AI Based Chatbot: A Case Study Afghanistan Healthcare Services Mental Health Disorder

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ABSTRACT: Artificial intelligence increasingly integrates our daily lives with the creation and analysis of intelligent software and hardware, called intelligent agents. Intelligent agents can do a variety of tasks ranging from labor work to sophisticated operations. A Chatbot is a typical example of an artificial intelligence system. For developing artificial intelligence Chatbot, we have implemented encoder-decoder attention mechanism architecture memory cells, TFIDF (term frequency-inverse document frequency) algorithm and LLM (Large Language Module).

To conduct this research, mixed methods research could involve combining both qualitative and quantitative methods to provide a more comprehensive understanding of the research topic. Survey utilized as the main methods for collecting the primary data and reviewed the existing literature for collecting the secondary data in this research. The data was collected from 18 participants, including medical doctors, patients, lecturers and university students in Afghanistan. Additionally, secondary data was obtained through a review of literature from other countries that have faced similar situations.

Moreover, the analysis reveals a widespread belief among respondents that the implementation of AI based Chatbot for Afghanistan healthcare service in mental health disorder will contribute to reduce illness in Afghanistan.

KEYWORDS: Artificial Intelligence (AI), Chatbot, TFIDF (term frequency-inverse document frequency), Afghanistan.

I. INTRODUCTION

Chatbot are Artificial Intelligence (AI) based systems or computer software through which we can human interaction with it using various techniques which include Neural Network (NN) and Natural Language Processing (NLP). AI technology which is used for building machines to process information and gives a response, which is very close to real. We can use some text and get a response from the system as real person by text and speech. It can be simple as answering a single line or it can reply too many sentences based on collecting most important words from it (Kumar & Ali, 2020).

This chatbot is planned to help the healthcare system to give answer to people without any doctor or healthcare employ. This system will save much time of people compare to consulting and meeting the doctor. The query will be answered by a trained system, if the answer is not available in the data set it will response negative.

II. PROBLEM STATEMENT

In 2022, the Ministry of Public Health reported that one out of two people in Afghanistan suffered from mental disorders, including depression and anxiety. The increasing awareness of mental health has made it a primary concern of development. Nearly 16 million people in Afghanistan needed cure, where the low and middle class faced more burden than the well-off people. This project is an attempt to make mental health more accessible. This conversational agent can be complemented with clinicians to make it more effective and fruitful (moph.gov.af/en/node/3173, 2022).

III. RESEARCH GOAL

It will give you a clear picture that healthcare today need to adopt this technology to drive more treatment, this Chatbot helps the healthcare system to give answer to many people without any doctor or healthcare employ. This system also save much time of people compare to consulting and meeting the doctor in section of mental health disorder.

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IV. LITERATURE REVIEW

This research is intended to cover the literature review of the study where in this research studied about chatbot in the area of mental health. Chatbots represents a potential shift in the interaction of people with data and services online (Brandtzaeg & Følstad, Why people use chatbots, 2017). With the increase rise of interest in chatbot design and development, we lack the knowledge to know about why humans use chatbots.

They are simulations which can understand human language, can process it and response to human while performing specific tasks, for example, a chatbot can be employed as a helpdesk executive. Chatbots are not considered as a recent development. The first chatbot was created by Joseph Wiesenbaum in 1966 named as Eliza (Weizenbaum & ELIZA, 1966). It first started when Alan Turing published an article named "Computer Machinery and Intelligence" and this raised an intriguing question, "Can machine think?" Since then we have seen multiple chatbots that are outstanding to their predecessors to become more naturally conversant and technologically advanced. These advancements made an era where conversations with chatbots have become more normal and natural as with another human.

Brief Timeline of Chatbots

1950

The Turing test was created by Alan Turing (Turing, 1950). It was a test of a machine's ability to exhibit intelligent behavior equivalent to, or indistinguishable from, that of a human.

1966

Eliza, the first chatbot, was created by Joseph Weizenbaum, designed to be a therapist (Gentner, Neitzel, Schulze, & Buettner, 2020). It used a method called "pattern matching" and "substitution" to create the illusion the bot was understanding what the user was saying.

1972

Parry, created chatbot by Kenneth Mark Colby, a psychiatrist and computer scientist from Stanford's Psychiatry Department in 1972 (ZEMČÍK, 2019). Unlike Eliza, Parry tried to make people pay attention to something else instead of itself.

1981

The Jabberwocky chatbot was created by British computer programmer Rollo Carpenter in 1981. It was launched on the internet in 1997. The goal of this chatbot was to make people feel like they were talking to another person in a natural, fun, and entertaining way. (Raj, 2019).

1992

In 1991, there was a significant advancement in the development of chatbots with the creation of Dr. Sbaitso happened. This chatbot utilized the Sound Blaster sound card, a groundbreaking technology developed by 16 Creative Labs. Dr. Sbaitso was able to synthesize speech, allowing it to communicate verbally and appear more human-like than its predecessors. However, despite this advancement, chatbots still struggle with communicating in a complex and sophisticated manner, a challenge that persists to this day (ZEMČÍK, 2019).

1995

A.L.I.C.E. (Artificial Linguistic Internet Computer Entity) chatbot based on natural language artificial intelligence. A.L.I.C.E. sometimes called Alicebot it is available as free and open source software. Alicebot is a chatbot that uses a special computer language called AIML (Artificial Intelligence Markup Language) to give responses to your query (Bani & Singh, 2017).

2001

SmarterChild is a chatbot that can help you find information quickly. It was made by a company called ActiveBuddy and was first released in 2001. You can use it to get news, weather, stock information, movie listings, and information on how to get around. But it is no longer used (Singh & Thakur, 2020).

