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BAYMAX: The Depression Detection App

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Abstract: Artificial intelligence (AI) technologies and techniques have useful purposes in every domain of mental health care including clinical decision-making, treatments, assessment, self-care, mental health care management and more. The expert system provides expert advice and therapy to overcome negative thoughts. This project is about virtual human conversation with the system to support user's interaction within a mental health care context. It provides private online healthcare guidance and support where the app can serve the role of a clinician or a psychotherapist.

It uses Android technology particularly relevant for applications in Mental issues. This project provides a system capable of calculating the depression level using Fuzzy Logic Controller. Thus, this application can have a meaningful impact on people's lives by improving their mental health.

Keywords: Depression, Chat Bot, Fuzzy Logic, Artifical Intelligence.

I. INTRODUCTION

Depression nowadays is the most common cause of serious illness and also one of the major reason behind suicides. There can be many causes of depression such as over stress, anxiety, over thinking, personal or professional problems, peer pressure etc. Depression is another reason for causing mental instability in a person. It has various side effects such as irritation, increased frustration and also mood swings.

The intensity of Depression can be classified into three types it can be mild, moderate or extreme/severe depends on the problems of a person that he is going through and it also differs from person to person. If we take a look at the age groups nearly all the age groups above 10 years of age face depression. The overall performance of an individual is affected whether he/she is working or if a student. There is no specific cure or a permanent cure for depression but there are various treatments available to reduce it or to bring out an individual from depression. According to the surveys, young adult groups that is from 19-29 suffer depression due to major life transitions such as relationship issues, due to increased competition in academics, coping up to new environment etc. Depression in midlife adults i.e the age group between 30-60 yrs suffer depression due to many reasons such as financial issues, caring for children, due to ageing or even health issues.

In this age group financial or economic factors are the main reason giving rise to depression. The very next age group i.e above 60 years whom we call senior citizen they usually face depression due to illness and due to ageing. After looking at the symptons and causes of depression on various age groups or even on a particular individual now we can look after its prevention. On primary level depression can be prevented manually by doing Yoga, Listening to music, Going out for a walk, Doing meditation, having a communication with someone. Depression can be prevented with help of professional doctors or by consulting a pyschiatrist . Physical exams are being conducted and diagnostics are being performed. Nowadays depression detection and treatments are available and carried out online either through websites or through android applications. AI plays a major role in building such usefull technologies various mental health realted applications are being built which helps the user to carry out the test and treatments online. Expert System is a branch in Artifical Intelligence that performs at the level of human expert and has adequate response time. Fuzzy logic is subset of AI it does the work of decision making it uses Boolean logic method that is true or false .

II. PROTOTYPE

Conventional Mental Health assessment provides a series of procedure primarily involving a clinician's direct interaction with the depression patients. Baymax provides unique advantages in the field of mental health, particularly in assessment by reducing errors. The prototyping started by looking for the information that the doctors need to understand a state of depression by collecting the data from the patient and context, which may have depression is detected. But Baymax the mental health companion is android app developed to help doctors with patient suffering from depression. Baymax uses depression detection test to check the depression level of patient. Along with depression detection test Baymax provides motivational thoughts to the user. The Baymax consist of navigational bar that consist of depression test, meditation tips, yoga tips, chants, positivity and Bhagavad Gita that contains motivational thoughts and shlokas.

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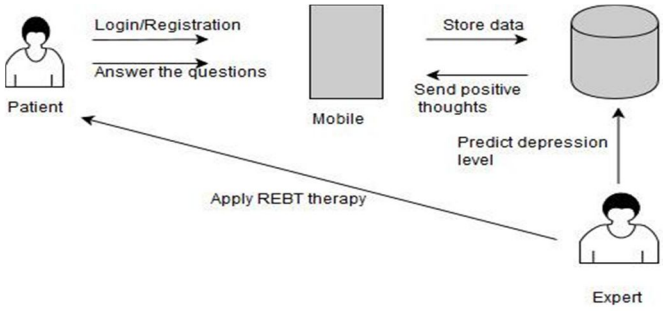
The depression detection test consist of multiple choice question test through which depression level that is high, medium, low is calculated accordingly. For calculating this level of depression fuzzy logic is used in android app. The Jfuzzylogic API is used in android to calculated the level of depression. The Jfuzzylogic API defines set of rules to android in which the range is defined. The fuzzy block consist of input and output. Fuzzify consist of range of values that is

