

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/370270146>

Artificial Intelligence's Contribution To Mental Health Education

Conference Paper · March 2023

DOI: 10.1109/ICSCDS56580.2023.10104905

CITATIONS

0

READS

93

6 authors, including:



Lalit Mohan Pant

Uttarakhand Open University

14 PUBLICATIONS 0 CITATIONS

[SEE PROFILE](#)



Tanweer Alam

Islamic University of Medina

245 PUBLICATIONS 3,074 CITATIONS

[SEE PROFILE](#)



Lims Thomas

St. Thomas College, Thrissur

7 PUBLICATIONS 3 CITATIONS

[SEE PROFILE](#)



Rakshith udigala Renukprasad

JSS College of Pharmacy

23 PUBLICATIONS 9 CITATIONS

[SEE PROFILE](#)

Artificial Intelligence's Contribution To Mental Health Education

Neha Anand¹

¹Assistant Director Academics
Teerthaanker Mahaveer University
Moradabad
nehaanand002@gmail.com

Dr Lalit Mohan Pant^{2*}

²Asst Prof Department of Psychology
Uttarakhand Open University
Haldwani
lpant33@gmail.com

Tanweer Alam³

³Department of Computer Science,
Faculty of Computer and Information
Systems, Islamic University of
Madinah, Madinah, Saudi Arabia
Email: tanweer03@iu.edu.sa,
ORCID: <https://orcid.org/0000-0003-2731-4627>

Dr. Sumit Pundir⁴

⁴Associate Professor, Department of
Computer Science & Engineering,
Graphic Era Deemed to be University,
Dehradun, Uttarakhand, India - 248002
sumitpundir1983@gmail.com

Lims Thomas⁵

⁵Assistant Professor, Department of
Social Work, Vimala College
(Autonomous), Thrissur
limstomas09@gmail.com

U.R. Rakshith⁶

⁶Assistant Professor, Department of
Pharmacy Practice, JSS College of
Pharmacy, JSS Academy of Higher
Education and Research, Mysuru,
Karnataka, India - 570015

Abstract. As AI offers a suitable response to various challenges associated with this disease, it plays a crucial role in mental health. A fundamental concept of the AI-based mental health remedy and its impact on directly affecting social-emotional learning has also been examined in this study with the appropriate material and references. The many types of AI that may unquestionably aid in general mental health education have already been specifically outlined in this research using all the data from existing books and publications. In addition to this, an AI-based chatbot platform has been built within the software system to identify various health factors that seem to be directly linked to mental health. The main challenges in this regard remained consistent with other AI-related healthcare systems including concerns for privacy and confidentiality apart from data integrity.

Keywords: Mental, health, Education, Artificial Intelligence (AI), Technology.

I. INTRODUCTION

Mental health education is very much necessary in recent times as it helps to reduce the level of different mental disorders that have been rising globally. The current population at least 10% of the interpolation is affected by mental disorders and 15% of people between are also experiencing various mental health

conditions between the age between 15 and 29 [1]. AI for mental health education is gaining a specific food hold across all the clinical practices and their various process of artificial intelligence that can be possibly implemented in the whole education system to improve the overall accuracy of diagnosis. The main aim of Mental Health education is to promote the overall health along with the well-being of any individual as well as communities through the excellence of teaching and in this process artificial intelligence is helping in various ways to identify different issues more quickly. Through mental health education it has become very much possible to improve awareness among all the individuals out there and artificial Intelligence can appropriately help all teachers and professors to teach different processes of Mental Health diagnosis and identification. In this particular research, it is very much necessary to provide a specific Idea regarding the contribution of artificial intelligence in Mental Health education and how in recent times it is most important after the covid Pandemic era [2]. Different types of artificial intelligence implementation that are currently going on in all mental health education, as

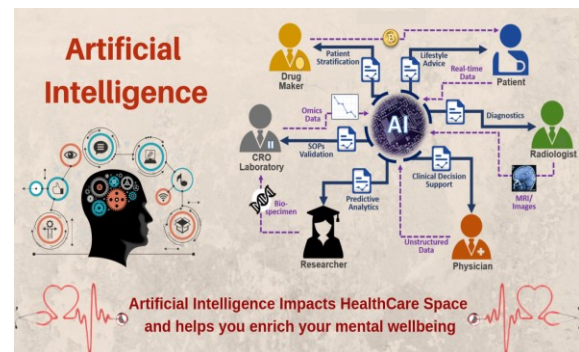
well as the diagnosis process, are also going to be appropriately discussed in this particular section. In the analysis and discussion section, the software implementation along with the accuracy score of all the Artificial intelligence models in the real-life scenario is going to evaluate with proper justification and references.

