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Name	Score	Speed	Memory	Attention	Problem Solving	Flexibility
		7	8	8	9	7
		7	9	2	4	3
		8	9	9	7	9

Alzheimer Disease Prediction Using Mobile Based Application

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ASTRACT

Healthcare has always been a resources intensive area in terms of technology. Consulting a doctor can result in large consultation fees which could be a great financial load. Access to doctors is also a very big problem as in a lot of rural areas of this country proper access to doctors and hospitals is not available. Medical diagnosis requires heavy machinery, advanced labs, and qualified technicians and doctors. For the upper and middle-class spectrums of the society, the above is not such a problem but for the majority of the population in the country, it is, as they either don't have access to such healthcare or cannot afford the available means. Hence there is a pressing need to make healthcare accessible and affordable. To create a game that helps in identification/detection of Alzheimer disease and stimulate grey matter and improve lifestyle through multipart intervention. Our approach is to identify the symptoms of Alzheimer and to keep the mind mentally strong through games, which exercise different parts of the brain in the Games section, different workouts, and nutrition tips. Combining brain games, and social interaction, the game can guide its users towards a multifaceted, holistic lifestyle change that may help curtail some of the effects of cognitive decline. We translated the research that is out there into a comprehensive and user-friendly game (which are categorized on basis of gender, age and mental condition) and we hope to help you to make a lifestyle change and live a healthier life.

KEYWORDS- Alzheimer, Mobile apps, Machine Learning.

INTRODUCTION

Alzheimer's is the most common form of dementia that destroys memory and thinking skills and causes problems with behaviour. It is estimated that Alzheimer's accounts for 60 to 80 percent of all dementia cases. Unlike age-related memory loss, Alzheimer's is not a normal part of aging and can affect a person's thinking, memory and behaviour. Broke down of the progression of Alzheimer's disease into seven different stages.

1. No Impairment: Neither Alzheimer's nor any other memory problems are visible or detectable.
2. Very Mild Decline: The individual might detect some minor memory problems, such as losing things around the home (e.g. key, remote). However, these aren't distinguishable from normal age-related memory problems, and the condition will likely not be detected by physicians or family members, for example, it is very likely that the individual will still get good results in memory tests.
3. Mild Decline: Friends and family may begin to notice memory problems. These may include difficulty finding words in conversations, remembering the names of new acquaintances as well as difficulties in
4. planning and organizing things. The individual might not do well on memory tests and these symptoms are likely to be noticeable to loved-ones

and medical professionals (i.e. a physician is able to make a diagnosis).

5. Moderate Decline: This stage shows clear symptoms of Alzheimer, such as: Difficulty with simple mathematics, issues with remembering even the most short-term events, problems recalling significant life events from the past, as well as having problems to pay bills and manage finances.
6. Moderately Severe Decline: It is typical for the fifth stage that individuals need help with day-to-day activities and might lose some of their independence. Nevertheless, they can still do basic things like showering, brushing teeth and are able to use the toilet on their own. They may be increasingly confused and struggle to remember simple personal details such as their age, their phone number, or date of birth. Even though people in this stage are increasingly confused, they're still able to remember events from their childhood and youth vividly.
7. Severe Decline: Individuals in the sixth stage of Alzheimer's usually require round-the-clock care, often by professionals. Wandering, loss of bladder and bowel control, assistance for activities of daily living (i.e. showering, teeth brushing etc.), significant personality changes and behavior problems, the inability to remember most details of personal history, confusion and/or unawareness of surroundings and environment as well as the inability to recognize faces (except close friends and family) are the most common symptoms in this stage.
8. Very Severe Decline: In the final stage of Alzheimer's, individuals are close to death. They become unresponsive and are unable to communicate. They need assistance with every aspect of daily life and may also need assistance with swallowing. People experiencing symptoms of Alzheimer need to go through many clinical tests which are time-consuming. Through this game they can get easy and accurate diagnosis without stirring from home. Also it consumes less time and gives immediate report rather than undergoing various medical tests. Thus this procedure will prove to be less hectic for the users.

