Artificial Intelligence Cognitive Behavioral Therapy Application Using Natural Language Processing

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Abstract

We want to developed an A.I application for mobile phones that aim to be support for mental health patients to provide privacy and anonymity. These application is using Cognitive Behavioral Therapy techniques to answer any questions or concerns throughout the conversation wihch will help users reduce their depression and anxiety. We used a Dialogflow bot frame work to apply the Cognitive Behavioral Therapy techniques.it's a Google-owned technology of developing human-computer interaction based on natural language conversations backed by machine learning. Mental health therapy can be expensive, thus we cannot ignore the fact that it cannot be afforded by everyone. It can also be intimidating to schedule an appointment, explaining what's going through the mind of a patient with a therapist who is a total stranger. The opportunity to create a cognitive behavioral therapy chatbot available to everyone creates a stepping stone in treating mental health.

Introduction

People with severe mental disorders on average tend to die earlier than the general population. This is referred to as premature mortality. There is a 10-25 year life expectancy reduction in patients with severe mental disorders (World Health Organization). Nowadays, a major concern of mental health doctors regarding traditional therapeutic approaches (such as visiting the doctor's office) is that they are confronted with a new phenomenon, specific to our time: the desocialization of their patients, especially the younger ones. Indeed, they grew up in a world where they were much more in contact with screens than previous generations. Thus, they have learned to trust the screens, sometimes more than human beings. However, it is not only young people who find themselves in this situation, since we have now been living for twenty years in a world where the use of computers is commonplace, regardless of age. And when social concerns arise in people who are used to screens, it is difficult to lead them to treatment, because therapy involves a social relationship: the one between the patient and the doctor. This is why new approaches are being invented and developed to adapt therapy to this new reality of the patient (Teichne, 2019)

Artificial intelligence is having a marked impact on the pharma and healthcare industries. From streamlining paperwork to scanning X-Rays – it is slowly transforming the way people are diagnosed and treated. One area within the industry that has potential to be disrupted by AI is mental health care, specifically with the use of chatbots for therapy and general wellbeing (Gillilan, 2018). A Chatbot is an artificial person, animal or other creature which holds conversations with humans. This could be a text-based (typed) conversation, a spoken conversation or even a non-verbal conversation. A chatbot can run on local computers and phones, though most of the time it is accessed through the internet. A conversational agent is typically perceived as engaging software entity which humans can talk to. It can be interesting, inspiring and intriguing. It appears everywhere, from old ancient HTML pages to modern advanced social networking. This study proposes to developed Artificial Intelligence applications for mobile phones that aim to be support for mental health patients and to provide privacy and anonymity. These applications, targeted at individuals, were developed to proactively check on patients, be ready to listen and chat anytime, anywhere and recommend activities that improve the users wellbeing.

Description of project

Deeptalk is a project built using artificial algorithms that analyzes the user's conversation and queries. It is a web application designed to simulate conversation with human users. The system uses built in Artificial Intelligence generated Cognitive Behavioral Therapy techniques to answer any questions or concerns throughout the conversation which will help users reduce their depression and anxiety. The user can chat as much or as little as they like, our Deeptalk app is always available when they need it. The user is required to sign up with their email address. Once an account has been created, they can start to communicate with our Deeptalk application. The information that the users share with Deeptalk will remain private & confidential.

