

ASSESSING PLAYER'S SPEED REACTION ON PUZZLE STRATEGY
GAME DESIGN



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

ASSESSING PLAYER'S SPEED REACTION ON PUZZLE STRATEGY GAME
DESIGN

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این رپورٹ تھیں کیکر کے لیے
This report is submitted in partial fulfillment of the requirements for the
Bachelor of Information Technology (Game Technology) with Honours.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA


FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2021

DECLARATION

I hereby declare that this project report entitled
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DESIGN**

is written by me and is my own effort and that no part has been plagiarized
without citations.

STUDENT :  Date : 3/9/2021
(NUR SYAFINA BINTI NIZAN)



I hereby declare that I have read this project report and found
this project report is sufficient in term of the scope and quality for the award of
Bachelor of Information Technology (Game Technology) with Honours.

SUPERVISOR :  Date : 3/9/2021
(TS. DR. MUHAMMAD HAZIQ LIM BIN ABDULLAH)

DEDICATION

First of all, thank you to my beloved parent for giving such a moral support and been understanding. Moreover, always give a good motivation and encouragement to fulfil this project development.

To my supervisor, Ts. Dr. Muhammad Haziq Lim Bin Abdullah, thank you for guided and gave a lot of advice while completed this project. Furthermore, for supervised the work of this report writing and progression for development project.

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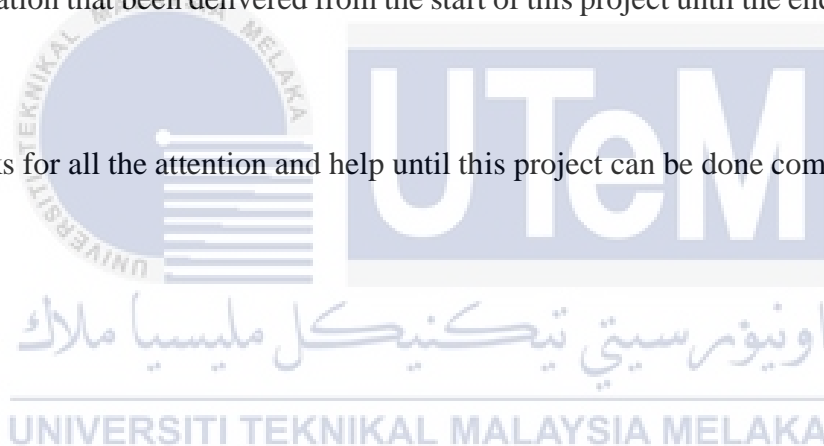
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Praised to Allah SWT for giving a chance to finish this Final Year Project report, feel grateful with every chance and opportunity that comes to make this project possible.

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ABSTRACT

The development of this project will emphasise the human reaction to find out the action taken by them in detecting their ability to react. The concept use in this development is the combination between puzzle and strategy which focusing more to puzzle design. Moreover, the study for this project is to assist player speed reaction based on puzzle strategy game design. Next, from the main idea, the problem that been identified is player lack in spontaneous action especially among youth when they encounter with spontaneous event. Furthermore, the objectives that been carried out for this project is to investigate player's speed reaction spontaneously based on puzzle strategy game. From the main objective, three keywords that been found are cognitive abilities, psychomotor skills and attention control which is the main point to recognise player's reaction abilities. In addition, the method used for identified player's reaction abilities is Beta testing that has been conducted on them. Next, along the way of testing been done, player or could be known as participant will be given a questionnaire for them to answering and carry on with the interview session. From the testing conducted, majority of participant agree the game they had played help them in reacting. The main reason is because the movement obstacle element placed in the game which make them respond quickly. In fact, the addition of elements for time limit is use to train participants to be more aware and make a fast action in the game. In conclusion, puzzle game strategy helps participants to discover their control for an attention, educate them in quickly think through what they see and planning their strategies in movement to avoided mistakes continuously. In addition, reactions help brain activity to function properly and identify the signal of sensor in human.