0-10 : Fine
11-20 : Normal
21-30 : Border Line
31-40 : Moderate
41-50 : Severe
51-60 : Extreme

Defuzzify consist of output and roleblock consist of exact result. After the result if the depression level is at the border line, moderate,severe, extreme. The app recommends REBT therapy to the user.

A. Diagrams

1) System Architecture



2) System Architecture

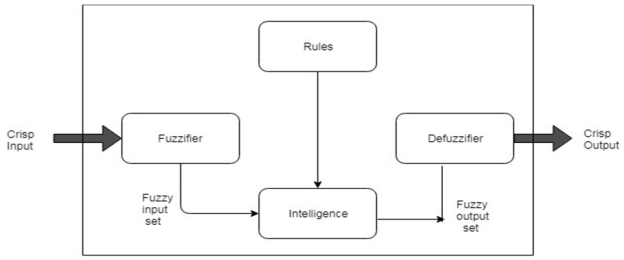
a) Patient registration and login to android app.
b) Patient start communication with chat bot.
c) Patient answer the questions
d) Predict depression level of patient from answers
e) Depression level is high then apply REBT therapy
f) Send positive thoughts to Patient
g) Repeat process of Questions and answers
h) Check again depression level of patient

B. Fuzzy System

It has four main parts as shown −

1) Fuzzification Module: It transforms the system inputs, which are crisp numbers, into fuzzy sets. It splits the input signal into five steps such as −

a) Knowledge Base: It stores IF-THEN rules provided by experts.
b) Inference Engine: It simulates the human reasoning process by making fuzzy inference on the inputs and IF-THEN rules.
c) Defuzzification Module: It transforms the fuzzy set obtained by the inference engine into a crisp value.



Fuzzy System

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2) Applications

a) Baymax can work in collaboration with psychiatric treatment**.** Although, psychiatric treatment is mandatory in case of severe depression, the patient might not want to share his feelings with anybody else, be it a doctor. In this case user can chat with the application and share all his feelings, knowing that it is just a expert. This can help reduce his depression to a certain extent and make him feel better.

b) Baymax acts as a companion or a friend A depressed person may isolate himself from the rest of the world. Baymax will act as a friend and will help him to overcome this problem.

c) Suicide Prevention. The app can prevent the person from committing suicide, by curbing his depression.

d) Baymax can help to deal with anxiety, social distress, relationships, career stress, mild depression, loneliness.

III. FUTURE SCOPE & CONCLUSION

The paper aims at detecting the depression level of a certain age criteria. From the result, it can be clearly stated that people differ from the state of health. to do so the person's information is kept in database and each individual is provided with a different level of treatment.

Given the current versatility and variety of development option for mobile application, the key is to determine what platform will best align with your business problems and goals. Mobile application are a powerful tool for connecting with the consumer, businesses and users, and their functionality and value is only increasing as the world continues to more towards mobility.

As the features where compared with some other significance features, and as a result it was stated that few project where dealing only till the depression detection. As this paper deals with the detection as well as to help to decreased the level of depression.

In the experiment presented in this paper, a depression detection approach based REBT therapy, In future work the project can be assessed with a SMS or location detection of end user.

