

# Independent Project

2016 Summer - 6910D

## **VR Mobile Shooter**

Supervisor: Prof. David ROSSITER

Toygar Onbay

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# Abstract

Mobile video game market has grown tremendously and now with the released virtual reality technologies more VR games are being developed, even for mobile phones. My aim was to figure out how I create an immersive, fun gaming experience on an average smartphone with Google Cardboard attached. Since in virtual reality environment you the user is observing 3D space, I wanted to turn this environment into a shooter game. After playing and studying various video games and VR games I came up with a design and implemented this design with Unity3D. This project resulted with a 3D VR game on Android to be used with Google Cardboard or similar VR attachment for smartphones. With each level player will face challenging enemies.

## 1. Introduction

There are lots of fun VR games right now and more are being developed it's still a new technology. However most of the good, high quality VR games are released for expensive VR glasses, such as Oculus Rift, Gear VR, and HTC Vive. There are some nice experiences a Google Cardboard user with average smartphone can enjoy but its limited compared to expensive options.

I wanted to show you don't need an expensive tool to experience fun and immersive VR games and apps, and it resulted with this project.

## 2. Design

My idea was to make a game where player can look freely around the game world and interact with this world. I played a VR game where you shoot enemies and wanted to make my own version.

The game consists of short levels where shoot enemies with your gun and avoid enemies with the cat.

The player can shoot the cat to move it so it can avoid shots and enemies or catch health items.

Player needs to survive until at the end of the level to successfully finish that level

Players can see their health and ammo at all times. If health reaches zero player needs to restart the level.

Player can only shoot 30 bullets after that the gun needs to reload but ammo is unlimited.

There are 4 enemy types in this game:

1. A mummy that can walk only forward, hurts the cat if it touches the cat.
2. A flying small ship that fires a fast unavoidable laser to cat.
3. A flying small ship that tries to reach to cat and explode.
4. A flying large ship that fires slow rockets that can be avoided.