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ABSTRAK

Projek pembangunan ini akan menekankan reaksi manusia untuk mengetahui tindakan yang diambil oleh mereka dalam mengesan kemampuan mereka untuk bertindak balas. Penggunaan konsep dalam pengembangan ini adalah kombinasi antara teka-teki dan strategi yang lebih memfokuskan pada desain teka-teki. Lebih dari itu, kajian untuk projek ini adalah untuk membantu reaksi pantas pemain berdasarkan reka bentuk permainan strategi teka-teki. Selanjutnya, dari idea utama, masalah yang telah dikenal pasti adalah kekurangan pemain dalam tindakan spontan terutama di kalangan remaja ketika mereka menghadapi peristiwa spontan. Selanjutnya, objektif yang dijalankan untuk projek ini adalah untuk menyiasat reaksi kepantasan pemain secara spontan berdasarkan permainan strategi teka-teki. Melalui objektif utama, tiga kata kunci yang dijumpai adalah kebolehan kognitif, kemahiran psikomotor dan kawalan perhatian yang merupakan titik utama untuk mengenali kebolehan reaksi pemain. Di samping itu, kaedah yang digunakan untuk mengenal pasti kebolehan reaksi pemain adalah melalui ujian Beta yang telah dijalankan ke atas mereka. Seterusnya, sepanjang proses pengujian dilakukan, pemain atau dikenal pasti sebagai peserta akan diberikan soalan untuk mereka jawab dan dilanjutkan dengan sesi wawancara. Melalui ujian yang dijalankan, majority peserta bersetuju permainan yang mereka mainkan dapat membantu mereka dalam memberi reaksi. Ini disebabkan oleh, elemen halangan pergerakan yang diletakkan dalam permainan yang membuat mereka bertindak balas dengan cepat. Sebenarnya, penambahan elemen had masa digunakan untuk melatih peserta menjadi lebih peka dan membuat pergerakan yang pantas di dalam permainan. Kesimpulannya, strategi permainan teka-teki membantu para peserta untuk mengetahui kawalan mereka untuk memberi perhatian, mengajar mereka untuk tangkas berfikir melalui apa yang mereka lihat dan merancang strategi mereka dalam gerakan untuk mengelakkan kesalahan secara berterusan. Di samping itu, reaksi membantu aktiviti otak berfungsi dengan baik dan mengenal pasti isyarat sensor pada manusia.

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LIST OF ABBREVIATIONS

| | | |
|-------------|---|------------------------------------|
| EEG | - | Electroencephalogram |
| VGP | - | Video game player |
| NVGP | - | Non- video game player |
| BCI | - | Brain-Computer Interface |
| GDLC | - | Game Development Life Cycle |
| MCO | - | Movement Control Order |



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CHAPTER 1: INTRODUCTION

1.1 Project Background

This project is based on puzzle strategy game and the idea is to assess player's speed reaction based on puzzle strategy game design. Therefore, main purpose for this development project is for assisting player with their speed reaction and to find out player lack of spontaneous action or reaction when they are having an interaction with spontaneous event. Furthermore, this project is carried out through observation from a group of people which consisting youths. The standardised age for this group of people is from 15 until 24 ages. From this group of people, the purposed of project can be identified by observe their different action and reaction while playing the game. The game is designed with several element that can help player to balance their skills in action, train their visual abilities and knowing their speed in paying attention.

Next, this project used first person perspective for player to interact with any kind of object and showed the sight of first person perspective. In addition, the concept chosen for this game is based on the environment and conditions of a house. The level also is divided according to several parts of the house. Next, certain assets will be added in the game to make the game look more real and interesting. The inside of house are like living room, entrance hall, the rooms and also kitchen while the outside of house is resemble as a yard. Besides, for the game development, three levels are

built in different environment and for each level included with several task that player have to perform to complete the level themselves.

In each level, different time limit is given based on the difficulties of task. The most important part is that players get points if they successfully complete each task given in the level. However, the player's health bar will decrease if the player is unable to survive before they find the checkpoint to the next level. Also, health bars vary based on difficulty level. In other words, player have to complete all the tasks given from each level and always be alert to time limits and health bars.

Furthermore, this project used Unreal Engine as software engine for development. Additionally, other helpful software that is important for project are Blender which use for designing asset in game and Adobe Illustrator is used for create user interface that easily help player to interact.

1.2 Problem Statement

Player abilities is different according to their potential while playing game and how their performance effect the gameplay to certain games. Moreover, player nowadays prefer action and adventure game as their main genre because the gameplay, storyline and mechanic for this type of genre is more complicated and more upgraded rather than other genres. Furthermore, these types of genres can be one of factor that can help players to give a full attention and improving their coordination with hand movement and cognitive abilities. In addition, player shows a lot of attention to a game with genre of action as it conclude their speed reaction for action and movement of theirs hand for controlling characters movement based on their abilities and skills while playing.

In contrast, for games that have strategy and puzzles, not too many tests are done using this type of game and quite a bit less to find and associate human speed reaction with puzzle strategy games. The main of this project to investigate human lack of spontaneous reaction or action is different among youth when they interact with random events. In other words, this project purpose is to identify about human reaction when faced random challenge and obstacle. From the game that is built, the elements incorporated in the game can help in the player skills and intelligence to be identified.

