Mind Analysis Game Using Android Mobile Technology

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ABSTRACT
Mind analysis game is a game that deals with the training and exercise of the brain. It tests the ability of the player to focus, reason under pressure and makes use of already acquired knowledge in a short period of time. Inactivity of the human mind and the low level of responsiveness of the human brain to stimulus which are prominent in some people, both old and young have been a great challenge. Hence, this study develops a mind analysis game that enhances the thinking and concentration of the user. The game was developed using C# programming language on a game engine called Unity 5. It runs on android operating system. It ensures efficient testing and improvement of a person's thinking abilities and makes sure that the person is able to gain intellectually from the game. The game also evaluates the performance of the players and makes appropriate comments when necessary according to the scores awarded to each question in every stage.

CCS Concepts
• **Human-centered computing → Ubiquitous and mobile computing → Ubiquitous and mobile devices → Handheld game consoles**

Keywords
Mind analysis game; Unity5; C#; Android operating system

1.   INTRODUCTION
A game is an ongoing series of complementary ulterior transactions progressing to a well-defined, predictable outcome. Descriptively, it is a recurring set of transactions, often repetitious, superficially plausible, with a concealed motivation [1]. Mind game can be defined as a mental activity such as a puzzle that people enjoy trying to solve [2]. It can be a mental exercise designed to improve the functioning of the mind and/or personality. Mental exercise is the act of performing a mentally stimulating task that is considered beneficial to warding off forms of dementia [3,4]. Mental exercises are very essential for both young and old people as it reduces the problem of inactivity of the human mind and low level of responsiveness of the human brain to stimulus.

Mind games in psychology is used to define three forms of competitive human behaviors:

1. A largely conscious struggle for psychological one-upmanship, often employing passive–aggressive behaviour to specifically demoralize or empower the thinking subject, making the aggressor look superior; also referred to as "power games"[5].
2. the unconscious games played by people engaged in ulterior transactions of which they are not fully aware, and which transactional analysis considers to form a central element of social life all over the world [6].
3. mental exercises designed to improve the functioning of mind and/or personality [7].

This study deals with the third definition given above.

Many players enjoy playing games because they provide a challenge. This provides one of the primary motivating factors for single-player home games, where social or bragging rights motivations are less of an issue. Games can entertain players over time, differently each time they play, while engaging their minds in an entirely different way than a book, movie, or other form of art. When a person faces a challenge and then overcomes it, that person has learned something. It does not matter if that challenge is in mathematics textbook or in an android phone game.

Challenging games can be learning experiences. Players will learn from games, even if that learning is limited to the context of the game, such as how to navigate through the forest or survive a particularly hairy battle. In the best games, players will learn lessons through gameplay that can be applied to other aspects of their life, even if they do not realize it. This may mean that they can apply problem solving methods to their work, use their improved spatial skills to better arrange their furniture, or perhaps even learn greater empathy through role-playing. Many players thrive on and long for the challenges games provide, and are enriched by the learning that follows.[8]

Android is a Google-owned open-source operating system written in Linux for use on mobile portable electronic devices such as cell phones, e-readers, tablet PCs, and other smart phones. Android is a powerful operating system with great features which make it to be one of the most widely used mobile Operating Systems these days [11,12]. Software developers can easily modify and add enhanced features into it so as to meet the latest requirements of the mobile technology.

Mobile games are very common these days because they have a kind of alluring power in them. No matter what one's age is, children or adults, both demonstrate equal enthusiasm when it comes to playing mobile games. They get glued to their smartphones and become totally oblivious to the happenings around them. Of late, with the ubiquitous presence of

smartphones, these games have been gaining tremendous popularity, owing to several reasons [13]. Mobile telephones are portable and therefore, the video games can be played anywhere. On board a bus, in the eating place or even within the loo. Actually, cellular games could be played everywhere.