## 3. Features and Implementation

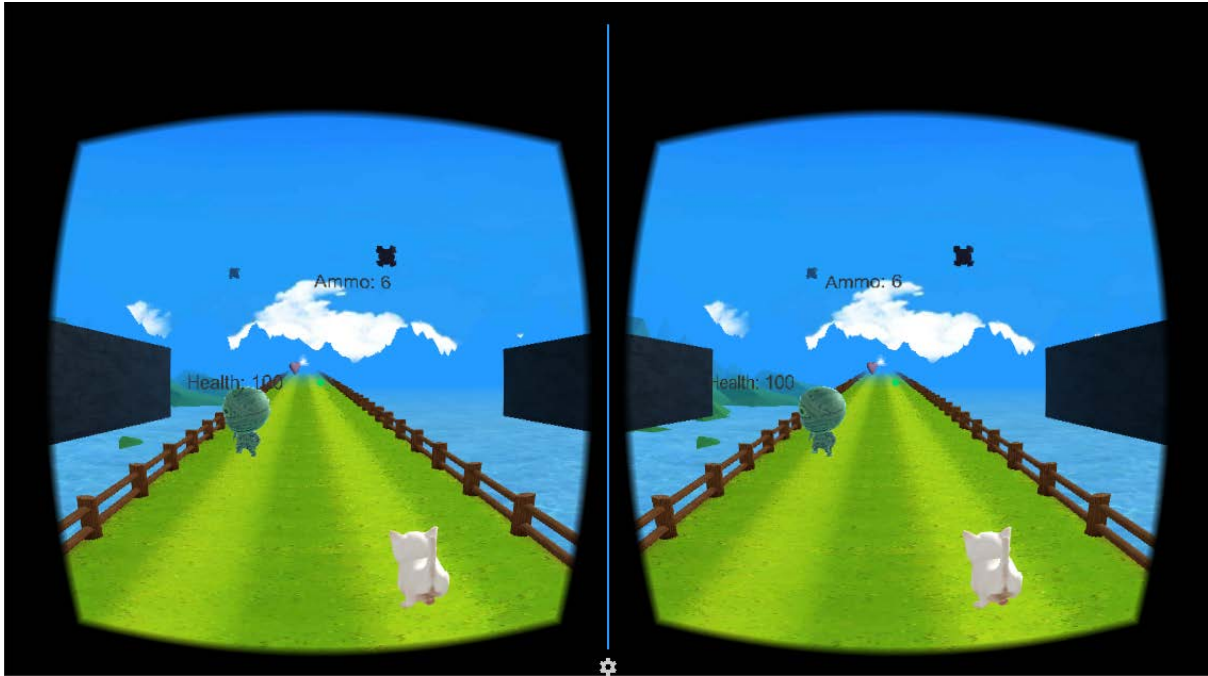
### 3.1 Features

CATastrophe features 5 levels, each level with similar structure but as the level increases it becomes more challenging.



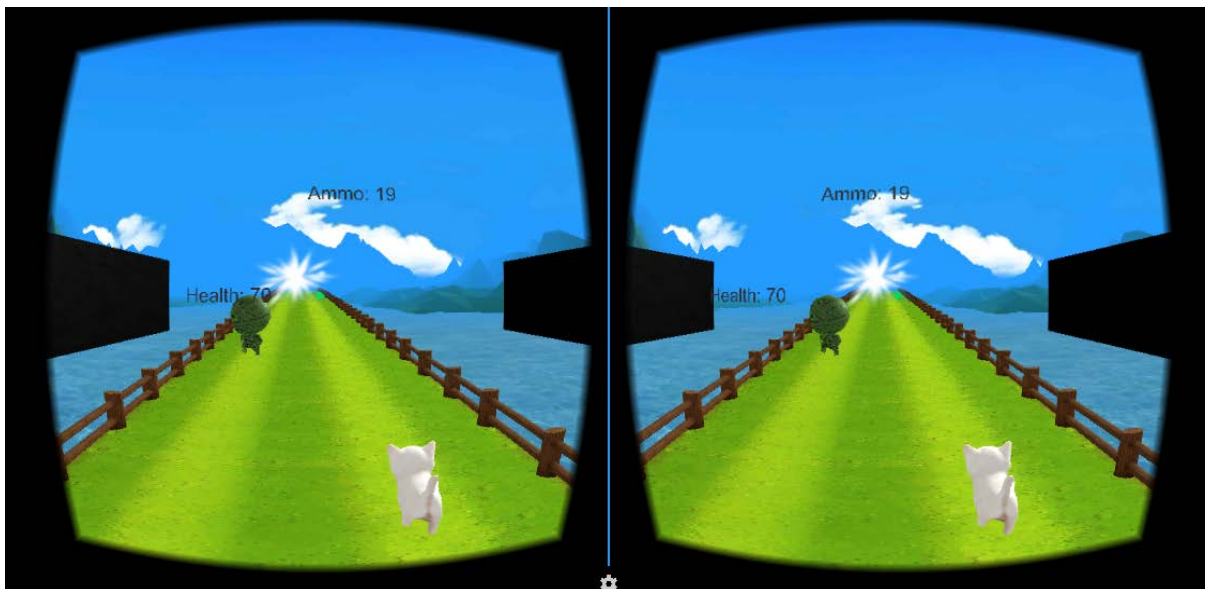
**Figure 1 Title Screen**

Figure 1 is the title screen. The first screen when the game finishes loading. From here player can select a level to play or exit the game.



