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Mental Health Analysis AI Chatbot

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Abstract: *The project work is a practical experience of the knowledge one has. The documentation leads a way to the concept to present the thinking and the upgradation of various techniques into the project. This project entitled "Mental Health Analysis AI Chatbot" is a practical project based on some trends of computer science. Every day the world is searching new techniques in the field of computer science to upgrade human limitations into machines to get more and more accurate and meaningful data. More and more mental health issues such as depression are getting known and recognized by our society today. However, not all of them can receive appropriate treatment. There are many of us still facing the problem of getting the appropriate mental health services every day. We cannot deny the fact that not everyone can get mental healthcare services as they might face some difficulties such as financial problems. Therefore, we may look for new solutions to fix this mental health issue. This demand for solving this issue has led to the proposal of technology as a solution. Chatbot, also known as a conversational agent which can participate in the conversation might be considered one of the solutions too. By mimicking the conversation between human counselor and patient, it can provide counselor service to the patient at some point. However, to further improve the quality of the counselor service, the improvement of the chatbot has to be carried out. By using deep learning, this proposed chatbot can recognize the meaning of the conversation and give a relevant response.*

Keywords: AI Chatbot

I. INTRODUCTION

According to World Health Organization (WHO), mental health can be defined as "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." (WHO, 2018) As we know, life does not always go well. There are always up and down in our life.

However, not everyone able to bear the stress well when the problem comes to them. At this moment, they are suggested to find help for their mental illness. However, not everyone is lucky enough to have the right to access mental healthcare services. Community-based mental health care is also rare in low-income countries; about 52% of low-income countries offer community-based mental health care programs, compared to about 97% of high-income countries (Saxena et al, 2007). Having poor financial issues is not the only obstacle they need to face when they are seeking medical help. The limited availability of medication and health professionals in the mental healthcare field in their country even makes the scenario worst. The purpose of building this chatbot is to offer some mental healthcare

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services to people without charging any cost. The service will able to deliver to them wherever and whenever they are. All they need is a device that able to connect to the internet and then the people at least will have the more easy option to relieve their stress and anxiety

II. LITERATURE SURVEY

Mental Health Research in Ghana
Ghana Med J. 2012 Jun; 46(2 Suppl): 29–38.

A literature search was conducted of social science and medical journals in Ghana and the UK. The authors conducted an on-line search of Pubmed using MeSH terms 'psychiatry AND Ghana', 'mental disorders AND Ghana' 'mental health services AND Ghana', 'mental health AND Ghana', 'self-injurious behaviour AND Ghana', in addition to a manual search of the libraries of Korle-Bu Teaching Hospital (KBTH), the Institute of Psychiatry, UK, and the London School of Hygiene and Tropical Medicine (LSHTM).AI chatbots can serve as a gateway to traditional therapy for individuals who may be hesitant about traditional in-person sessions. They can also engender positive associations for therapy among adolescents, who regularly deal in instant communication and feel more comfortable interacting with technology.

T. Kamita ,T. Ito ,A. Matsumoto, T. Munakata, T. Inoue , A Chatbot System for Mental Healthcare Based on SAT Counseling Method, 2019

The SAT method is an interview-style counseling and therapy techniques developed by Munakata [4]. Unlike conventional counseling technique, which uses language stimuli obtained through dialogue with a counselor to act on thoughts, the SAT uses visual stimuli obtained by viewing image images to quickly identify unrecognized real feelings and desires by functioning associations, inspiration, and intuition.In the SAT method of therapy, visual stimulation with images encourages intuitive associations and inspiration, and the effect is established by frequent stimulation with repeated viewing of the images [5, 6]. Continuous use of the self-guided mental healthcare course is important, but motivation to promote the use of course for employees who do not necessarily actively engage in self-care is a challenge.

Therefore, we propose a self-mental healthcare course using chatbot (Chatbot course) on LINE, a SNS platform that is commonly used as a communication tool using a widely used smartphone terminal from the viewpoint of practicality and motivation.

