



Group ID

CS16 -77

Shahrbano Wamique

01-134132-173

Hasnain Ali

01-134132-060

**Zombie Fight Game
With Augmented Reality**

Bachelor of Science in Computer Science

Supervisor: [Dr. Imran Siddiqui](#)

**Department of Computer Science
Bahria University, Islamabad**

Certificate

We accept the work contained in the report titled “Zombie Fight Game with Augmented Reality”, written by Shahrbanoo Wamique and Hasnain Ali as a confirmation to the required standard for the partial fulfillment of the degree of Bachelor of Science in Computer Science.

Approved by . . . :

Supervisor: Ms. Alyia Amir (Senior Lecturer)

Internal Examiner: Mr. Abdul Hannan (Senior Lecturer)

External Examiner: Dr. Tauseef Jamal (Associate Professor)

Project Coordinator: Dr. Arif ur Rahman (Assistant Professor)

Head of the Department: Dr. Faisal Bashir (HOD, Associate Professor)

Dedication

Firstly, we would like to thank almighty ALLAH AZZAWAJAL with his grace we were able to complete the project. Next we would like to thank our families who supported us throughout our educational career. Last but not the least we would like to thank our friends who were there for us all the time.

Acknowledgements:

All praises to Allah, the most beneficial and merciful of all who guided us throughout this project. We would like to thank our respected supervisor Dr. Imran Siddiqi without his help and continuous support we were not able to complete this project, he helped us in every step where we needed. At times when the project completion felt hard, Sir was there to motivate us and help us to achieve our set goals. In addition to my supervisor; we would like to express our gratitude towards our friends. It would not be wrong to say that my friends have been my backbone throughout the project.

Shahrbano Wamique

Hasnain Ali

Abstract:

Augmented reality, or AR, is an indirect or direct view of our real-world environment whose elements are augmented. Our project will consist of creating a marketable game which is based on augmented reality. Our game takes advantage of your camera, GPS and AR that make zombies which are 3D models appear on your screen as if they are present in the real world environment. First the player has to navigate in a real environment to find the zombie and then kill it. The player is provided with different supplies and guns to kill the zombie. The player has to shoot three times to kill this 3D model zombie.

*We think someone else, someone smarter than us,
someone more capable; someone with more resources will
solve that problem. But there isn't anyone else."*

Regina Dugan

Table of contents:

Certificate	2
Dedication	3
Acknowledgements:	4
Abstract:	5
Table of contents:	7
List of figure	10
List of Table	12
Acronyms and Abbreviation	13
Chapter 1	14
Introduction	14
1.1 Project Background/Overview:	16
1.2 Problem Description:.....	16
1.3 Project Objectives:	16
1.4 Project Scope:	16
Chapter 2	17
Literature Review.....	17
Chapter overview:	18
2.1 Pokémon Go:	18
2.1.1 Game play:	18
2.2 REALSTRIKE GAME:.....	19
2.3 AR Basketball Game:	20
2.4 Paintball Arena:	20
2.5 Spec Trek:	21
2.6 AR Invaders:	21
2.7 Parallel kingdom:	22
2.8 iSnapeYou :	22
2.9 Skeeter Beater.	23
2.10 Droid Shooting:	23
Chapter 3	25
Software Requirements	25

Specification	25
3.1 Proposed System:	26
3.2 Existing System	26
3.3 Requirement Specifications	26
3.3.1 Functional Requirements.....	26
3.3.1.4 Camera.....	26
3.3.2 Non-Functional Requirements.....	27
3.4 Use cases	27
Chapter 4.....	30
Design	30
Chapter overview:	31
4.1 System Architecture	31
4.2 Sequences diagram:	32
4.3 Activity diagram:	33
4.5 Low level language:.....	34
4.5.1 Interface view:.....	34
Chapter 5.....	39
System Implementation	39
Chapter Overview	40
5.1 System architecture.....	40
5.2 Tools	40
5.2.1 Unity.....	40
5.2.2 Fuse Adobe.....	40
5.3 Component.....	41
5.4 Language	41
5.5 Communications.....	41
Chapter 6.....	42
System testing and evaluation.....	42
Chapter Overview	43
6.1 Software testing techniques	43
6.1.1 Graphical User interface.....	43

6.2	installation testing.....	43
6.1.2	Usability Testing	44
Chapter 7	46
Conclusion	46
References:	48

List of figure

2.1	Pokemon nearby	18
2.2	Capture Pokemon.....	18
2.3	Battle of Pokemon	18
2.4	Real Strike Game	18
2.5	AR Basketball	18
2.6	PaintBall Arena	18
2.7	Spectrek	18
2.8	AR Invaders	19
2.9	Parrallel Kingdom	21
2.10	Isnape You	21
2.11	Skeeter Beater	23
2.12	Droid Shooting.....	23
3.1	Use Case diagram.....	28
4.1	Architecture diagram.....	31
4.2	Sequence diagram.....	32
4.3	Activity diagram.....	33
4.4	Interface	35
4.5	Instruction	36
4.6	Carrier	36
4.7	Find zombie	37
4.8	zombie appear	37
4.9	Ready to shoot	38

4.10	Aim toward zombie	38
4.11	shoot the zombie	39
4.12	dead zombie	39

List of Table

3.1	Use case	26
6.1	Test Case 1	42
6.2	Test Case 2.....	42
6.3	Test Case 3.....	43

Acronyms and Abbreviation

- 1) MMO Massive Multiplayer Online game
- 2) FPS First Person Shooter game
- 3) GPS Global Positioning System
- 4) PvP Player vs. Player
- 5) MAC Mouse Activated Computer
- 6) GUI Graphical User Interface

Chapter 1

Introduction

The last few years have seen a tremendous increase in the number of hand held devices. Hand held devices are those computing devices that can be used in hand such as Smartphone (mobile phones) and tablets computers. Or we can say those devices which are easily portable .These devices become increasingly powerful as the technology evolves. The early years of this century witnessed the replacement of traditional desktop machines by notebook computers which themselves are being replaced by hand held mobile devices

When it comes to developing application for these devices, the remarkable development in hardware and software of these devices makes it possible to have a huge variety of options to choose from. This attracted a significant number of developers to shift their focus to what was later termed as mobile application (or mobile app) development. Today, mobile application development has emerged as a huge market (in addition to desktop or web development) valuing more than \$27 billion [1] and has resulted in over 500 thousand jobs in Europe alone [2]. The popularity of mobile apps can be estimated by the fact that the word ‘app’ was listed as word of the year in 2010 [3].