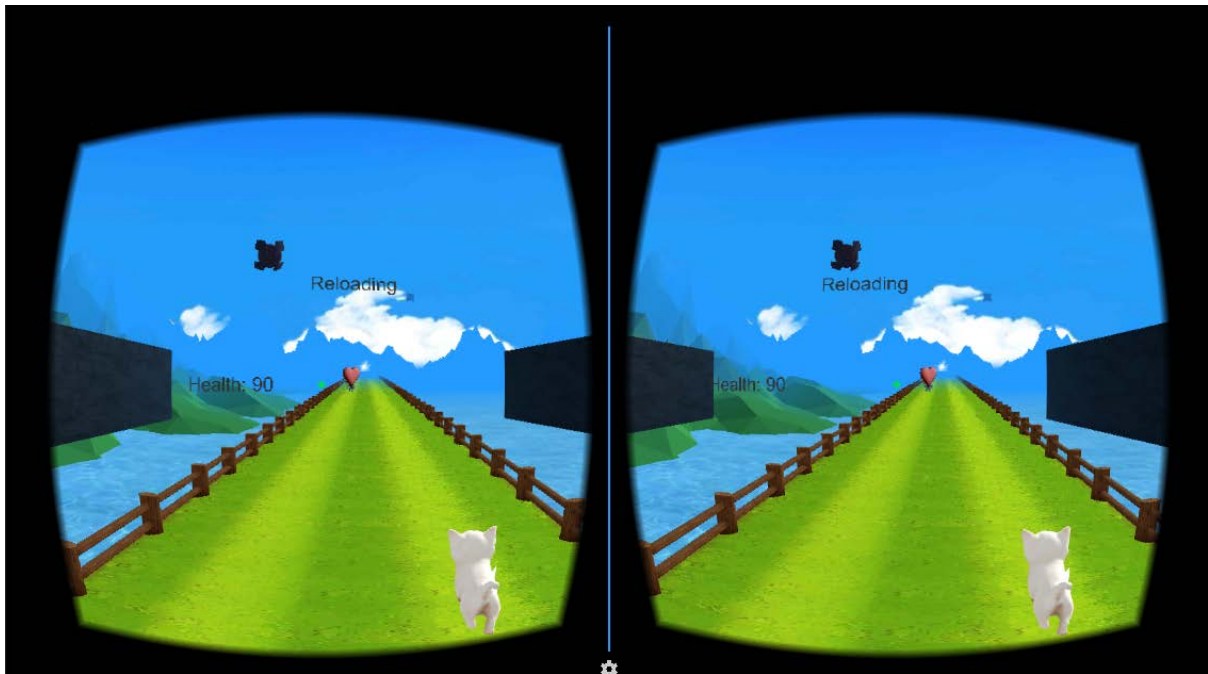
**Figure 2 First Level**

Figure 2 shows beginning of the first. In this level player will be introduced basics of the game. From this point player can move his head to aim and click the Google Cardboards button or presses controller's "A" button to shoot enemies. If the player shoots the cat or presses the controller's "B" button the cat will switch sides so that the cat can catch pickups and avoid obstacles.