II. LITERATURE REVIEW

Various AI models in mental health education

Machine learning along with deep learning Always provide a very high accuracy level in the diagnosis of mental health condition and also predicts the outcomes of different patient and eat further helping in overall mental health education. The education on mental health is all about the process that is going to perform in various real-life processes to identify different mental health conditions and implement different processes to improve them [3]. Computer vision for all the imaging data analysis as well as understanding different nonverbal use such as gestures, Facial expression, and human pose. In medical health education, natural language processing is one of the main factors that can appropriately perform the speech recognition process along with the text analysis which is also going to use for specifically simulating the entire human conversation of any person who is feeling mentally ill. Different **computer vision applications, as well as machine learning algorithms**, are generally mature fields with very Universal use cases across different industries and it is going to help in the artificial intelligence model implementation for an appropriate approach to mental health education [4]. In recent times, AI is used to analyze all electronic health records as well as voice recordings of all the behaviour signs of different patients from social media accounts to understand their specific changes in Mental Health, and these are going to provide an example for all the students who are currently pursuing the education in medical health. All the professors of different institutes out there can appropriately get help from different data scientists to employ different kinds of techniques such as **deep learning as well as supervised machine learning and further natural language processing** [5]. All these can help to understand the difference between physical as well as mental States which are directly associated with a very specific **mental health disorder. On the other hand, there is also a natural**

language processing Chabot that can specifically track all the responses of different users and evaluate the overall progression as well as the severity of any kind of mental illness and it is a very specific and imported learning process inside the medical health education as it helps to cope with different symptoms [6]. Different artificial intelligence-powered virtual therapists include **Tess, Woebot, Ellie, and Replika**. This particular category also appropriately includes all the mental health tracking tools that are artificial intelligence-powered because all these can work to measure the heart rate oxygen level along with blood pressure which is the vital sign that can indicate the changes inside the mental will be as well as physical wellbeing of any individuals. Through all the stacking devices in the overall courses of Mental Health education, the students can appropriately understand the importance of artificial intelligence along with Different techniques in the current scenario that can be implemented to understand the whole process very easy.



**Figure 1: AI in mental health education
 Importance of AI in the education of mental health**

AI has a very high potential to facilitate all mental well-being specifically with the use of Smartphones and all smart Technology. All these tools are required to be designed very well and in the appropriate collaboration with different medical professionals can very easily facilitate early detection along with evaluation and they can also suggest the treatment option that is a most huge part of medical health education [7]. AI is also becoming a very vital part of the entire patient engagement strategies that can be adapted very much by all Health Care Organizations to improve as well as personalise the patient experience it is also a very important sector of Mental

Health education. The AI Chabot is also very useful to make appropriate access to all the care a very frictionless along with the easiest process. AI Technology scans also be appropriately incorporated into different mobile applications and various divine the system to facilitate specific communication with the patient as well as the doctor for tracking the timing of medication. AI Technology can also provide appropriate knowledge to all the individuals out there regarding mental health education and how the knowledge can appropriately help to reduce stress and anxiety as well as all the different processes that directly provoke mental illness [8]. All the applications which are AI-based can always allow users to access different therapeutic help at any time. All the algorithm of artificial intelligence for the appropriate Mental Health Care as well as the importance of Mental Health education has province successful to detect all the symptom of depression and different other conditions by specifically analyzing the overall behaviour signals [9]. It can also assist all the patients who are struggling with different mental discharges and for decreasing depression and anxiety through using various apps which can provide relaxation to all the patients.

III. RESEARCH METHODOLOGY

In this recharge regarding the importance of AI along with its contribution to mental health education, the secondary research method is going to use through proper data implementation as well as analysis in the software platform. In the secondary research, the researcher is going to analyze all the data that is available on the internet regarding various physical signs and behavioural issues as it can provide appropriate outcomes along with accuracy scores that can help to get the proper result about the importance of AI. In this research, the interpretivism research philosophy, as well as descriptive Research Design, is going to use it can appropriately help to interpret the overall data in different segments for understanding the overall importance of AI along with its advantage of it towards the mental illness diagnosis process [10]. The main reason behind choosing the secondary research method is that it can appropriately analyze all the data of different patients and it does not require a lot of money to perform that which is another benefit of it. Apart from these, it has been also observed that through these research methods, appropriate Research Design is possible to

implement inside these research that can accurately plan and design the overall dishes process so that it can help to improve the overall quality with appropriate information regarding the AI contribution in Mental Health education.