The term virtual reality (VR) is quite familiar nowadays, wherein a person can view a completely virtual (read: computer generated) environment, with the potential to move around and interact with it in ways defined by the experience [4] The meaning of virtual reality comes from these two words i.e. virtual which means near and reality which we experience as human being, so the term ‘virtual reality’ means ‘near reality’. Virtual reality present our senses with a computer generated virtual environment that we can explore in some fashion. Virtual reality is the term used to describe the three dimensional, computer generated environment, which can be explored and interacted with by a person. The person becomes a part of the virtual world and the person is able to perform series of actions.

Following are some examples of the fields in which VR is used:

- Architecture
- Sport
- Medicine
- The Arts
- Entertainment.

Virtual reality (VR) is the creation of a virtual environment presented to human senses in such a way that the human experience it as it is present in the real world .VR uses a lot of technologies to achieve the goals .VR technology is becoming cheaper and more widespread

Augmented reality (AR) is an indirect or direct view of our real-world environment whose elements are extended. It uses computer generated elements such as videos, sound, graphics or GPS data etc [5, 6]

Augmented reality (or AR) is similar to VR, but the features of AR are overlaid on the real world. The augmented reality and virtual reality are the inverse reflection of each other. Virtual reality (VR) provides a digital recreation of a real life setting whereas augmented reality provides virtual elements which are overlaid in real world. Augmented reality improves by adding virtual components such as digital images, graphics that can easily interact with the real world where as virtual reality tries to create its own reality that is completely generated and driven.

Augmented reality has many applications. Like VR they are also used in different fields such as military, industrial and medical, now it has also been applied to commercial and entertainment areas.

Augmented reality allows video game players to experience digital game play in a real world environment. Companies and platforms like Niantic and LyteShot developed as augmented reality gaming creators. Niantic is notable for releasing the record-breaking Pokémon Go game [7]. Pokémon Go is a easy to play, location-based augmented reality game.

1.1 Project Background/Overview:

Mobile-phone gaming has become a multi-billion-dollar-a-year industry business. Widespread ownership of cell phones ensures high market penetration ,for the people whom have departments dedicated solely to mobile gaming .Pokémon Go is a game based on augmented reality and it is one of the most trending game nowadays. We got inspired by this game and tend to make a game which will be a bit similar to Pokémon Go but will differ in idea. Our project will consist of making a marketable game based on augmented reality.

1.2 Problem Description:

As discussed earlier, with the increase in the availability and accessibility of smart digital devices equipped with a camera, the last few years have witnessed a shift of paradigm and many of the applications as well as frameworks have migrated to the mobile platform or are in process of migration. Computer vision and augmented reality [8] based solutions are the most notable of these. Inspired by the potential these solutions offer, we intend to develop a game based on augmented reality in which we interact our 3D models with real world. Our major objective is to make an impact game in which the 3D model have to fight the zombies to save the world and with help of supplies located at different location the zombies can be easily killed.

1.3 Project Objectives:

The key objective of the proposed project is to develop an interactive and entertaining augmented reality based game that allows people to use their Smartphone's and fights zombies in the real world environment.

1.4 Project Scope:

This project will consist of creating a marketable game based on augment reality and mobile application development. There will be two major characters the human and the zombie. The zombies will be a 3d models found in real world. Both the character will be opponents and will fight to survive. Human would need food and other supplies like weapons (which they will find will navigating to different locations) to survive and kill the zombies.

Chapter 2

Literature Review

Chapter overview:

Augmented reality is an indirect or direct view of our real-world environment whose elements are extended. It uses computer generated elements that include video, sound, graphics or GPS data etc. In the gaming industry VR technology is mostly used on Smartphone devices, but there are some games developed for PC as well .Following are some of the games which are based on the augmented reality

2.1 Pokémon Go:

Pokémon go is the record breaking game which is based on augmented reality .Pokémon is the one of the most trending game nowadays, its free-to-play, location-based augmented reality game which was developed by Niantic. It is available for IOS and Android [7]. The game was firstly released in July 2016. The main idea of this game is to locate and capture Pokémon. In this game, the player uses its mobile GPS to locate Pokémon. Pokémon are the virtual creatures which visible on the screen as if they are present in the real world environment as the player. This game support in-app purchases for featured items that make the game more exciting. Pokémon Go has a variety of reviews, some appreciated the game because it motivates people to be more active, while others criticized because of some technical issues and limited region availability. But it became global regardless of such views. Pokémon go is listed as one of the most profitable mobile app in 2016. The game hits a number of more than 500 million downloads worldwide.

2.1.1 Game play:

In order to play this game, a user have to create his account to logged in . Once the player logged in with the created account, it can create and design their own avatar. Once the avatar is created it is then easily visible on the map using the player's location. Then the player simply have to navigate around and you will see a Pokémon if it is nearby [Fig 2.1]. When the player sees a Pokémon on the map he has to tap on it and then the player can capture the Pokémon by throwing poke balls on it [Fig2.2]. We have limited amount of balls so we need to get those balls from poke Stops. There are certain features on the map which include Poke Stops and Pokémon Gyms. Poke stops provide some item to the player such as Poke Balls, berries and potions, whereas the Poke Gyms serve as the battle locations for the matches [Fig 2.3]. While playing the game as the player moves in the real-world environment, their avatar moves within the game's map simultaneously. There are various types of Pokémon species present at different place in the real world environment. AR mode uses the camera of mobile device to display an image of the Pokémon as if they were present in the real world. We can catch the Pokémon by flicking the Poke ball from bottom of the screen up towards the Pokémon. If the Pokémon is trapped in the poke ball it comes under the control of the player. Although Pokémon-Go game is free-to-play but the player can purchase some additional game which include poke balls and other supplies.