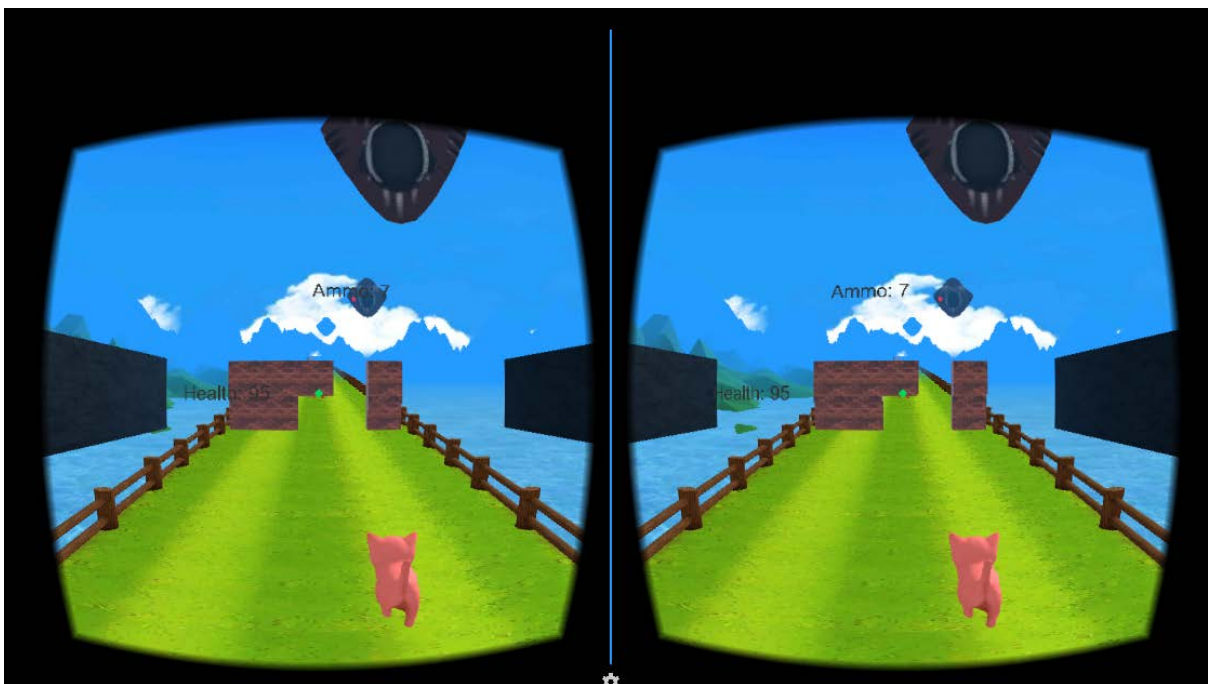
**Figure 3 finishing the level**

When players gets close to the end of the level they will see glowing light in figure 3. When the cat touches the glowing light the level will end. Each level cat is teleported to a new location and these glowing lights represent teleport gates.



**Figure 4 Reloading and health pickup**

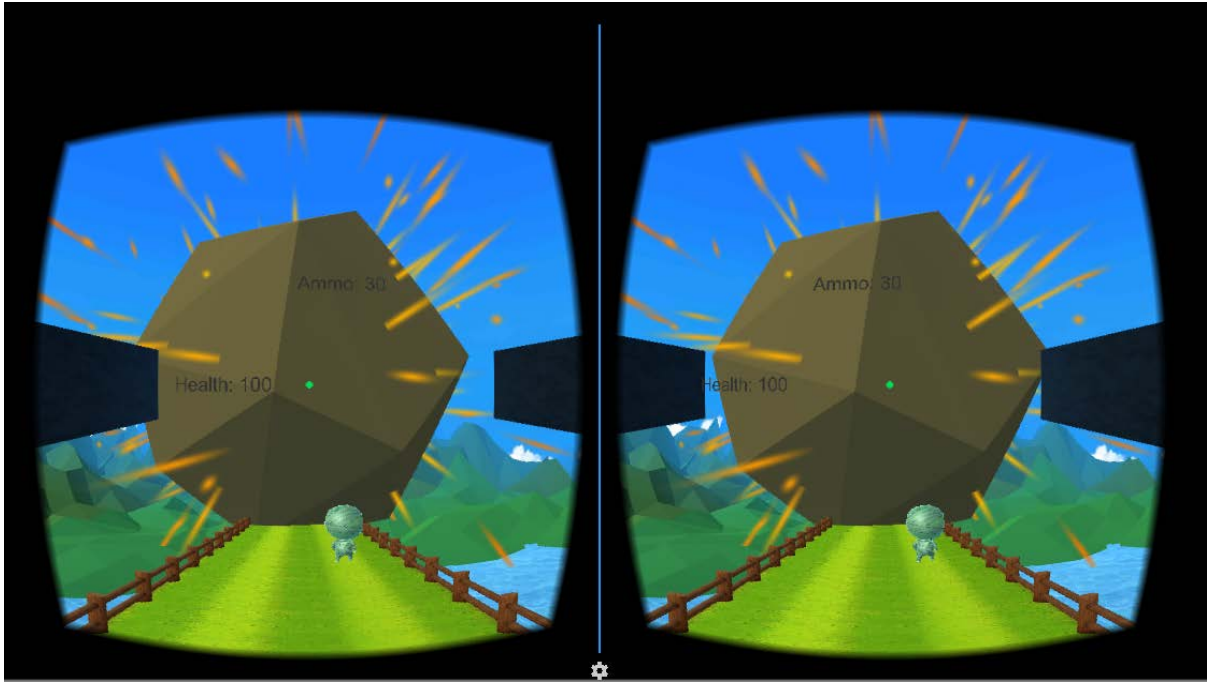
As you can see in figure 4 players see a text that says “Reloading” it shows to players that they need to wait a little while so they can keep shooting again. Also in figure 4 you can see a health pickup which restores half of the cat.