IV. ANALYSIS AND DISCUSSION

AI plays a very important role in the monitoring process and it also offers a very significant benefit. Early detection, as well as prevention of appropriate behavioural signs that can provoke the overall mental illness, is a very significant impact on the outcomes. A specific aspect of monetary mood along with mental health outside the particular clinical setting is possible to retain different records of patients along with their overall mode Diaries. In the specific research, the research is going to implement the Chabot by training it using appropriate data and checking the functionality of the chatbot, which can appropriately monitor all the behaviour signs and also provide notification to the patient regarding the medicine and all other approaches that can reduce the mental issues. AI can specifically combine with the Smartphone as well as a sensor to increase the overall monitoring of a huge amount of people [11]. It can appropriately monitor the dynamic variation of the voice along with the speaking rate as well as the quality that can appropriately determine how the patient is feeling. This research is going to an appropriate level of internet-based cognitive behavioural therapy that is very important as well as beneficial aspects regarding mental illness as well as mental health education [12]. **Mental health chatbots** are a specific type of artificial intelligence that can appropriately design to help any individual who is suffering from a mental problem [12]. The Chabot is an online service that anyone can access through the mobile app as well as the website. Through this Chabot, it is possible to appropriately help in different processes of the treatment of mental health, and mental health education is also going to provide the student with a clear Idea regarding before-in-body parameters that are directly connected with this disease. The Chabot always uses a very similar job to a particular therapist but they are not specifically operated by any humans. However, this particular AI base device can appropriately advise the correct as well as an appropriate process that needs to maintain throughout the treatment process and it is most importantly backed by science. The Chabot of Mental

Health education can appropriately help with a very large variety of Mental Health issues that can be addiction, depression along with stairs. If any individual is struggling with any of these particular issues then the mental health Chabot can be very helpful for that patient [13]. There are also data crunching capabilities of all these AI-based chat bought which is very much impressive and it can appropriately talk to any human in a specific way that is generally unimaginable. The Chabot that is going to design in this particular section is going to provide particular notification facilities where if they are any kind of emergency or discomfort situation the patient is facing it can appropriately notify regarding the same.

```
# This Python 3 environment comes with many helpful analytics libraries installed
# It is defined by the kaggle/python Docker image: https://github.com/kaggle/docker-python
# For example, here's several helpful packages to load

import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)

# Input data files are available in the read-only "../input/" directory
# For example, running this (by clicking run or pressing Shift+Enter) will list all files under the input directory

import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

# You can write up to 20GB to the current directory (/kaggle/working/) that gets preserved as output when you create a version using "Save & Run All"
# You can also write temporary files to /kaggle/temp/, but they won't be saved outside of the current session
```

Figure 2: Importation of libraries and packages

In this particular picture, all the libraries along with packages that are important to develop a chat bought have been implemented. Without the appropriate Implementation of different packages along with libraries, it is not possible to appropriately develop the Chabot system inside the software platform which can specifically help all the individuals out there to understand their status of mental well-being [14]. All the function has been implemented and executed in specific manners showing that it can help to execute the overall development.

Empathetic Dialogues

```
In [ ]:
ed = pd.read_csv('/kaggle/input/empathetic-dialogues-facebook-ai/emotion-emotion_69k.csv')
ed.head

In [ ]:
ed.columns

In [ ]:
empathetic_dialogs = []
for i in ed.empathetic_dialogues:
    try:
        empathetic_dialogs.append(i.split('\nAgent :')[0].split('Customer :')[1])
    except:
        continue

len(empathetic_dialogs)
empathetic_dialogs
```

Figure 3: Importation of Dialogues

The abovementioned picture is appropriately providing all the information regarding the importation of different dialogues that can the Chabot appropriately analyze to determine whether the individuals are having any kind of mental illness or not [15]. All these processes are directly backed by different scientific research along with the practice Honors from different medical expertise and psychological science disciplines. In this manner, the overall development would be executed.