A. Comparison

Sr.No	Features	Baymax	Other Existing App
1	Chatbot	✓	✗
2	REBT Therapy	✓	✓
3	Music	✗	✓
4	Fuzzy Logic	✓	✗
5	SMS Sending	✗	✓
6	Send Positive Thoughts	✓	✓

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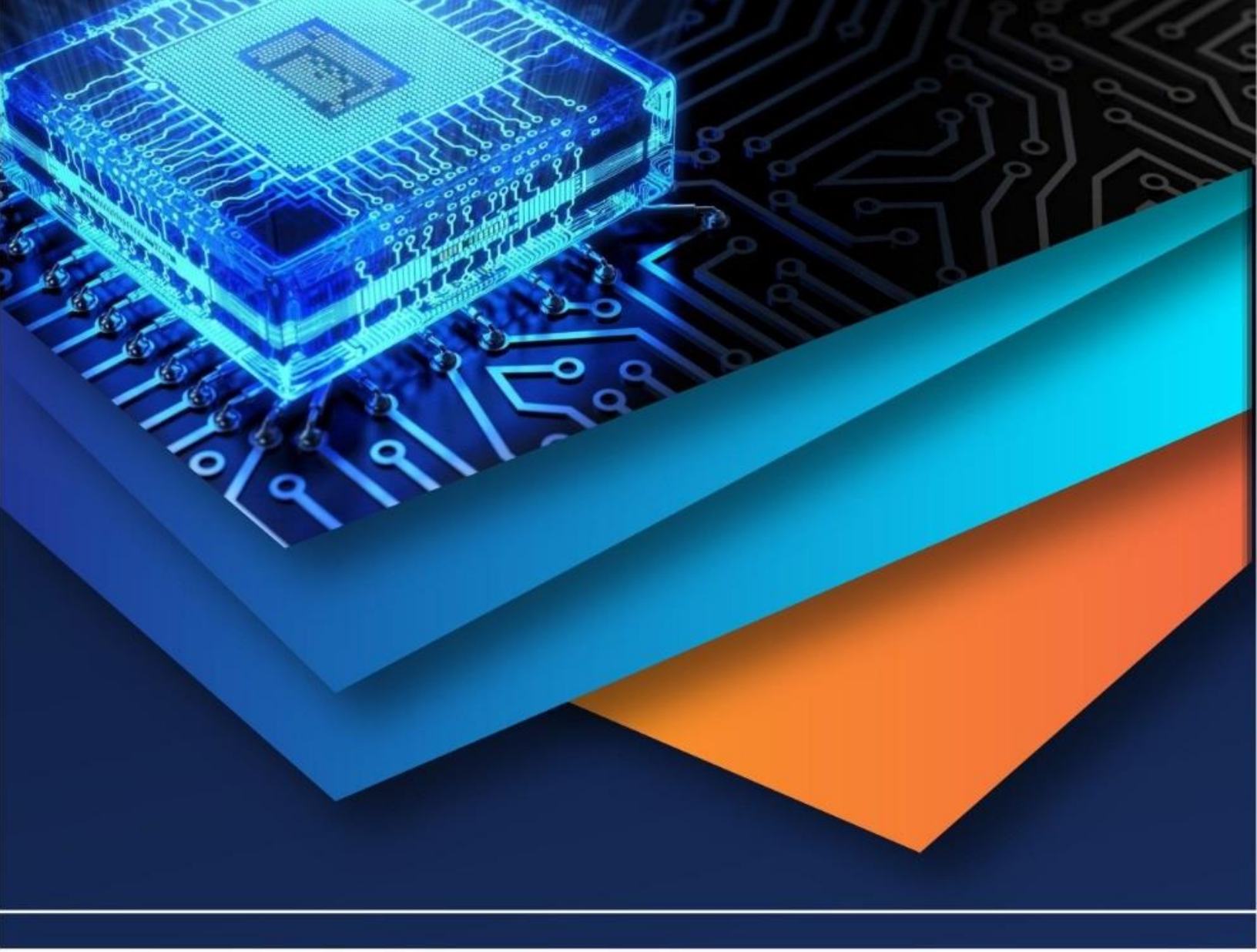
B. Distinguish Between

Baymax	Other Existing App
Chatbot is provided for communication	Chatbot is not provided
REBT Therapy is applied	REBT Therapy is applied
Music is not provided	Music is provided
Fuzzy Logic is provided	Fuzzy Logic is not provided
Positive thoughts is provided to patients	Positive thoughts is provided to patients
SMS sending is not provided	SMS sending is provided

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