**Figure 5 Second level**

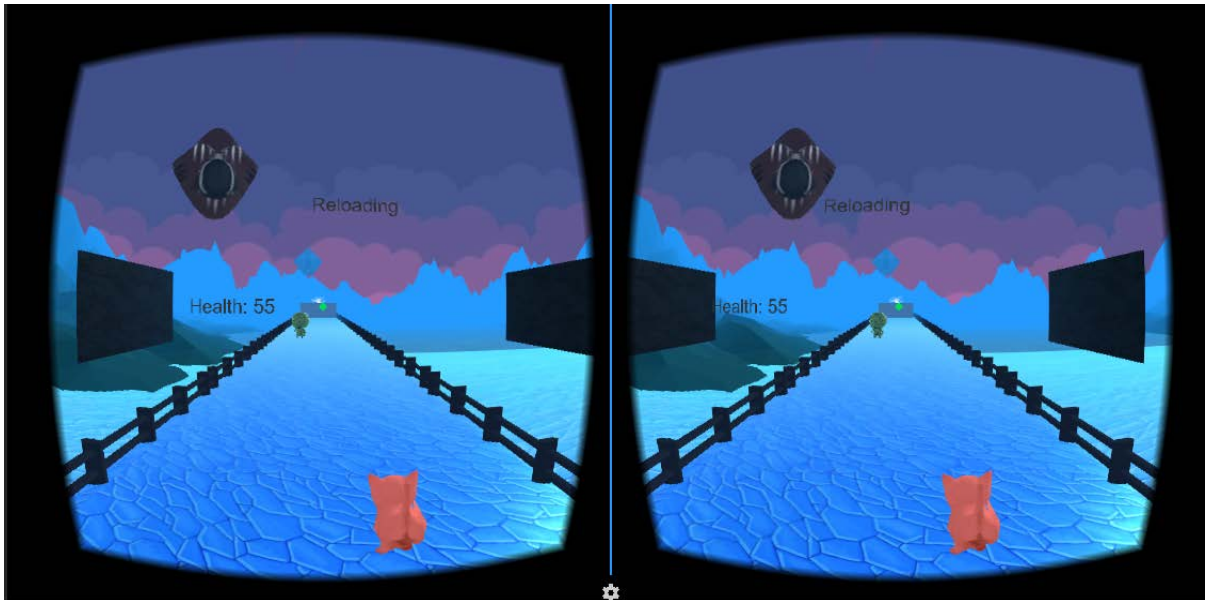
In figure 5 we see the second level. Here the players are introduced to a new enemy.