Fig2.1

Fig2.2

Fig 2.3

2.2 REALSTRIKE GAME:

It is created by “YII UNIVERSAL ELITE LTD”. This is the first AR game, which is a 3D FPS (First Person Shooter) which means only the guns are visible not the person [Fig 2.4] .It uses camera to generate an FPS experience in the real world environment . Total 25 guns are used to play this game. Those guns can be selected from 6 various categories There are three visions night vision, thermal vision, or tactical flashlight, the player can change these vision according to their requirement .It is also available on IOS platform [8]



[Fig 2.4]

2.3 AR Basketball Game:

It created by “Augmented Pixels”. It’s an augmented basketball game. In this game the player has to aim the camera at a vacant field and then an AR basketball hoop will appear on our mobile devices [Fig 2.5]. This game can easily be played by swiping, tilting and moving your mobile screen .The main purpose of this game is to throw the ball in the hoop .One of the most useful features it has that’s the player progress is automatically saved whenever you exit the game. This game is only available on IOS [8].



[Fig 2.5]

2.4 Paintball Arena:

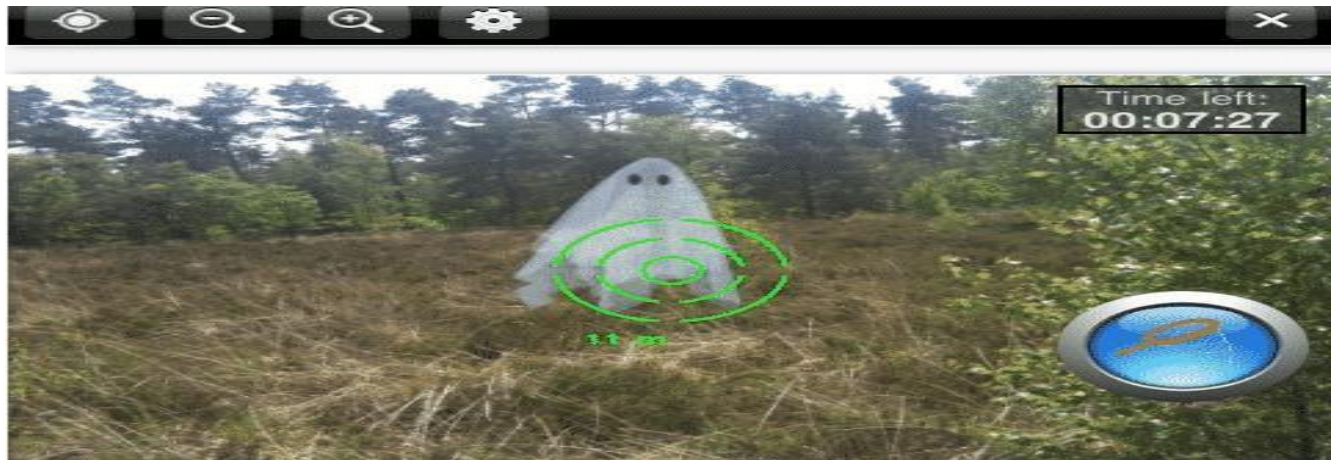
It is developed by Mambo Studio. This game is a multiplayer game. the player can play this game by completing mission with your friends .This game can be played in any type of surroundings but it requires a strong internet connection. Before the game starts the player must specify the opponent’s shirt color in order to find or detect him. After specifying the shirt color, the player has to select the game mode .There are two modes one is the time limit mode and the other is the unlimited time mode .After selecting the mode we can starts the game [Fig 2.6] .If your weapon is out of paintballs, you can reload it by shaking the phone. This game can easily be installed in both platforms i.e. android and IOS [8].



[Fig 2.6]

2.5 Spec Trek:

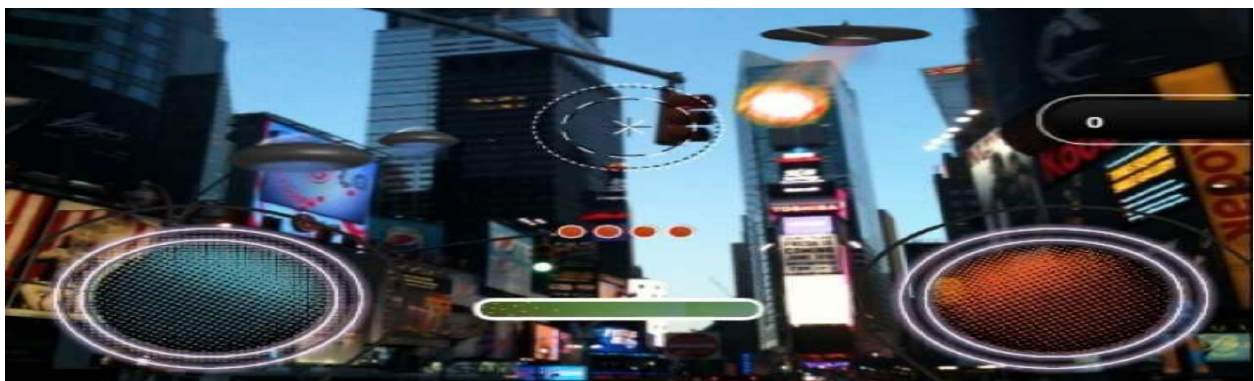
It is developed by “Game4All”. This game is an augmented reality ghost hunting game, in which with the help of the Camera and GPS the player can catch virtual ghost in the real surrounding [Fig 2.7]. The player can easily catch the ghost by tilting their phone to the camera position. Through the camera the player can scan the ghosts and can see the ghost in augmented reality and then can catch the ghost. It is available on the android platform only [8].



[Fig 2.7]

2.6 AR Invaders:

It is developed by “Quill Pen Studio”. It is a space invader game. In this game the player has to join forces with the earth resistance in order to defend the planet against the aliens [2.8]. If the player is standing then the game is 360 degree shoot them up position, while if the player is sitting then it shifts to 180 degree in defend base mood. The problem in this game is that if the player exits the game your progress is not saved. This game is available on both Platform i.e. Android and IOS [8].