OBJECTIVE AND SCOPE OF PROJECT

1. Early Detection of symptoms of the disease
2. To include safety measures
3. To reduce risk factor of dementia
4. Reducing time required for diagnosis of the disease tests
5. Improve quality of life through intervention and treatment methods

IMPLEMENTATION

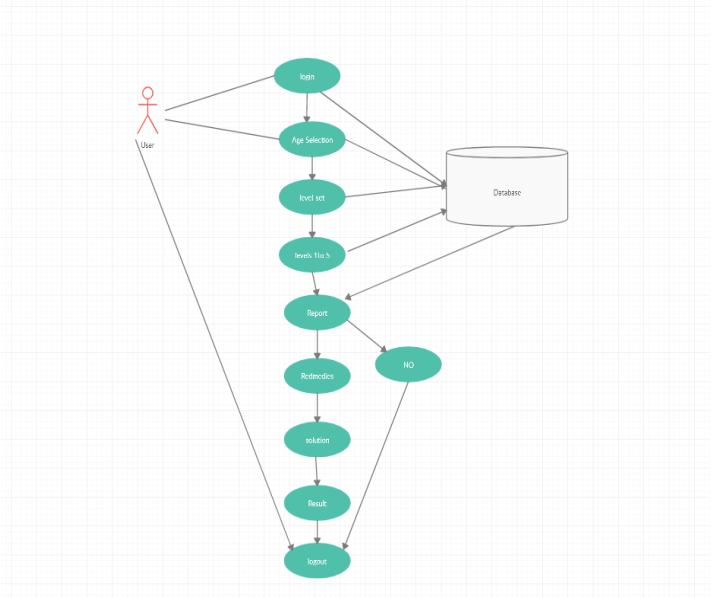
The main purpose of this paper is to evaluate the mobile apps for people with Alzheimer's disease based on the user reviews. This evaluation will be effective in assisting developers in improving those mobile apps in the next release. This paper consists of the following four steps:

1: -DATA COLLECTION : On downloading the app from Play Store, the user will have to enter few details to access the app. Data set of the user response will be created and saved in the database.

2:- DATA PRE- PROCESSING : Once the data is collected it will bw sorted into different categories. Also, when the games are played the score of the games will be classifies according to the factors such as Speed, Memory, Attention, Problem solving capacity and Flexibility.

3:- MACHINE LEARNING CLASSIFIER : Three machine learning classifiers (support vector machine, logistic regression, and random forest) will be used to automatically classify the users score according to the 5 factors.

4:- EVALUATION: The evaluation of three selected machine learning classifiers using the well known metrices: Accuracy, Precision, Recall and F-measures.



DATA PRE- PROCESSING

After the sign up in the mobile application, the user's data is set as unique key where user name and ID, the 5 factors will be columns and in each row the data of a new user will be stored. The game decide the score and from the score all the factors will be known and its intensity whether less or normal. The following table shows the sample data classification.

FACTORS OF DETECTION

The probability of the users suffering from the disease will be measured on the basis of time taken for the completion of the level, frequency of being able to complete the level, screen touch behaviour and face expression detection.

The algorithm used for these detection factors are Time based algorithm, Answer based algorithm, Touch based algorithm, Face behaviour detection based algorithm.

Through these factors we can detect the five main aspects of Alzheimer that are memory,
attention.

Problem solving capacity, speed and flexibility respectively. The games used are universally proven to be helpful for detection and curing of these kind of disease.

FUTURE SCOPE

Apart from detection game we wish to add more option for remedies which will include more memory simulating games, different workouts, and nutrition tips(because recent studies have shown that physical activity can reduce the risk of developing dementia by upto 88%) thus, these more aspects in game will prove to be more obliging to the users.

To also create a virtual open workspace for the people sharing same affection which will give them a chance to open up and revealing themselves in front of others. Make their outside behaviour the same or congruent with your inside feeling and thoughts.

CONCLUSION

The audience can easily download this App for free and can follow all the subsequent steps given in the App, hence receive an accurate result. They should use this App for early and effective detection of Alzheimer. It is definitely a good choice to use this App as it is free to download and thus save money by not actually going through payable test conducted by Psychologist or Doctors.
This idea of developing an App for early Alzheimer detection can be implemented when the audience wish to go through an Alzheimer test. This App can be used by any individual and hence get a self-analysis in-spite of going any where else for testing.

In most of the demography it is observed that Alzheimer is found in the people of higher age groups which is quiet natural. But if anyone of not belonging to higher age group i.e. either being an adult or a child, is facing this problem then they can instantly use this App without spending any amount. This solution will be very effective if it is implemented on a large scale and thus we can get better Alzheimer detection result and accurate statistics of masses facing this problem. Thereafter necessary actions can be taken for the same.

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