FIRE DRILL SIMULATION USING VIRTUAL REALITY SYSTEM

[LUKMAN ARIF BIN MOHD KAMAL]

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SESI PENGAJIAN: [2020 / 2021]

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[FIRE DRILL SIMULATION USING VIRTUAL REALITY SYSTEM]

LUKMAN ARIF BIN MOHD KAMAL

This report is submitted in partial fulfillment of the requirements for the Bachelor of [Computer Science (Software Development)] with Honours.

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DECLARATION

I hereby declare that this project report entitled

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

STUDENT : _____ Date : 26/06/2021
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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 [Computer Science (Software Development)] with Honours.

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DEDICATION

First, I would like to thank my supervisor, Ts. Dr. Siti Nurul Mahfuzah Mohamad for providing my PSM suggestions and advice during the semester. I will seek Ts. Dr Siti Nurul Mahfuzah's advice if I have encountered difficulties during the development. It was a pleasure that Ts. Dr Siti Nurul Mahfuzah was supervising me throughout my project.

I do want to express my gratitude to the PSM committees. They had invited some lecturer to give seminar talks on how to create a quality PSM project and guidance. I considered the discussions beneficial in finalizing the proposal

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Lastly, I want to thank my parents and friends and express my gratitude to them. They had helped by donating funds during the semester that I need to complete this project. They were always my friend and gave me emotional encouragement while I'm feeling down.

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ABSTRACT

Everyone has a smartphone conveyed with them in the rapid growth of connectivity, and Virtual Reality technology is also growing interest among youngsters. People are more drawn by fact or other immersive ways to learn things. Interactive technology can offer simple knowledge to the users without getting bored. Most schools and institutions will conduct some fire drills to test the capacity of the students and the staff. This application is targeted at University Teknikal Malaysia Melaka students and staff.

Virtual Reality for Fire Drill is an application that will use a virtual reality device and controller to get some information and train themselves by using a fire extinguisher for a fire accident situation. This application would provide a training session and a situation where the individual with the steps provided to extinguish the fire with the fire extinguisher. After that, there will be a room with some details for the person where they need to go through it before joining the training session as a reference.

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LIST OF ABBREVIATIONS

FYP	**-**	**Final Year Project**

UTeM
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CHAPTER 1: INTRODUCTION

1.1 Introduction

Chapter 1 explains and discusses the overview of the project and certain historical details concerning the project. Additionally, this chapter also addresses the declaration of issue of this project and offer a good view into the nature and intent of the project. This section will become a guideline for the completion of all subsequent research.

The Fire Drill Simulation using Virtual Reality system is a project aimed at replacing the current conventional fire drills and briefing on fire safety. This initiative is intended to allow students and staff to learn about fire safety well. Unity with C++ language is the framework which is used for this project. Traditional approach of providing the fire drill to students and staff is not effective because they get annoyed with the material as if they prefer the same thing being replicated by fireman demonstration. Students and workers are not given the details because they like it, so most students and staff are not aware of it. VR technology is one of the technologies that has evolved that produce new technology which is Oculus Rift S that provide new experience of virtual reality and can be similar or completely different from the real world.

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This project aims on modification of this system where certain modules in this project is upgraded to meet the current requirements.

There are a number of limitations on this project which has directed to make changes to get rid of the limitations and at the same time brings more functionality and effectiveness to this project. Every project needs improvement in terms of functions, modules, controls and so on so that this project maintains its sustainability throughout the days and in future.

1.2 Problem Statement

Based on analysis, there are many fire accidents happening in Malaysia because of the carelessness of some individuals. Especially, in universities students and staffs are lack of fire drill knowledge. This is because of the traditional way to expose the knowledge of fire drill. For that reason, a system called fire drill virtual system was developed. There were several problems in the system such as users are lack of environments that has high possibilities of catching fire, users have no options to choose type of fire extinguisher, no detailed step to break glass fire alarm for the users to follow and learn and there was no emergency call service to fire brigade that user can do before putting out the fire.