[Fig 2.8]

2.7 Parallel kingdom:

It is created by “PerBlue”. Parallel kingdom is a location based MMO (Massive Multiplayer Online) game .This game take advantage of your Google map by turning it into a map which is filled with dungeons, castles and kingdoms [Fig 2.9] .This game have been nominated for a lot of awards which include The Best AR game, The Best MMO and The best use of local service .Just like the normal RPG (Role playing Game), the player will receive a lot of level and upgrades. The best thing of this game is the PvP (player vs player) mode, in this mode the player can fight with the other player. This game is available on Android, IOS, MAC and PC as well [8].



[Fig 2.9]

2.8 iSnapeYou :

It is developed by Sense8. In this game the player phone screen is transform into a sniper rifles , which can be used to kill real targets around you. In order to kill the target aims your phone camera towards the target and then press the fire button [2.10]. If the player manage to get a head shot of the target then he will be awarded with some extra points .The graphics of this game is quite realistic. The player can easily take screenshot of your game and can share it with your family and friends, the player is allowed to take screenshot and share it on Facebook and other social media .It is available on the Android platform only [8].



[Fig 2.10]

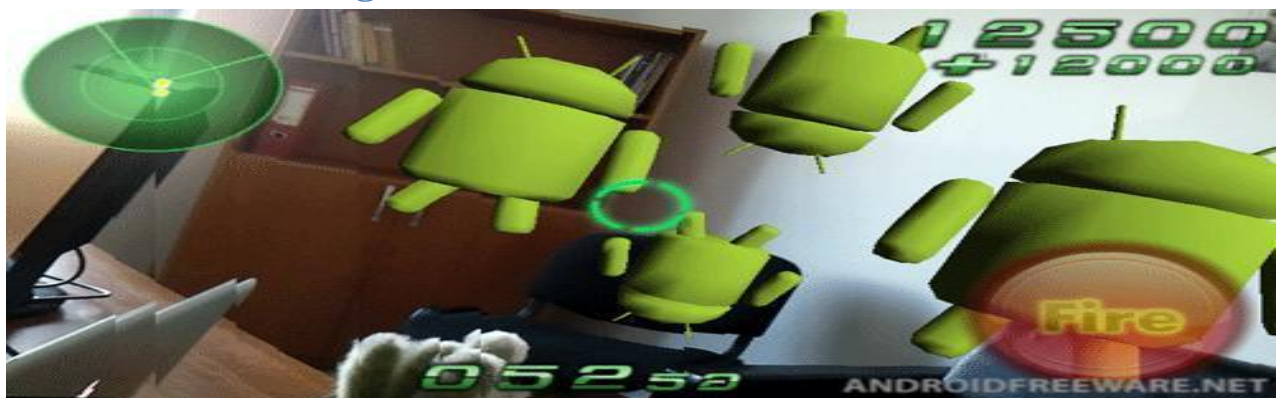
2.9 Skeeter Beater.

It is developed by “COG Tactics,Inc”. In this game the player has to squash the AR insects that appear on your screen, and find more to get more score [Fig 2.11]. The greater amount of AR insects you will squash the greater points you will get .After each level the insects increase in speed and it is difficult to kill them .If the player misses any insect then his points will be deducted . The player has to reached a certain point to pass the level .This game can only be installed on the Android platform [8].



[Fig 2.11]

2.10 Droid Shooting:



[Fig 2.12]

It is developed by: Quest-Com Co,LTD”. This game is quite addictive and fun to play . By using the AR capability its makes small droids that appears on the player screen .These droids attack

from every corner. This game contains radar on the bottom of the screen which indicates where the enemies are coming from. With the help of the wide range of weapons available on this game the player can kill all the droids before the time runs out. This game is only available on Android platform [8].

Chapter 3

Software Requirements

Specification

3.1 Proposed System:

The proposed system would be an augmented reality based game that could be used on Android Phones. The project will consist of creating a marketable game based on augmented reality and mobile application development. There will be two major characters: the human and the zombie. The zombies will be 3D models found in the real world. Both the characters will be opponents and will fight to survive. Our game takes advantage of the camera, GPS, and AR that allow lots of zombies to appear around the player. The player can kill the zombies with guns provided. The more zombies you kill, the more points you get.

3.2 Existing System

First of all, we have created our 3D model which is the zombie using a software named as Fuse Adobe. After creating the model, we worked on the animation of the proposed game. Now we are working on how to display our 3D model in the real world environment. In the end, we will design our shooting mechanism using C-sharp language in Unity tool.

3.3 Requirement Specifications

Requirement Specifications is a description of all the functional and non-functional requirements of a system. In the sections below, we have discussed the functional and non-functional requirements of our project.

3.3.1 Functional Requirements

Functional requirements are used to describe the set of inputs, outputs, and behaviour of any system. Functional requirements define the main functions of a system and its core components. Some of the functional requirements of our project are discussed below:

3.3.1.1 Find zombie

The player will find the zombie (3D model) by navigating the environment.

3.3.1.2 Kill zombie

The player can kill the zombie by the help of supplies provided by the shooting mechanism.

3.3.1.3 GPS

GPS is the abbreviation for Global Positioning System, a radio navigation system that is used to find the exact locations of the land, sea, etc. This location feature helps to navigate zombies present nearby and will link our game with Geo-location.

3.3.1.4 Camera

The camera is used to interact with the real world.

3.3.1.5 Gyroscope

Gyroscope is the sensor which is used to maintain and control the position, level or orientation .it works with the accelerometer to detect the rotation of phone and features liking tilting of phone or shaking it in order to perform certain actions. It allows the device to rotate the screen from portrait to landscape. In our game we use gyroscope as game controller .As we move our phone the player will move accordingly.

3.3.2 Non-Functional Requirements

These requirements are used to judge the operation of a system, rather than behavior of system. The application must satisfy the following non-functional requirements which are discussed below

3.3.2.1 Availability:

Once the application is installed in the android phone then the user can use it anytime or anywhere.