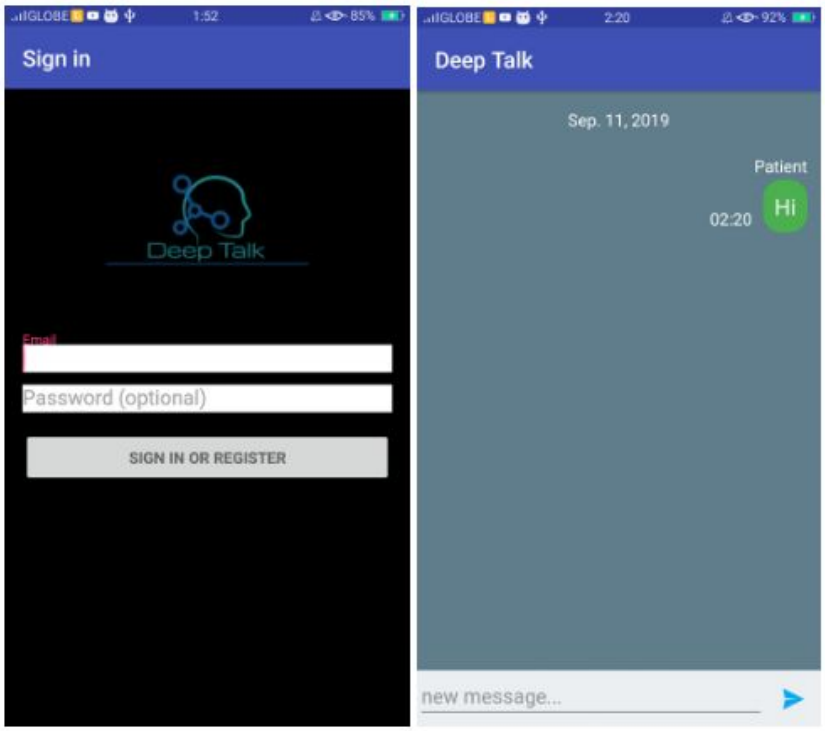

Figure 1. Screen Design

The goal of the project is to help users with everyday stress and challenges such as symptoms of depression, anxiety, relationship problems, procrastination, loneliness, grief, addiction, pain management and more. Deeptalk does not aim to take the place of a therapist. Rather, it is designed to be an additional resource or a way of seeking help when there is no other available alternative. Therapy for a lot of people can be intimidating so if they feel like communicating with a conversational agent we want to make sure that our Deeptalk app can provide assistance close to a physical therapist any time of the day. The proposed project focuses on charging minimal to no fees, which can be beneficial for people who cannot afford therapy.

Methodology

Dialogflow is bot framework a Google-owned technology of developing human-computer interaction based on natural language conversations backed by machine learning. Dialogflow provides a platform that allows developers to design and implement conversation interfaces which can be embedded in external applications like bots. Dialogflow supports 14 different platforms including Skype, Telegram, Slack, Cortana, Alexa and Facebook Messenger. However, even though bot application created with Dialogflow is technically possible integrate with Azure Bot service; it would demand additional preparation, because Dialogflow bots are designed to work with Google's own Cloud Platform. The process of dialogflow agents follows from invocation to fulfillment is similar to someone answering a question, with some liberties taken, of course.

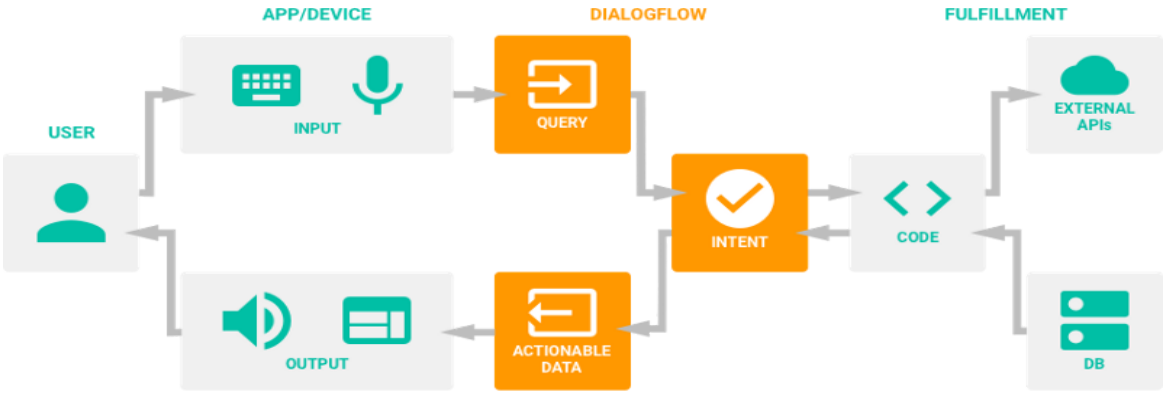

Figure 2. Dialogflow Data Flow

Machine Learning, allows an agent to understand user inputs in natural language and convert them into structured data, extracting relevant parameters. The agent uses machine learning algorithms to match user requests to specific intents and uses entities to extract relevant data from them the agent learns from the data you provide in it. it builds a model (algorithm) for making decisions on which intent should be triggered by a user input and what data needs to be extracted. The model is unique to the agent. The model adjusts dynamically according to the changes made in agent and in the Dialogflow platform. To make sure that the model is improving, the agent needs to constantly be trained on real conversation logs.