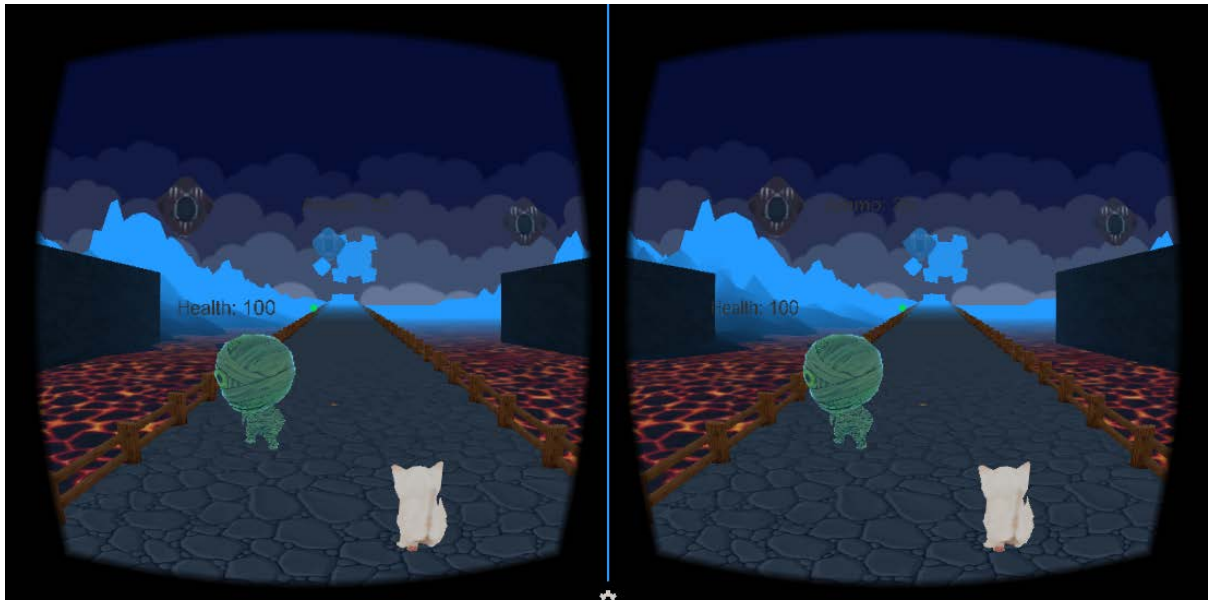
**Figure 6 Looking behind**

If players take a moment to look behind they will see a boulder following them. This was done to get rid of enemies that pass the player and give the cats running purpose.



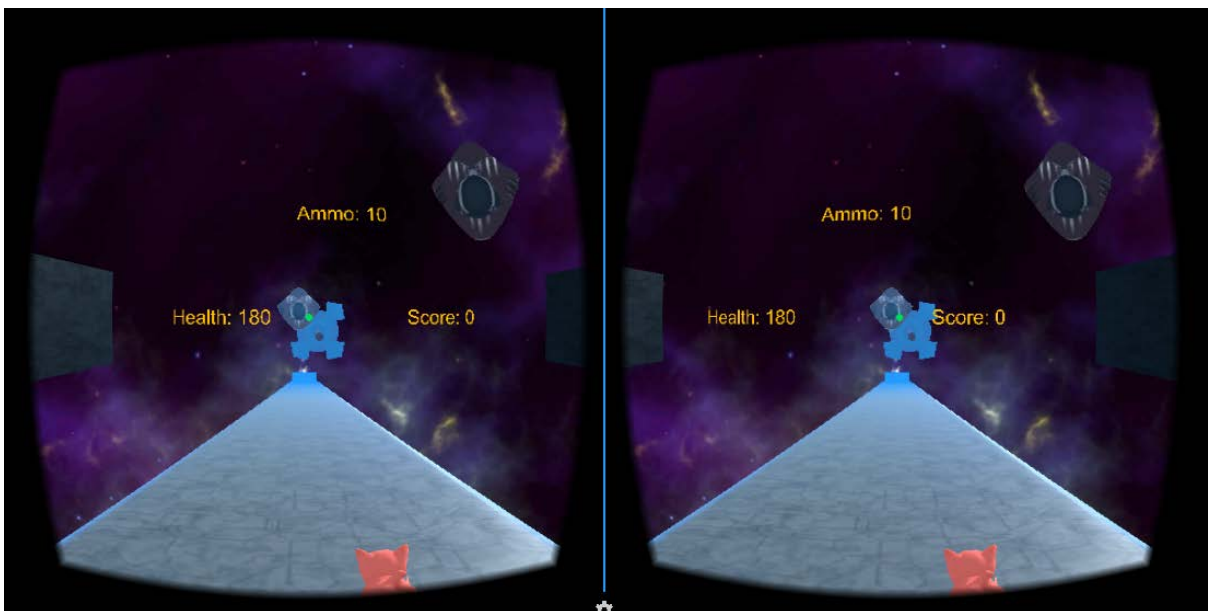
**Figure 7 Third Level**

The first 3 level's environment was similar with different sets of enemies. Now player is in a slightly different environment where everything is frozen.