Unity 5 is the new edition of the best development platform for creating 2D/3D games and interactive experiences. Unity 5 is regarded to as a feature-rich and highly flexible Editor. The Unity 5 platform has several features, some of which are the audio mixer, powerful animator and an industry-leading multiplatform support [14,15].

2.   MATERIALS AND METHODS

Building games is one of the most challenging and rewarding experiences one can ever have. Taking pure imagination and making it come alive is absolutely addictive—a creative process so immersive and consuming that one will start craving it when it hasn't been done for too long. [16]

In developing a game, the audience must be known. Knowing your audience can determine the simplicity or complexity of the game. But, generally speaking, a game should be flexible enough to be a fun to the player and at the same time, improve their learning ability.

Two of the design tools used for this game are Use Case Model and the Data Flow Diagram.

2.1   The Use Case Model

Fig. 1 shows the use case model of the game. There are two actors in the system: the User and the Admin. It also shows the functions of the different modules that exist in the system.
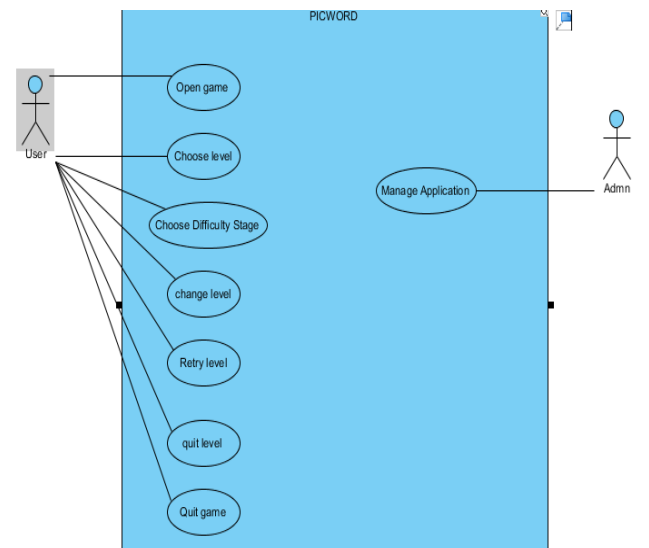

Figure 1: Use Case Model of the Game

2.2   Level 0 - Data Flow Diagram

Fig. 2 shows level 0 of the data flow diagram. It represents the high level functionality of a system.
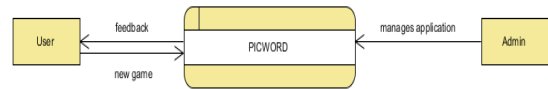

Fig. 2: Level 0 - Data Flow Diagram

2.3   Implementation Tools

The game was developed using C Sharp (C#) programming language on a game engine called Unity 5 and it runs on android operating system. C# programming language was used because it communicates well with Unity's libraries.

3. IMPLEMENTATION AND RESULTS

In the system, there is a time constraint and the player is adequately timed for each level of difficulty. The game tests for the ability of the player to think under pressure. A percentage is displayed at the end of each level along with a message to the user according to his/her performance.

This mobile application has two users in the system.
1.   Admin: The Admin manages the application and works with the backend of the system. He/She controls everything that is going on in the system. The backend is only accessible to the administrator. It is protected from the user with some level of access control. The Admin can add new categories and new levels of difficulty to the   already existing application. He can also edit or tweak any part of the game when necessary.
2.   The User: The User interacts with the system and makes use of all its features. When a user opens the game application, he sees a welcome screen that contains the different options that he/she can pick from. (New game, difficulty stages, level, quit). If the user decides to pick the "New game option", the game starts by default at the lowest level of difficulty. For each stage in a level, there is   a group of 5 questions in different categories.

The more the user plays, the more difficult the game becomes and the time to answer each question becomes shorter, and the number of pictures reduces. A user can decide to change   his   level   of difficulty to further push himself/herself to learn more. At the end of each stage, a message that states the grade/performance of the user is displayed on the screen. When a user has played to his/her satisfaction, he/she can decide to close the game to continue at a later time or just completely close the game. If the user completely closes the game, no history of last game would be displayed if he reopens it.