3.3.2.2 Usability:

This game is quite fun and addictive to play around the house. It can be a source of entertainment. In this game all the player has to do is kill the zombies. A new user can easily play this game

3.3.2.3 Robustness:

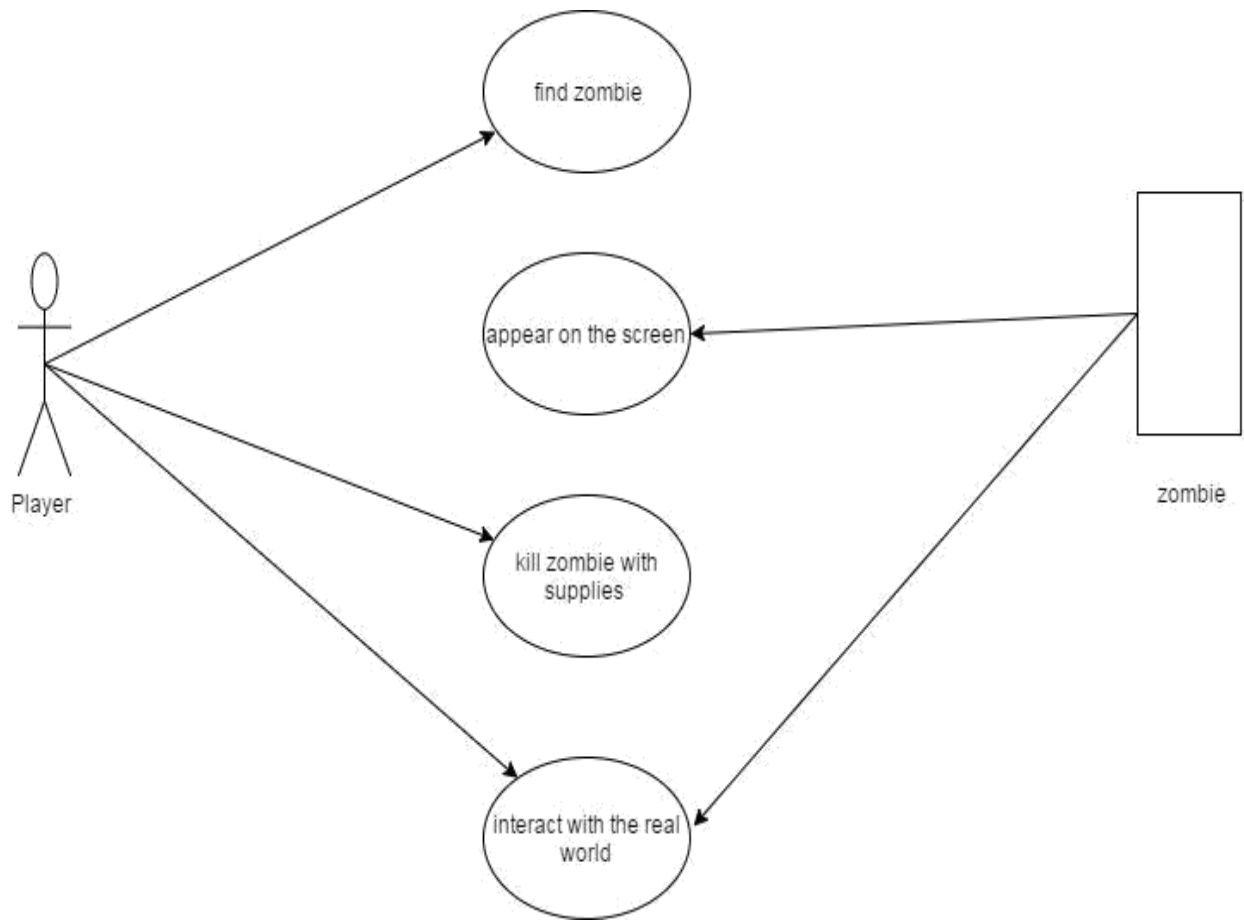
This game is robust and can recover from crashes.

3.3.2.4 Reliability:

This game provides reliability to the user by automatically saving the progress whenever we exit the game or closed it by mistake.

3.4 Use cases

Following is the use case diagram of our proposed project



[Fig 3.1] Use case diagram

Use case ID	UC-1
Title	The zombie game use case
Pre –conditions	The game starts
Post –conditions	Find and kill the zombie
Descriptions	The player use shooting mechanism to find and kill the zombie
Normal flow	Find and kill the zombie
Alternative flow	If zombie is not found , navigate again
Assumption	None

[Table 3.1]

3.4.1 Steps

- In search of zombie the user navigated through the real world environment
- The zombie which is the 3D model appear on the mobile screen
- The user kill the zombie with the help of the supplies provide
- Both the user and the zombie interact with the real world environment