1.3 Objectives

The project objectives are:

- i. To investigate puzzle strategy game for measuring human speed reaction
- ii. To develop puzzle strategy game based on identified strategy
- iii. To assess the player's speed reaction through playing puzzle strategy game

1.4 Goals and Genre

The main goal of this project is to assist players speed reaction with puzzle strategy game and help players know their ability in reaction and control their speed in action. In addition, the reactions and attention given by players can also be used to classify their skills and expertise when playing video games.

This project is a puzzle strategy game in the framework of 3D design. Moreover, it focuses on the players in helping them play by a given rule. Then, add levels for player progress while playing and include entertainment for player purposes.

1.5 Game Features

The target audience allocated for this project is between 15 to 24 years, it aims to identify the effectiveness of the project carried out by expecting a group of people

from a young age to assist in providing the progress and success of the project. Moreover, there is no limitation to gender as the entertainment purpose of this project is to show the similarities between these two genders. This group of people chosen can come from casual types of players as well as hardcore types of players which they are experienced in playing video games.

The game rules for each level are different according to the difficulties and the situation that occurs in that level. Next, the time limit given is varies based on the level that player faced. In addition, this time limit used is purposeful to study the player speed while handling the situation and give a reaction based on the event occurs. In the games, scores are given to record player's achievements as they go through each level in the game. In fact, a health bar is provided to help players to be more careful in taking the appropriate action to keep survive in the game. In general, players need to have a good strategy and great thinking skills to complete the mission and found a way to survive in game. Furthermore, player lose when they did not settle down the mission by the time given or player fail to survive with their health bar down to zero.

1.6 Conclusion

In conclusion, this chapter explained about the idea concept for the project and described the gameplay and mechanics that include in the development project. Moreover, the project developed is intended to meet the requirement for helps player in detect their speed reaction with spontaneous event. Furthermore, in this chapter it is concluded about puzzle strategy game can also be one of the methods used to see player abilities to give attention and reaction while playing game.

Therefore, the next chapter is about literature review elaborated in accordance with evidence support obtained from finding research that related to project

requirement. Next, an explanation of the project methodology for development progress of this project will be described in more detail in the next chapter.



CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

First of all, the objective of this project was to study and observe the human reaction rate when confronted with unexpected situations. Moreover, the project focuses on the game's unique design as well as the puzzle strategy features used in it. Secondly, this project will discuss and examine the usage of video games as a tool for train players to enhance their eye-hand coordination and their ability to pay attention to their surroundings. Furthermore, the genre of action games is the genre that is most frequently used to conduct research on the abilities of players. It is also the genre that is prioritized and preferred by all players. However, other video game genres are rarely used as research material and less exposed to the outside world.

Next, the literature review is done from the collected research finding papers to explained the evidence and solid argument that can supported the related title of project. Also, the project methodolgy used is to defined targets and plan objectives for the project. Hence, a problem statement of the projects was consent to strengthen the purpose of the project being developed.

2.1.1 Literature Review

This project is created for objective purpose which for helps player to enhance their speed reaction and detect their attention skills with cognitive abilities while they

are playing the game. In addition, puzzle strategy game also can be one of elements used for assisting player reaction and helps their performance.

In the literature review, there are three (3) research article that related with project title which are:

- i. **Electroencephalogram (EEG) is a functional brain tools that can measure and record signal of human brain activity and discovered any signal in the tools from the brain.**

Ismail. W et.al (2016) stated that when electrical happened simultaneously across the brain, waves like the EEG signal are produced which contain information about brain activity and range in amplitude from 0.5 to 100V when measured from peak to peak voltage. Another studied by Cabanero-Gomez et.al(2018) said EEG and video games in terms of relation for identified human cognitive skills and their training performance with the uses of general methodology such as include preprocess of the data, extract the features and classified the features by training. For example, Artificial Neural Networks (ANN) which a strong machine learning technology that used biological neural networks to do classification and regression. Then, Zabcikova M(2019) declared that the use of modern technology such as brain-computer interfaces (BCI), the human brain may directly interface with the environment, and the device executes its role as a BCI with an acceptable level of accuracy and can opening up many new possibilities. Furthermore, Seal A et .al (2020) applied EEG signals to five types of brain waves such as Delta, Beta, Theta, Alpha and Gamma and they also discovered another signal include in EEG signals which is noise that corrupts the signal of interest.