COMP4801 Final Year Project

A 3D Game to Raise the Teenagers' Awareness on Cybersecurity

Detailed Project Plan

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Abbreviations

Three-dimensional: 3D

Virtual reality: VR

1 Introduction

The following section introduces this project plan. Firstly, a brief background on cybersecurity will be given. The motivation of this project and related inspirations are also presented below, followed by an outline of the report content and structure.

Over the recent decade, the general public have started relying on digital devices at an increasing scale due to the rapid technological advancements. With the boost in dependence on digital devices, escalation in the numbers of cybercrimes has also come along. Millions of people have been cheated by cybercriminals without even noticing, as suggested by the fact that there were almost 700 million people suffering from cybercrimes in 2018 [1]. Currently, cybercriminals generate revenues of $1.5 trillion annually, and this statistic is anticipated to continue growing, with the total damage of cybercrimes costing $6 trillion annually by 2021 [2]. Among these many victims, teenagers is suggested to be the major age group that is fueling this growth, as they usually have the highest amount of exposure to non-evaluated applications, which are usually the sources of cybercrimes, making them the most vulnerable [3]. In view of the above situation, raising the awareness of the general public, especially the teenagers, on cybersecurity proves more important now than ever.

In order to efficiently explain and teach the teenager group about the concept of cybersecurity, we choose to use game to convey the message, particularly 3D VR game. VR is the concept of simulating human experience that can be similar to or completely different from the physical reality. 3D environment and VR both possess advantages for learning over other types of games, mostly because of their visual, auditory and spatial elements which result in better recall for players on what they have learnt [4].

Moreover, the immersive setting created by them helps learners involve emotionally into the game due to realism, hence enhancing the learning experience further [5].

In the aspect of 3D game, the fundamental concept of this project is inspired by the 3D game “Watch Dogs” after reviewing its idea of introducing hacking technology into a game. Its protagonist will make use of cyber-abilities such as identity framing to achieve various tasks, and in the process it actually reflects how powerful or dangerous misuse of digital data could be, hence bringing up the importance of cybersecurity. On the other hand, in the aspect of VR game, the type of this project is inspired by the VR game “Rec Room”. It features a VR world in which players could navigate around a social sandbox of places, and in different places players may engage themselves into various mini-games. After reviewing its mechanics, many would understand why VR game could provide a more immersive environment than other types of game. With the help of devices such as HTC Vive, players’ physical movements actually translate into the game, causing them to feel like they are really interacting inside the virtual world.

The remainder of this paper is organized as follows. Firstly, we details the objectives and scope of this project. Following is a description on the methodology used, including equipment, game engine, mini-game design and some other supporting features. Next, we gives the schedule and milestones. Lastly, we closes with a short conclusion.

2 Objective and Scope

The objective of this project is to teach the general public, particularly the teenager group, about the nature, types and adverse effects of cybercrimes if they do not maintain a better cybersecurity. Consequently, we hope that it could help the players to better detect the occurrence of cybercrimes and protect themselves, or even protecting others from suffering from these crimes, and eventually combatting cybercriminals together.

This project will feature a 3D VR world in which player will be acting as a cyber-police and patrolling around the world. The aim of the player will be to find out suspects of cybercrimes. Once they discover one, they will need to arrest them and determine whether the suspects have really committed cybercrimes. The process will be in the form of mini-games, for example, if player discover a suspect who may have committed hacking, the mini-game will be to find out which file he has hacked. Correct determination will grant player marks, and the goal of player will be to gain as many marks as possible. First of all, the target audience of this game is teenagers, ideally aging from 12-18, as they are the most vulnerable group towards cybercrimes. Secondly, it will be a single-player game. Furthermore, we will be using a few of the most prevalent cybercrimes, such as hacking and phishing, as the models of mini-games, but in the long term, we hope to add in more and more types of crimes so as to keep players updated with the current development of cybercrimes and better equip them against newly emerging ones in the future.

3 Methodology

3.1 Equipment and Set-up

This project will make use of HTC Vive set as its main tool. By using HTC Vive Headset, a VR environment could be simulated for players to interact with. On the other hand, HTC Vive Base Stations will help with the motion tracking of players while HTC Vive Controllers will aid players to control their in-game characters.

3.2 Game Engine

This project will be using Unity as its game engine. Unity is a cross-platform game engine that is supported by more than 25 different platforms, which virtually means that most of the operating systems could run Unity games. Moreover, Unity supports both 3D and VR games, therefore it is perfectly suitable with the theme of this project. However, as Unity VR games that make use of HTC Vive set only support Windows Operating Systems [6], we will be using Windows Platform as our development platform this time. Last but not least, C# will be adopted as the scripting language for this project as Unity only supports C# language currently.

3.3 Mini-game Design

The mini-games mentioned above will be in the form of completing tasks and basing on the result obtained afterwards to determine whether the suspects have committed a certain cybercrime. Correct options will grant players points but incorrect options will not deduct their score. This is because the main objective of this game is plainly to lead them to the correct attitude towards cybersecurity, therefore rather than increasing the possibility of demoralizing them through the act of deducting their score, we value a cheerful learning process more and hope that every player could learn in a blissful way.

Through this process of continuously combatting cybercriminals, players will certainly be able to grasp the necessary knowledge to battle against cybercrimes.

3.4 Supporting Features (Optional)

A leaderboard function may be implemented to record each player cumulative score over the course of gaming to increase the incentive for players to play the game. We hope that the competitiveness introduced by this function may act as a driving force for players to continue the journey of combatting cybercriminals and hence equipping themselves with cybercrime knowledge. On the other hand, a database system may also be implemented to record the score of every player, and MongoDB will be used in case of actual implementation. Furthermore, a coordinate system may be implemented such that players could track their position while patrolling and prevent getting lost in the VR world.

4 Schedule and Milestones

Task	Deadline
Deliverables of Phase 1 (Inception) ● Detailed project plan ● Project webpage	29 September 2019
Development of minimum viable product ● Complete cybersecurity research ● Complete VR settings ● Build 3D models ● Finish at least 1 mini-game	31 December 2019
First presentation	13-17 January 2020
Deliverables of Phase 2 (Elaboration) ● Preliminary implementation ● Detailed interim report	2 February 2020
Development of final product ● Enhance VR settings ● Finish remaining mini-games	24 March 2020
Final testing and amendments	31 March 2020
Deliverables of Phase 3 (Construction) ● Finalized tested implementation ● Final report	19 April 2020
Final presentation	20-24 April 2020
Project exhibition	5 May 2020
Project competition (for selected projects only)	3 June 2020

5 Conclusion

Cybersecurity is an issue that has been proven more important now than ever due to the ever-growing trend of cybercrimes in recent decade. This paper proposes a 3D VR game for learning essential knowledge about cybercrimes in a rewarding and contented way with details on its methodology, development schedule and others. We hope that this project could help the general public, especially the teenager group, protect themselves from cybercrimes and combat cybercriminals together.

6 References

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