Chapter 4

Design

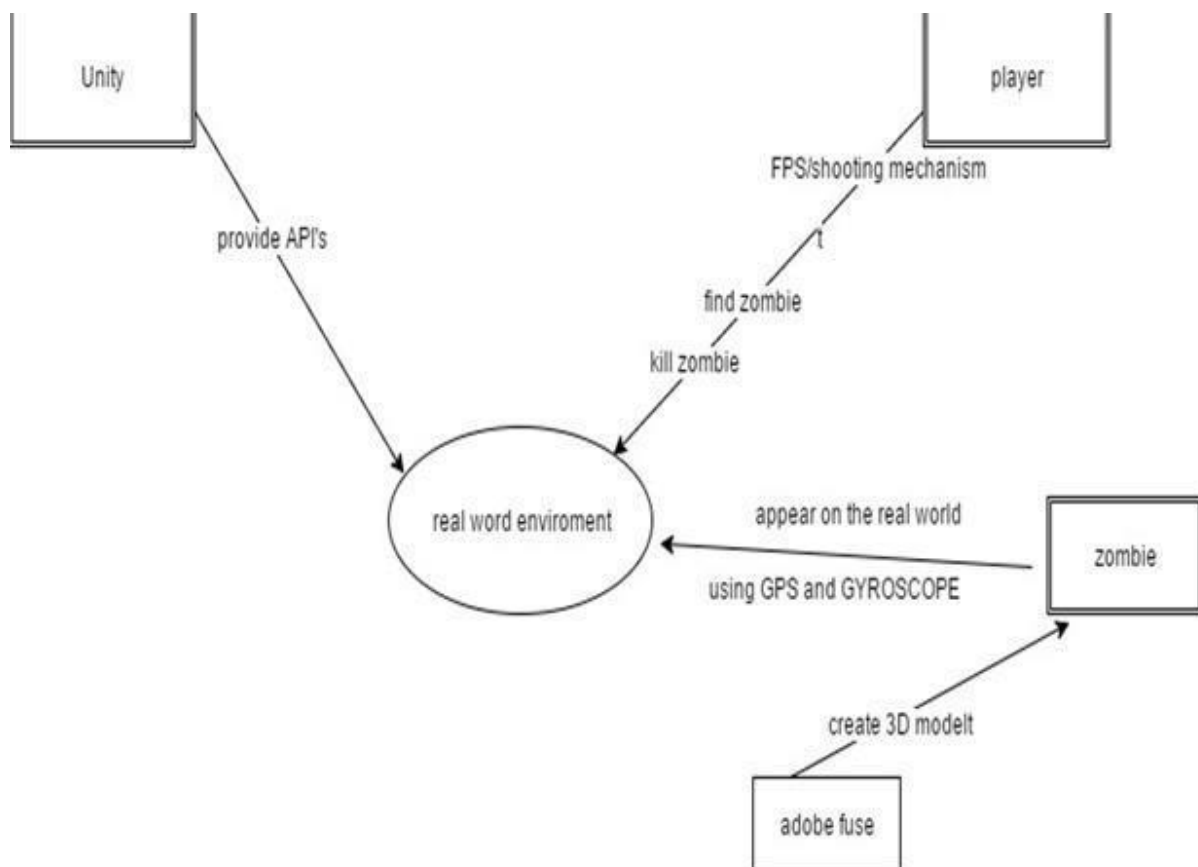
Chapter overview:

System design is the process of defining the architecture, component, modules, interface and data that are used for a system to satisfy specified requirements. In this chapter we will present the system design of our proposed augment reality game application for android based mobile devices.

4.1 System Architecture:

The Architecture of this system is interactive and simple. It consists of user friendly interface which contains the main menu for interaction. There is another menu for option in which instructions of the game is written, it will help the player to play game. There is a "Exit" menu to quit the game .The game play is the first shooting game in which the person find the zombie in the real world and kill the zombie with the help supplies provided by the shooting mechanism

Following is the architecture diagram of our proposed systems

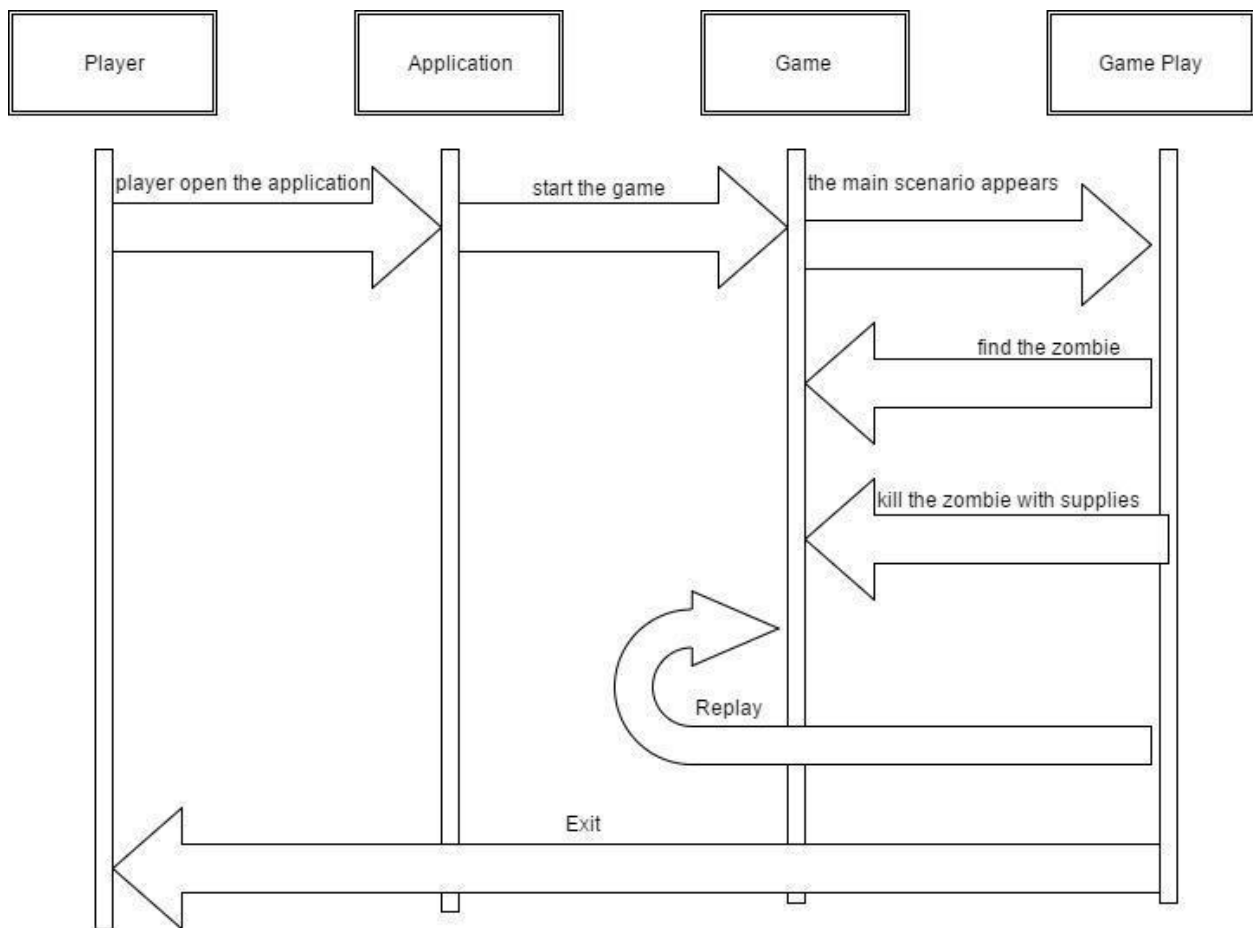


[Fig 4.1]Architecture Diagram

Unity5 tool provide APIs to create our game .Whereas the player is provided with the shooting mechanism which we have create using the unity5 tool to kill the zombie .Firstly the player has to find the zombie by navigating through the environment in order to kill it. The zombie appears on the screen using GPS and gyroscope. Adobe Fuse tool is a tool which is used to create 3D model, by using this same tool we have created our zombie [Fig 4.1]

4.2 Sequences diagram:

Following is the sequences diagram of our proposed game [4.2].