Topical Chat

```
In [ ]:
tc = pd.read_csv('/kaggle/input/chatbot-dataset-topical-chat/topical_chat.csv')
tc.head

In [ ]:
tc_dialogs = list(tc.message)
tc_dialogs[:50]
list(tc.message)

In [ ]:
len(tc_dialogs)
```

Figure 4: Implementation

Various information has been implemented inside the software platform along with the dialogues between different medical experts along with the technological wizardry. All the dialogues are very easy to understand, and it also becomes very important to maintain an appropriate technological approach so that the entire thing can perform very easily without any kind of destruction along with

error [15]. Through the Chabot system, it becomes very easy to understand the importance of mental illness and how the whole artificial intelligence-based system can be implemented inside mental health education.

```
In [ ]:
import tarfile
tar = tarfile.open("/kaggle/input/150k-python-dataset/py150.tar_1")
tar.extractall()
tar.close()

In [ ]:
ls

In [ ]:
import sys
import json as json
import ast

def PrintUsage():
    sys.stderr.write("""
Usage:
    parse_python.py <file>

""")
    exit(1)

def read_file_to_string(filename):
    f = open(filename, 'rt')
    s = f.read()
    f.close()
```

Figure 5: Development of models

Moreover, in this section, also different packages along with the library have been properly implemented with the help of python technical solution which can provide proper notification to all individuals so that they can take appropriate precautions. For example, if an individual feels sadder along with pathetic than usual then the chat is going to identify the specific reason and also start to appropriately deal with the problem.

```
In [ ]:
import nltk
nltk.download('stopwords')

In [ ]:
questions = pd.read_csv("/kaggle/input/pythonquestions/Questions.csv", encoding = "ISO-8859-1")
print(len(questions))
display(questions.head(5))

In [ ]:
print("Number of unique Questions : ", questions['Id'].nunique())

In [ ]:
questions['qLen'] = questions['Title'].apply(lambda x : len(x.split(" ")))
questions['qBodyLen'] = questions['Body'].apply(lambda x : len(x.split(" ")))

In [ ]:
import matplotlib.pyplot as plt

In [ ]:
questions['qLen'].hist(bins=35)
plt.title("No. of words in Title")
```

Figure 6: Interpretation of questions

Various questions that have been asked and implemented inside the Chabot are going to execute with appropriate information and technical approach

inside the software perform with the help of artificial intelligence . The Chabot can appropriately provide all the necessary information regarding the depressive episode that is currently in an individual is facing so that they can take appropriate initiative in order to mitigate those.

Data training for chatbot

```
In [ ]:
import numpy as np
import tensorflow as tf
import pickle
from tensorflow.keras import layers, activations, models, preprocessing, utils

In [ ]:
tokenizer = preprocessing.text.Tokenizer()
tokenizer.fit_on_texts([str(i) for i in all_questions[:1000]] + [str(i) for i in all_answers[:1000]])
VOCAB_SIZE = len(tokenizer.word_index) + 1
print('VOCAB SIZE : {}'.format(VOCAB_SIZE))

In [ ]:
from gensim.models import Word2Vec
import re

vocab = []
for word in tokenizer.word_index:
    vocab.append(word)

def tokenize(sentences):
    tokens_list = []
    vocabulary = []
    for sentence in sentences:
```

Figure 7: Data training

After the data importation process along with the dialogue as it is very much necessary to train all the data so that they can update their skill and understand human behaviour more appropriately. In mental health education, it becomes very important in recent times to use all these AI-based Chabot systems and change them appropriately so that it becomes very much up to date with medical expertise and a science-based approach .

```
In [ ]:
enc_model, dec_model = make_inference_models()

for _ in range(10):
    states_values = enc_model.predict(str_to_tokens(input('Enter question : ')))
    empty_target_seq = np.zeros((1, 1))
    empty_target_seq[0, 0] = tokenizer.word_index['start']
    stop_condition = False
    decoded_translation = ''
    while not stop_condition:
        dec_outputs, h, c = dec_model.predict([empty_target_seq] + states_values)
        sampled_word_index = np.argmax(dec_outputs[0, -1, :])
        sampled_word = None
        for word, index in tokenizer.word_index.items():
            if sampled_word_index == index:
                decoded_translation += '{} '.format(word)
                sampled_word = word

        if sampled_word == 'end' or len(decoded_translation.split()) > maxlen_answers:
            stop_condition = True

    empty_target_seq = np.zeros((1, 1))
    empty_target_seq[0, 0] = sampled_word_index
    states_values = [h, c]

print(decoded_translation)
```

Figure 9: Model development

In the abovementioned picture, the model has been properly executed which can provide appropriate information as well as the solution to different problems of Mental Health education with

appropriate information regarding the triggering factor of this condition.