People nowadays expect things to be learned in a more interesting way compared to the traditional ways. Then here comes Virtual Reality to implementation to overcome these problems in a more efficient way. Virtual Reality plays a very essential part in training, simulation and marketing. According to analysis, there are numerous fire incidents every year, resulting in significant property and life loss. Many of them can be effectively stopped if we take extra precautions and comply with other fire-protection laws and regulations. The current system was not enough to overcome these problems to ensure the number of fire accidents decrease and to gain fire drill knowledge to the people.

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Therefore, the upgrades on this system will ensure that these problems can be solved in terms of technologies and high sensitivity virtual reality controls. The added implementations on this system will help users to gain more knowledge about fired drill in an easiest and most interesting way of learning. To be more interactive and attractive, it's to enhance the new awareness media.

1.3 Objective

Obviously, the purpose of the undertaking must be articulated in order to ensure the mission works legitimately.

1. To identify Virtual Reality elements and component for Fire Drill Simulation.

2. To develop Fire Drill Simulation based on the identify elements and components.

3. To evaluate user acceptance of the developed Fire Drill Simulation

1.4 Scope

The scale of the project shows the project's scale as to what would be included and not included. It has two scopes which are the scope of the project and scope of user. There is a list of hardware and software used within device scope to upgrade the virtual reality application. Virtual Reality for Fire Drill lists targeted users within product scope.

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The target of the users for Virtual Reality for Fire Drill application are as follows:

i. Student and Staff (Main)
   a) Users will be directed to a main page of the application. They can choose what they want to do whether to train or test themselves in a specific location as well as a room to know some information about fire drill and fire extinguishers.

ii. Public
   a) Public in our country are also included in the scope so that this awareness can reach them and create a new generation of people who aware of fire accidents and how to react during fire breakouts.

1.5 Project Significant

In general, the aim of this project is to overcome identified problems and limitations to make this system into a more reliable and sustainable system by using Virtual Reality tools which is Oculus Rift S. There should be a proper and correct procedures in fire drill to ensure students and staffs get the accurate plan of action to be done in an emergency situation. Upgrading this system could make the procedures more understandable and make sure fire accidents are overcame in a good and right actions. Environments will be identified to make sure the environments meet the requirements of the type of extinguisher in a specific fire. For example, a wooden chair burning in a classroom has to be put out by class A fire extinguisher. An emergency call service is essential in such situations so that student or staff could make a call to the fire brigade. Other than that, steps to break glass fire alarm will be upgraded. These modifications would be able to make this system more efficient as a training platform for the students and staffs.

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1.5.1 Expected Output

Expected outcome from this project is users could feel the experience and train in new other environments more likely to catch fire. Also, user can experience the feel of holding object and move around in this simulation. Other than that, users could choose the type of extinguisher to specific type of fire in a situation as well as they will have a clear and detailed steps in breaking fire alarm glass. Users can call the emergency service before putting out the fire. Besides that, through this modifications, students and staffs could learn how to control the specific situation with correct procedures and precautions whenever they involve in fire accident. In addition, the students and teachers can use virtual reality software to train themselves for fire protection in the modern world.

CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

A literature review is an analysis of a research appropriate for a particular field on subject. It provides an outline of what has been learned, who are the main contributors, what are current hypotheses and observations, what questions are being raised, and which methods and strategies are relevant and useful. For others because it will not in itself be a key literature study, but instead it will fail to comment on another research. Such an analysis will not only provide a summary, but it will also discuss and illustrate similarities between different materials in order to take care of main themes. Besides writing down and referencing, only a declarative analysis can incorporate details and express concepts and trends.

2.2 Domain

Virtual Reality (VR) is the use of computer technologies to create a virtual world. Unlike conventional user interface design, the VR puts the user within an experience. Users are submerged in 3D environments, and can communicate with them instead of seeing a screen in front of them. For this virtual world the machine is turned into a gatekeeper by replicating as many senses as possible, such as vision, hearing, touch, and even smell. The only drawbacks to near-real VR interactions are the quality of material and the cheap computing resources. With using of this technology, Virtual Reality Fire Drill system has been developed to meet specific objectives. This project will improve the system into more locations of fire drill by analyzing which locations need its high priority. Based on problem, users found the lack of locations and unavailable of preference to choose which type of fire extinguisher is intended to be fixed in this project. Most of the users do not have the awareness on type of fire extinguisher and their use in fire accidents.

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