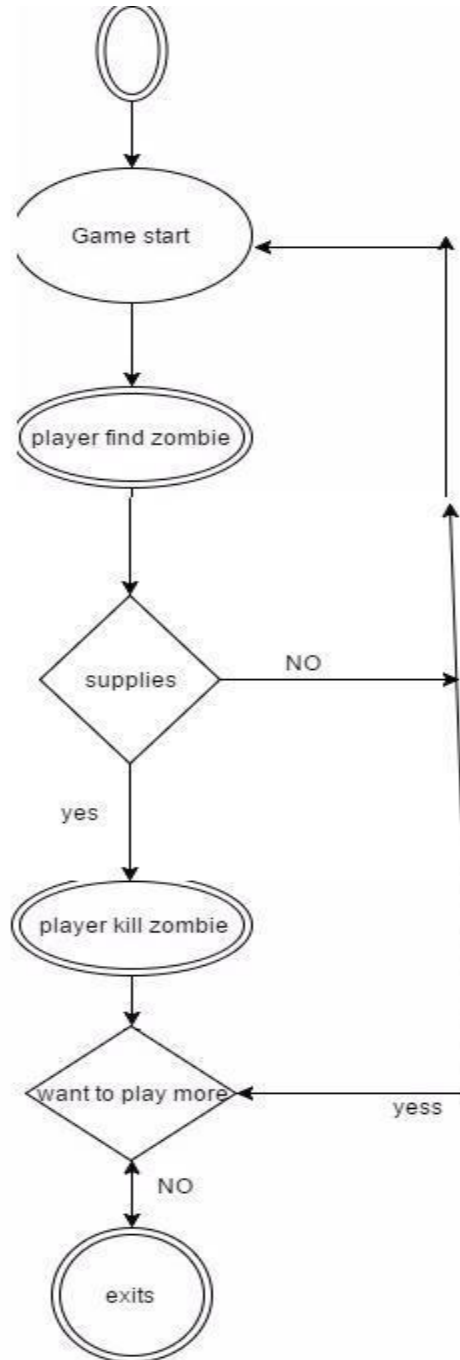


[Fig 4.2]Sequence diagram

When the player open the application the main menu is displayed, the time player start the game the main scenario appear on the screen .The main scenario is the real world environment in which a 3D model which is the zombie appear using the geo-location .The player have to find the zombie by navigating the real world environment and kill it by using the supplies .After playing the game the easily exit it.

4.3 Activity diagram:

Following is the activity diagram for the proposed game.



[Fig 4.3] Activity diagram

When the game begins the player start finding the zombie, zombie can appear at different located at different time. When the zombie appears on the screen the player aim at the zombie and by using the supplies and the guns the player kills the zombie. If the player wants to replay the game

4.5 Low level language:

In low level design we discussed our interfaced view:

4.5.1 Interface view:



[Fig 4.4]

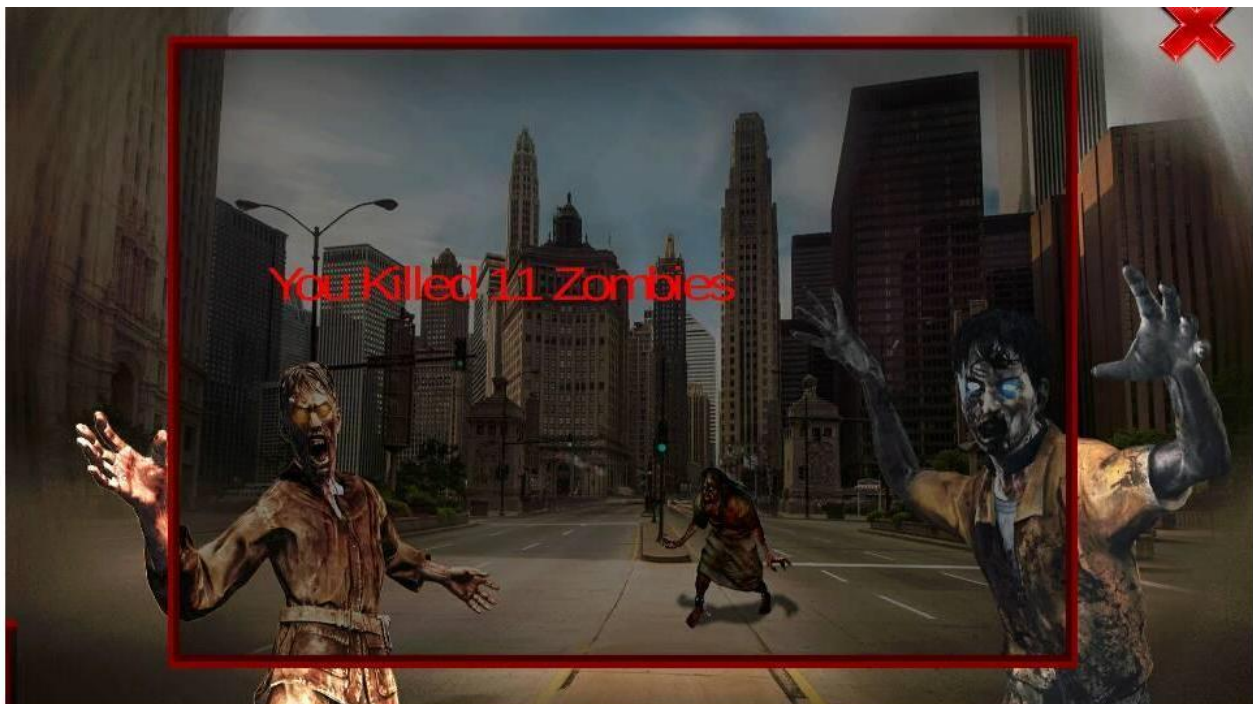
The above image is the main interface or main menu of our proposed game .When you select the game from the menu list of the android phone this is the first thing that appears on the screen .It consist of three options .