V. CONCLUSION

Based on the above discussion it is possible to conclude that in current times AI has a very vital role in mental health education because it provides an appropriate solution to the different problems of this condition. In this research, a basic idea regarding the AI base mental health solution and how it is directly impacting the education of mental health has been also explained with proper information and reference. Various forms of AI that can help overall mental health education have been specifically explained in this particular report with all the available information from different literature and articles. Apart from this Chabot system is AI-based and has been developed inside the software platform to recognize different health factor that is directly connected with mental health. Moreover, in this particular research, the researcher has specifically identified different issues that can happen in different AI base systems which are very much important for medical health education so it becomes very easy to work up on that. The execution process of the data based on the Chabot system has been appropriately processed in the software platform to get an appropriate solution.

VI. REFERENCE

- [1] Abd-Alrazaq, A.A., Alajlani, M., Alalwan, A.A., Bewick, B.M., Gardner, P. and Househ, M., 2019. An overview of the features of chatbots in mental health: A scoping review. *International Journal of Medical Informatics*, 132, p.103978.
- [2] Barros, J., Morales, S., García, A., Echávarri, O., Fischman, R., Szmulewicz, M., Moya, C., Núñez, C. and Tomicic, A., 2020. Recognizing states of psychological vulnerability to suicidal behavior: a Bayesian network of artificial intelligence applied to a clinical sample. *BMC psychiatry*, 20(1), pp.1-20.
- [3] Bickman, L., 2020. Improving mental health services: A 50-year journey from randomized experiments to artificial intelligence and precision mental health. *Administration and Policy in Mental Health and Mental Health Services Research*, 47(5), pp.795-843.
- [4] Briganti, G. and Le Moine, O., 2020. Artificial intelligence in medicine: today and tomorrow. *Frontiers in medicine*, 7, p.27.
- [5] Cheng, Y. and Jiang, H., 2020. AI-Powered mental health chatbots: Examining users' motivations, active communicative action and engagement after mass shooting disasters. *Journal of Contingencies and Crisis Management*, 28(3), pp.339-354.
- [6] Chung, J.W.Y., So, H.C.F., Choi, M.M.T., Yan, V.C.M. and Wong, T.K.S., 2021. Artificial Intelligence in education: Using heart rate variability (HRV) as a biomarker to assess emotions objectively. *Computers and Education: Artificial Intelligence*, 2, p.100011.
- [7] Dekker, I., De Jong, E.M., Schippers, M.C., De Bruijn-Smolters, M., Alexiou, A. and Giesbers, B., 2020. Optimizing students' mental health and academic performance: AI-enhanced life crafting. *Frontiers in Psychology*, 11, p.1063.
- [8] Fonseka, T.M., Bhat, V. and Kennedy, S.H., 2019. The utility of artificial intelligence in suicide risk prediction and the management of suicidal behaviors. *Australian & New Zealand Journal of Psychiatry*, 53(10), pp.954-964.
- [9] Graham, S., Depp, C., Lee, E.E., Nebeker, C., Tu, X., Kim, H.C. and Jeste, D.V., 2019. Artificial intelligence for mental health and mental illnesses: an overview. *Current psychiatry reports*, 21, pp.1-18.
- [10] Han, E.R., Yeo, S., Kim, M.J., Lee, Y.H., Park, K.H. and Roh, H., 2019. Medical education trends for future physicians in the era of advanced technology and artificial intelligence: an integrative review. *BMC medical education*, 19(1), pp.1-15.
- [11] Lee, E.E., Torous, J., De Choudhury, M., Depp, C.A., Graham, S.A., Kim, H.C., Paulus, M.P., Krystal, J.H. and Jeste, D.V., 2021. Artificial intelligence for mental health care: clinical applications, barriers, facilitators, and artificial wisdom. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 6(9), pp.856-864.
- [12] Matheny, M., Israni, S.T., Ahmed, M. and Whicher, D., 2019. Artificial intelligence in health care: The hope, the hype, the promise, the peril. *Washington, DC: National Academy of Medicine*.
- [13] Pham, K.T., Nabizadeh, A. and Sele, S., 2022. Artificial intelligence and chatbots in psychiatry. *Psychiatric Quarterly*, 93(1), pp.249-253.
- [14] Rigby, M.J., 2019. Ethical dimensions of using artificial intelligence in health care. *AMA Journal of Ethics*, 21(2), pp.121-124.
- [15] Sharma, A., Lin, I.W., Miner, A.S., Atkins, D.C. and Althoff, T., 2023. Human-AI collaboration enables more empathic conversations in text-based peer-to-peer mental health support. *Nature Machine Intelligence*, pp.1-12.