**Figure 8 Fourth level**

In figure 8 we see the last 4<sup>th</sup> level in a volcanic setting.



**Figure 8 Fifth Level**

In figure 8 we see the last 5<sup>th</sup> level in a space setting.





**Figure 9 Level finished screen**

In figure 9 we see what happens when players survive the level. They are greeted with a message that displays score.



**Figure 10 Game Over**

When player's health drops down to 0 players are faced with a game over screen in figure 10.



**Figure 11 Instructions**

In figure 11 we see one of the instructions the game shows to teach the players how to play the game.

### 3.3 Implementation

CATastrophe is made with Unity3D using C# programming language. With Unity3D this game can be deployed on many platforms but this game requires an Android phone, Google Cardboard and an optional controller.

#### 3.3.1 Tools Used

**Unity3D** is the main tool I used to develop this game.

**GIMP** is an image manipulation program. Sometimes I needed to edit textures.

**BFXR** is a simple sound effect creation tool.

**Microsoft Visual Studio** is the default code editor for Unity3D. I used it to write C# scripts for Unity3D.

#### 3.3.1 Resources

- The models, textures, and sounds I used in this game are from <https://www.assetstore.unity3d.com/>. There are lots of free to use resources game developers can use.

## 4. Conclusion

This project succeeded in reaching goal of creating a fun and immersive game. At this stage CATastrophe has 5 levels. To be put on the Google Play Store it needs more levels. In future I may add more levels and features so that CATastrophe can become a full game.

This project shows that with Unity it's possible to make good looking, fun games for average smartphone. VR trend will continue to grow, since its new VR game development is very open to experimentation and discovery. I hope to see new games and applications on VR and maybe even work on them myself in future.

## 5. Appendix

### 5.1 Minutes of the 1<sup>st</sup> meeting

**Date:** Monday, 11 July 2016

**Time:** 11 am

**Place:** Room 3512

**Attending:** Prof. Rossiter, Toygar ONBAY

**Absent:** None

**Recorder:** Toygar ONBAY

#### **Approval of minutes**

The minutes of the last meeting were approved without amendment.

#### **Report on Progress**

Developing the gameplay elements are mostly done.

#### **Discussion Items and Things to Do**

Design levels

#### **Meeting adjournment**

The meeting was adjourned at 1.am

### 5.2 Minutes of the 2<sup>nd</sup> meeting

**Date:** Friday, 29 July 2016

**Time:** 11:00 am

**Place:** Room 3512

**Attending:** Prof. Rossiter, Toygar ONBAY

**Absent:** None

**Recorder:** Toygar ONBAY

#### **Approval of minutes**

The minutes of the last meeting were approved without amendment.

#### **Report on Progress**

Game design finished, demo ready with basic gameplay mechanics with temporary sprites.

#### **Discussion Items and Things to Do**

Add instructions, "Game Over" and "Level Cleared" messages to the game.

Make a video demonstrating the game.

#### **Meeting adjournment**

The meeting was adjourned at 11:15am.

### 5.3 Minutes of the 3<sup>rd</sup> meeting

**Date:** Saturday, 30 July 2016

**Time:** 7:47pm

**Attending:** Prof. Rossiter, Toygar ONBAY

**Absent:** None

**Recorder:** Toygar ONBAY

#### **Approval of minutes**

The minutes of the last meeting were approved without amendment.

#### **Report on Progress**

Video submitted.

#### **Discussion Items and Things to Do**

Report needs more improving.

### 5.4 Minutes of the 4<sup>th</sup> meeting

**Date:** Tuesday, 2 August 2016

**Time:** 10:00am

**Attending:** Prof. Rossiter, Toygar ONBAY

**Absent:** None

**Recorder:** Toygar ONBAY

#### **Approval of minutes**

The minutes of the last meeting were approved without amendment.

#### **Report on Progress**

Report on process.

#### **Discussion Items and Things to Do**

Finishing touches on report