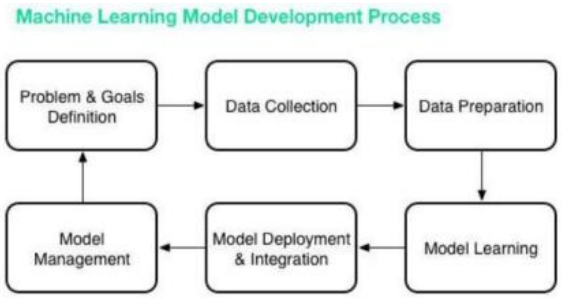
III. PROPOSED SYSTEM

A. Problem statement

The problem statement for mental health literacy research is to develop and evaluate interventions that can be feasibly and sustainably implemented in day to day life to improve knowledge of mental health, promote help-seeking behaviors, and reduce stigma and negative attitudes towards mental illness .

B. Methodology

Machine Learning Model Development Process The proposed chatbot is developed by following the procedures of the machine learning model.



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a. Problem and goals definition:

The proposed chatbot is developed by using Python language with an open source software library, Keras from Tensorflow. There are few procedures when building the ML model. First of all, we need specified the goal of building the model such as either classify the text input or recognize the emotion of the voice input.

b. Data collection and preparation:

Next, we had to prepare the data for training our model. The datasets should be large enough to increase the accuracy of the result. Besides, the data also need to undergo some pre-processing so that the data able to fed into the model training.

c. Model learning:

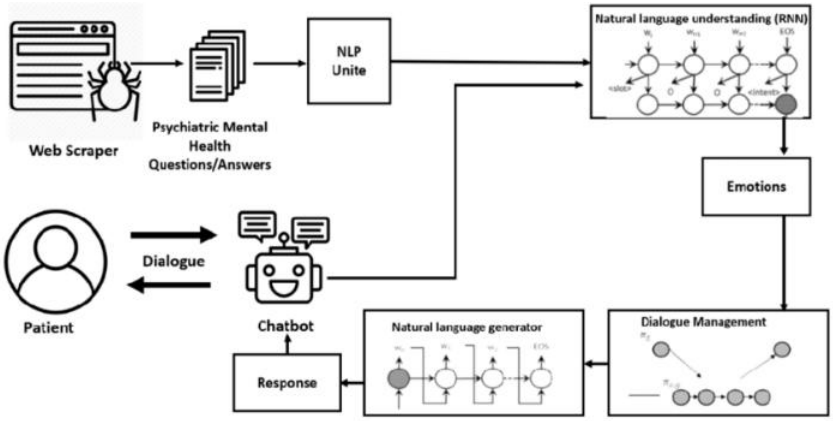
In this stage, we will start to train our model by using Tensorflow. Tensorflow is an open-source software library developed by Google Brain to allow people to use it for machine learning. All the training process is done on the laptop by using the Nvidia GeForce 940MX GPU. After training, the chatbot was expected to recognize the categories of the input according to the trained model and reply to the user.

d. Model deployment and integration:

After the model is done training, the proposed chatbot would be deployed on the website by using FLASK which is a micro web framework that is written in Python. This chatbot web application allows people to get the counseling service by just entering the website address to the browser.

e. Model management:

After that, we had to do some testing in order to see how the chatbot would reply to us after training. The proposed chatbot will collect the voice input from the user and convert it to text by using Speech-to-Text (STT) technology. The chatbot will process the input and produce the output by using the trained model. The output text will be converted into voice output to user by using Text- to-Speech technology. The chatbot will reply to the user in text form and voice form together. We also need to check whether the chatbot has achieved the goal that we expected by starting a conversation with the chatbot. If the output is not correct, then we need to adjust somepart of the processing module until we get the expected outcome.