3.1.1   Screenshots of Results

1. The menu page: Fig. 3 shows the menu page of the game. This is the first page that provides the users with the possible options he/she can choose from. It contains the New Game, Continue Game, Difficulty, Ratings, Help and Exit options.
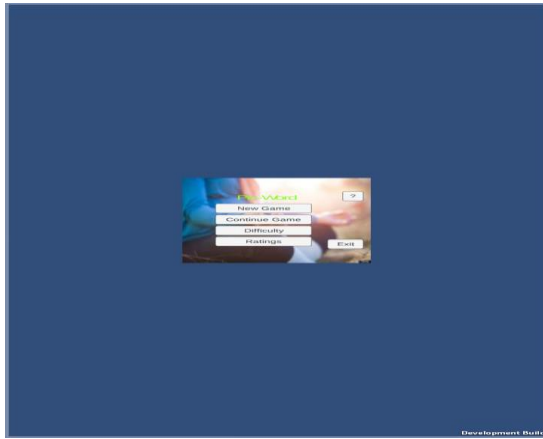
Figure 3: The Menu Page

1. Stage 1 Question: Fig. 4 shows the stage 1 question of the game. It presents some pictures to the user and asks him/her to give a one word answer to describe them.

Figure 4: Stage 1 Question

3. Answer Page: Fig. 5 shows an answer page. This is displayed after the slideshow has finished playing. The user has the option to replay the slideshow but he/she would lose 5 points and 5 seconds of his/her playing time would be deducted from the total time given to play the game. There is an input box where the user can put his answer. If the answer is incorrect, the user has to use the replay button to look at the slideshow again. When the player selects "Done" after giving the correct answer, he moves to the next level.
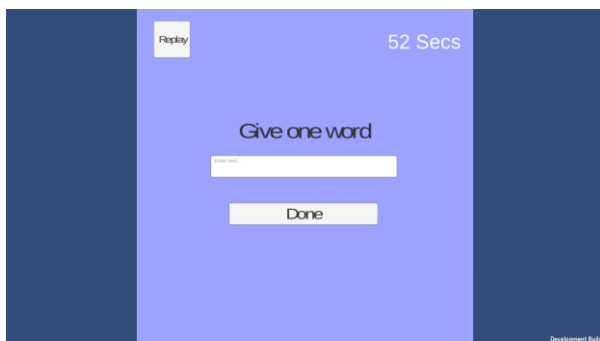

Figure 5: Answer Page

4. The Score Page: Fig. 6 shows the score page of the system. When the player gets the answer right, he is congratulated and awarded a score and the next stage is displayed. The score page is displayed after every stage.
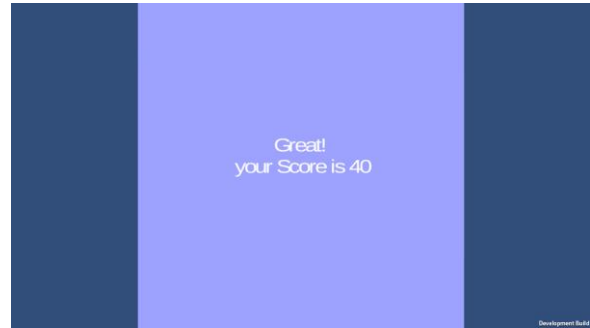

Figure 6: The Score Page

4. CONCLUSION

The Mobile Mind Analysis Game developed in this study helps users to exercise their brain by giving brain teasers in form of logical questions. It helps the players to take note of their surroundings and also train the brain to make use of unconsciously stored information in the brain. Hence, it enhances the thinking and concentration of the user thereby reducing inactivity of the human mind and giving a high level of responsiveness of the human brain to stimulus.

5. ACKNOWLEDGMENTS

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