2010

Siri is a smart assistant that you can use on your iPhone. It can help you with things like making phone calls, sending messages, and setting reminders. It's made by a company called the International Artificial Intelligence Center, and it uses speech recognition technology from a company called Nuance Communications. Siri also uses advanced computer learning to work its magic. In 2012 Google launched the Google Now chatbot. It was originally codenamed "Majel" after Majel Barrett, the wife of Gene Roddenberry and the voice of computer systems in the Star Trek franchise; it was also codenamed as "assistant" (Raj, 2019).

2014

Alexa is a popular virtual voice assistant application developed by Amazon. Alexa provides multiple functionalities like real-time data extraction, voice interaction, weather forecast, broadcasting, smart audio-video streaming, tasks list management, home, automation control and others (Sadavarte & Bodanese, 2019).

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2016

In 2016, Facebook introduced a new platform for Messenger that allowed chatbots to interact with users. Later on, the chatbots were able to join groups, show a preview of what they could do, and even scan QR (Quick Response) codes through the camera on Messenger. This allowed users to quickly access the chatbot without having to search for it. In May 2016, Google unveiled its Amazon Echo competitor voice-enabled bot called Google Home at the company's developer conference. It enables users to speak voice commands to interact with various services (Raj, 2019).

2017

Woebot is a chatbot that is easy to use for several reasons. It is also user-friendly, and it has a policy that keeps your personal information. Woebot is a chatbot that can give you quizzes and videos to help you learn about your thoughts and mental health (Brandtzaeg, Skjuve, Dysthe, & Følstad, 2021).

V. RESEARCH METHODOLOGY

Research methodology is very important in any research and I want to mention Case study and Systematic Literature Review is used in this research. And data collection for this step addressing research questions may involve quantitative methods such as surveys and data collection, sampling the appropriate sample population for the study this may include medical doctors that worked in section of mental health and patients who have experienced.

Furthermore, in this section, the methodology for this research is explained. It dialogs about the methods used for gathering data from different groups of the people that worked and are experienced in section of mental health disorder. As this is a qualitative research and requires explanation of the answers given by the respondents, therefore, I have talked with many doctors about my topic, according of the instruction prepared the questionnaire form in Persian language after finishing the survey, the questions were changed to English and set to a dataset for analyzing and manipulating.

A. DATA COLLECTION

We have collected data using the chosen research design. This involved conducting surveys and analyzing data from relevant sources such as government reports, databases, and academic literature. For the surveys we will design questioner in Google forms according to our research question, the questioners were designed in two categories: the first part put personal information for responders, second parts include question for professional's doctor and who have experienced or have information about this issue.

In overall our data collection performed in two ways, one was primary data collection and the other was secondary data collection methods. Both the primary and the secondary data collection is presented here:

Primary Data Collection

Primary data is the data that has been collected from the Kabul hospital doctors at and citizens who had experience in mental disorder. Conducting surveys is a popular method of primary data collection. We create a questionnaire and distributed it to people who have experience in mental disorder in Afghanistan.

Secondary Data Collection

Secondary data collection refers to the process of collecting data from existing sources rather than directly from a primary source. In the context of the AI chatbot for Afghanistan health care services especially in mental health chatbot, secondary data collection involved gathering information from a variety of sources, such as academic journals and research papers.

B. THE DATA ANALYSIS AND RESULTS

The implementation of AI based chatbot for Afghanistan healthcare service in mental health disorder, presents a range of challenges that must be carefully analyzed and addressed to ensure the success of the project. As a system analyst, it is important to conduct a thorough analysis of these challenges in order to identify potential solutions and ensure that the system is designed and implemented in a way that is both effective and usable for public. This questionnaire is designed to guide the analysis of challenges in the implementation of AI based chatbot for Afghanistan healthcare service in mental health disorder, with a particular focus on data set. The questionnaire aims to provide a comprehensive overview of the chatbot that must be addressed in order to ensure we have a successes project. The analysis generated by this questionnaire can help to inform the development and implementation of the project in Afghanistan and beyond.

The majority of respondents expressed that the implementation of this chatbot will decrease the concern of Afghan people about mental health disorders and 83.3% agree and 11.1% are not, illustrate in the figure 5.3.

VI. CONCLUSIONS

This research explains a medical chatbot which can be used to replace the conventional method of disease diagnosis and treatment recommendation. The chatbot can acts as a user application. The users of this application can specify their symptoms

to the chatbot and in turn, chatbot will specify the health measures to be taken. General information about symptom and diseases are available in the dataset and thus the chatbot instance can provide information about disease and treatment of a user. After analyzing the symptoms of different users, it finally predicts the disease to the user and details about the treatment become visible.

A smart medical chatbot can be useful to patients by identifying the symptoms as described by them, giving proper diagnosis and providing with suitable treatment for the disease. In the busy life, it is rare for people to frequently visit hospitals for check-ups. Chatbot is great importance in such situations as they provide diagnostic assistance with a single click of button. Chatbot doesn't require the help of any physician to give proper health measures to the users and this is one of the major advantages of chatbot. Moreover, the cost effectiveness in using chatbot is a major attractiveness to users. The chat with users is completely personal and this helps users to be more open with their health matters and paves way for chatbot to efficiently identify the disease.

Furthermore, the role played by chatbot can sometimes be beyond the scope and user may require consulting a doctor for taking health related tests. In such situations, chatbot can be helpful if it can be made to set up an appointment with an efficient doctor based on their schedule. Also it will be beneficial if the symptoms and disease identified by the chatbot can be made into a report and automatically forwarded to an available doctor where he can further assist the user with more advices and future measures to maintain their health.

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