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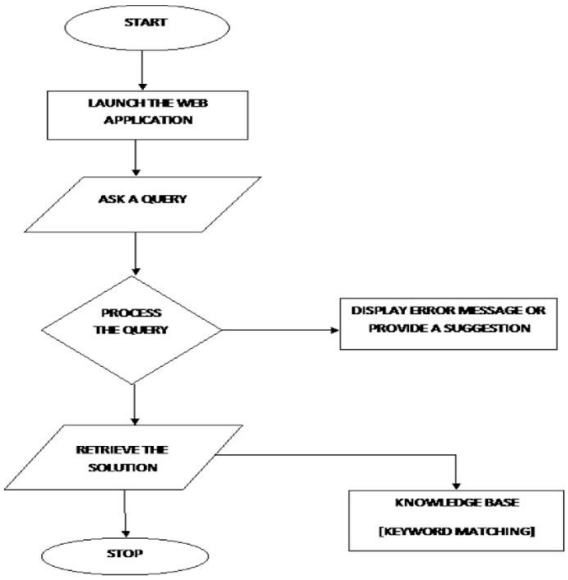
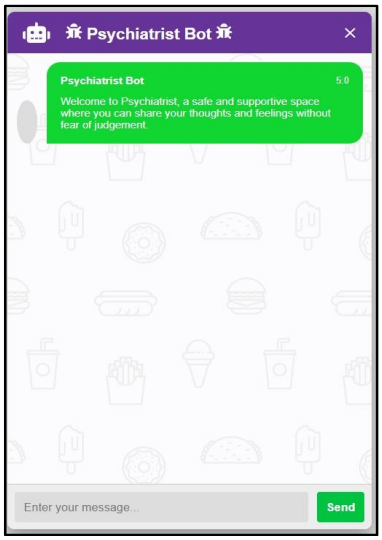
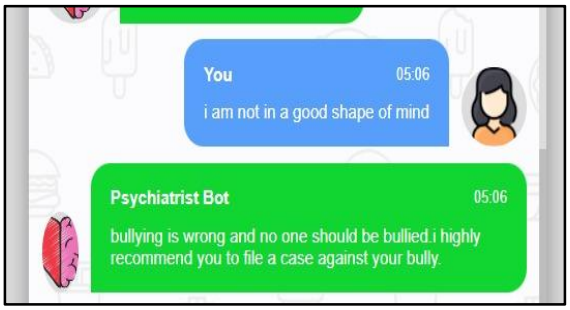


Flowchart

IV. RESULT





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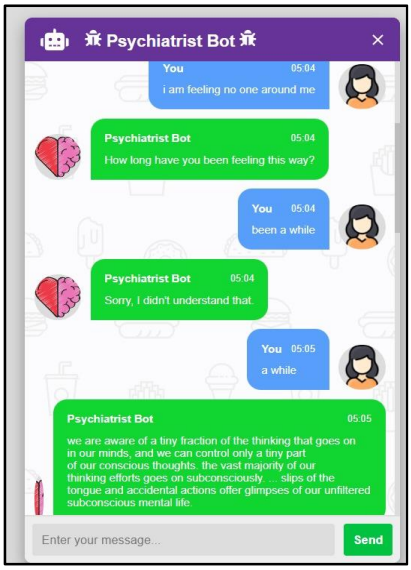

V. CONCLUSION

The Mental Health Analysis AI Chatbot project demonstrates the potential of AI technology to provide valuable support and resources for individuals dealing with mental health issues. By leveraging natural language processing capabilities and empathy-driven responses, the chatbot has the capacity to make a positive impact on users' mental well-being.

In this project, although the proposed chatbot is developed it is regrettable to say that this chatbot still considers apart from giving the diverse response every time. The accuracy of the model prediction can be further improved by training with larger datasets. Besides, the flow of the conversation for the chatbot is considered hard to design. Apart from the reason that lack of psychology knowledge and experience, it is not guaranteed that the user will follow the instruction given. Although the chatbot still considers able to give a related response even it is out of the range of the conversation flow, but this makes the chatbot unable to perform all the functions completely and reduces the quality of the mental healthcare service.

VI. FUTURE WORK

The proposed chatbot can be further improved by expanding its training data. Keep collecting the feedback of the user or even cooperate with human counselors to improve the content of the chatbot also recommend to be carried out. So that this chatbot can give more professional counseling services to the people. Besides, this chatbot also can become more advance if it is added to face emotional recognition. Face recognition should work like voice emotional recognition as it will perform some action according to the facial expression of the user. By working together with both recognition modules, the chatbot should be able to predict the situation of the user more accurately and serve the user much better.

AUTHORS' CONTRIBUTION

- Farzana Khan: Conceptualization, Supervision, Guidance.
- Khan Khalid: Methodology, Formal analysis, Resources, Visualization, Validation.
- Hassan Ansari: Formal analysis, Visualization, Validation.
- Singh Omkant: Formal analysis, Investigation.

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