- **Intent -** An Intent is a specific action that the user can invoke by using one of the defined terms in the dialogflow console. It's allow us as developers to define a selection of individual tasks that can be invoked by the user.

- **Training phrases -** Define a list of user say options this allow us to define different phrases which can be said by the user in order to trigger our intent.

- **Entities -** An Entity is a property which can be used by dialogflow to answer the request from the user. The entity will usually be a keyword within the request such as name, date, location, etc. When the user speaks or types their request, Dialogflow will look for the entity and the value of

the given entity can be used within the request.

- **Response -** The response is the content which dialogflow will deliver to our user once the request for fulfilment has completed. The context is used to keep a reference to parameter values as the user moves between intents throughout the conversation.

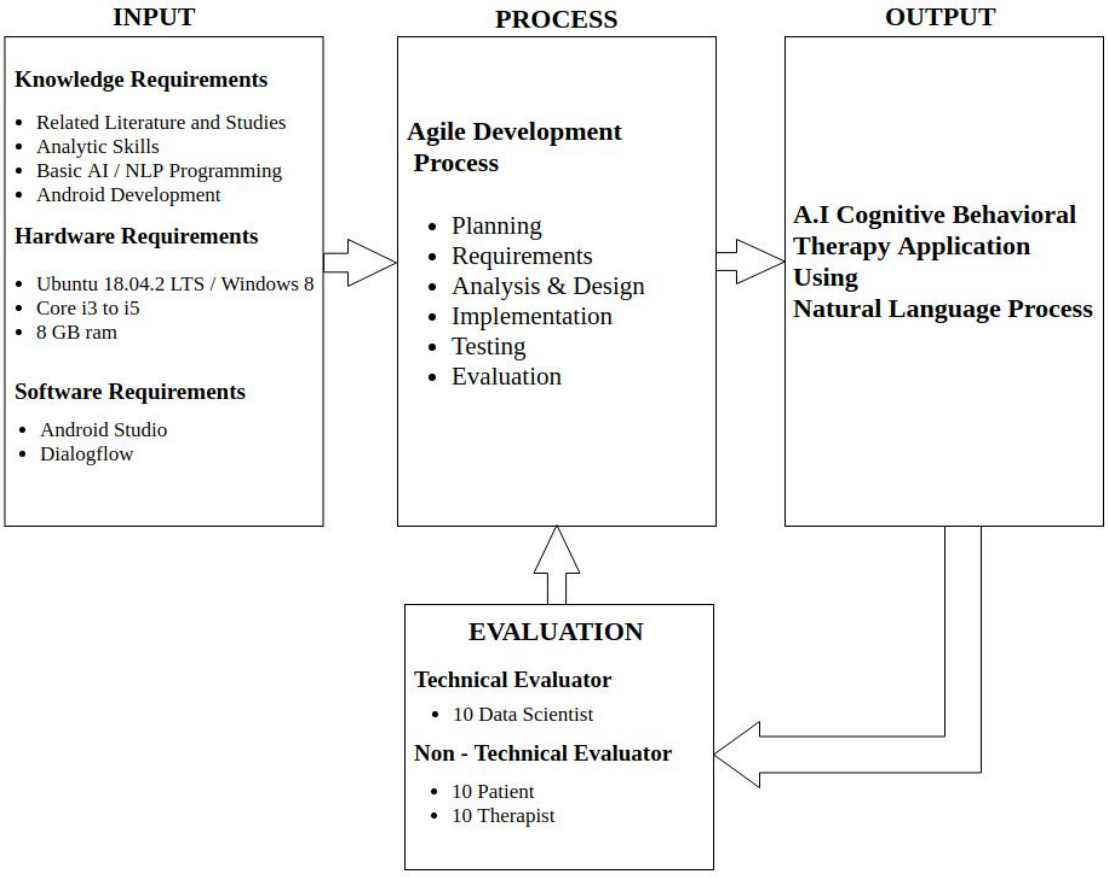

Figure 3. Conceptual Framework

Conclusion

In this research, the developers discuss conversational agents and how they are changing the landscape of user interaction in this time of cognition. The focus on the project was to create an application available to everyone no matter where they are as long as they have internet access. Where users are able to access Deeptalk any time of the day. To provide users with the opportunity to treat mental health by using our Deeptalk conversational agent. We believe that our proposal will have an impact to this era where mental health is a concern that needs response.

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