and impossible. Either the integrity would be compromise or the grooming. One of the aspects is compromised on the virtue of other which would again prove harmful. iv. Critical Patients- It cannot handle critical patients as it lacks the hepatic tenderness and hence it does not predict the tone and the temper of the individual. This might annoy an individual which could prove provocative to illicit steps. v. Emotions - The technology won't perceive emotions cautiously and with alertness since the model is based on the training of feedback it would groom itself and the patients erroneously even after using neural based networks eventually a model has the groom a mentally sick person if it lacks emotions it can misguide the person.

Results and discussion

As in competence with the real world, the technical applications of any technology become tougher. The technology takes heavy amount of time to train before they roll into real world for their cause of innovation. The census and reports collectively talk about adaption of a technology with soft skills, let alone enunciates the tough experience of a human to deal a therapeutic process. The dearth of aiding human for peaceful life in spite of ease of convenient technology could mean unascertained. The upfront process is bit simple for an individual to apprehend and

yet make it interactive; the linear dynamicity of the technology makes it adaptable yet twisted in behind for the trickiest case to be supervise it with any controversial conflict in an individual growth.

Discussion: This article enunciates to employ AI in the field of medical science to prove efficacious results. The article manifests the technology from theoretical point of view to practical implications to reflect its dire need with the befitting technology. It discusses about the dire need of such technology managing emotional chaos. The figures and table scrutinizes about the futility of mental health divergently on gender, age and economical aspects. The physicians dealing patients of mental health have themselves being affected due to empathetic accountancy of ones being. The intervention stage can be tapped in Upfront with the interactive application that analyzes growth on the basis of the categories marked that. The article could mean useful for future prospects as there is serious addition of numbers to the census of mental health disorder suffered.

Conclusion

The Artificial world constructed with algorithms is an eye-opener. Adding up to ease of the world, this technology is one of a kind, numerous logics, and algorithms that perceive the human mind as a humanitarian. The application of the technology at such a level is virtuous and revolutionizes every aspect. It has by far overcome all the hurdles, such as emotional straining, cost efficiency, availability, and regardless of the appointment made one can always lean on its engagement. The application stands on three pillars – Information Processing, Computational Intelligence, and Pervasive Computing which motives the dynamicity of integration at much a wider scale. The later development could focus on the linguistic language to offer more comfort to the patient and thus allowing barriers to get less, it can also use geolocation data (people facing the same issue and their experience and their technique of handling) and self-monitoring data. The endeavor faced here can be eased with algorithms and logic.

Acknowledgement

To be precise, the thesis breaches the world from being practical and authentic. I am thankful for a platform that allowed me to hunch over a project where intellects have contributed to their prestigious work and made it humanitarian. I am highly obliged to be part of such great work and presenting it to such a substantial level. However, the paper talks about a tread over the contributed work.

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