1. **Play:** if the player wants to start the game then they will click Play.
2. **Instruction:** if the new user doesn't know how to play the game they can check the instructions.
3. **Carrier :** By clicking Carrier the score of the player will be shown



[Fig 4.5]

This screen appears when the player press the instruction button, these instruction helps the player to play this game .The player has to aim at the zombie in order to kill it .When the aim is exactly on the zombie the game will notify that it is ready to shoot then the player has to click the bullet button for shooting the zombie.



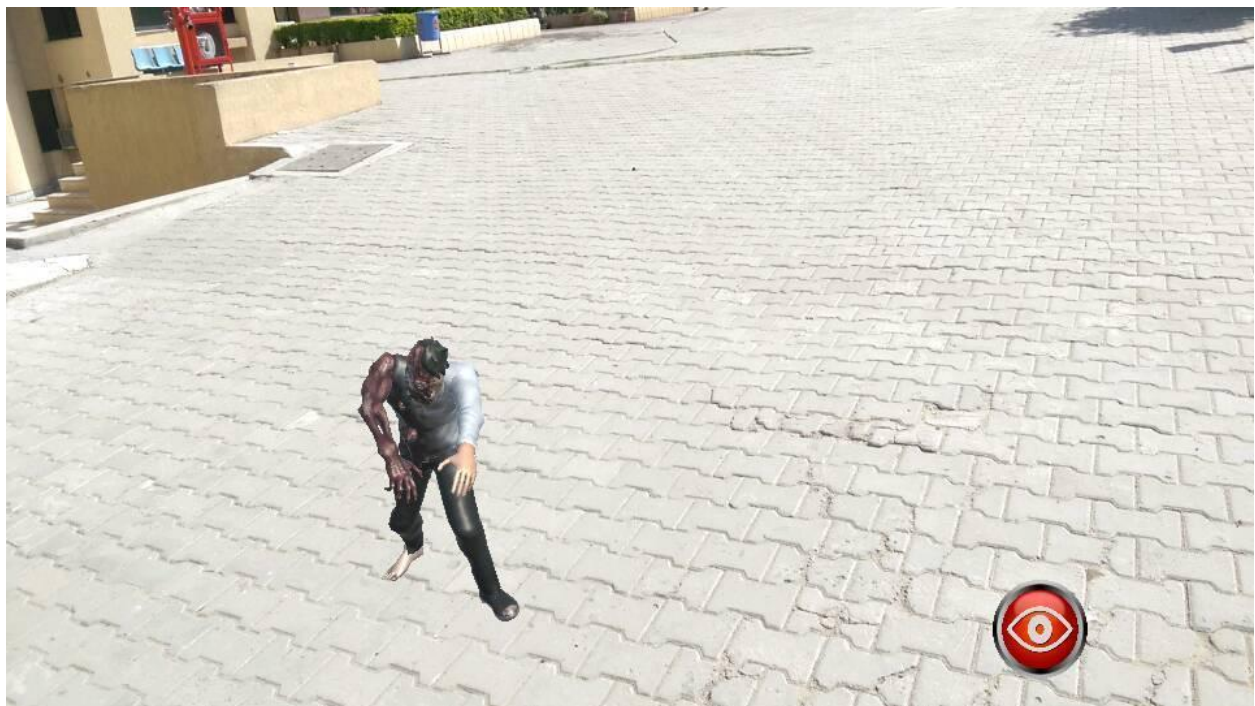
[Fig 4.6]

The above screen appears when the player press the carrier button, then the save scored or the number of the zombie the player has killed is shown.



[Fig 4.7]

The above image is of the real world environment in which you have to find the zombie which is the 3D augmented model.



[Fig 4.8]

The above image show the zombie which is the 3D augmented model appear on screen as it is present in the real world environment



[Fig 4.9]

In the above image it shows that the player is ready to shoot at the zombie that appears on the screen. By clicking on the eye button the gun will appear on the screen.



[Fig 4.10]

In the above image it shows that the player is aiming its gun towards the zombie so it can get the perfect shot.



[Fig 4.11]

In this image the player is shooting the zombie in order to kill it. The player has to shoot three times in order to kill the zombie



[Fig 4.12]

The above image shows the dead zombie that we have killed by shooting it for three times.

Chapter 5

System Implementation

Chapter Overview

Implementation is the process in which we can move an idea from concept to reality .The system implementation is an understanding of a technical specification for a program software component, or other computer system through programming and development.

5.1 System architecture

The system architecture is a high level logical representation of applications which shows that components a system will have and how they are connected to each other

Zombie fighting game based on augmented reality is a first person shooter game, which we have implemented through Unity5 .This game is developed by using C-sharp Scripts which were integrated into unity.

First of all we have created and designed our major character i.e. the zombie which is a 3D augmented model in Fuse Adobe software. After creating the 3D model we have worked on the animation using the same software. Secondly we worked how to set our 3D model in the real world using the gyroscope. Thirdly we have design a shooting mechanism using Unity5. In the end we have design whole interface of our game.

A C-sharp script contains code for giving life to the player. These scripts contain codes for zombie movement, shooting mechanism and the implementation of zombie in the real world. FPS is also developed using C-sharp scripts. The ground on which the player plays the game is known as terrain in unity.

5.2 Tools

Following are the tool which are used in developing our game

5.2.1 Unity

Unity is a cross-platform game engine tool which is created by the Unity Technologies that provides the Game developers the ease to develop a game. The game includes video games for Personal Computer, console, mobile devices and websites. Unity is also notable for its ability to target games to multiple platforms [9].

5.2.2 Fuse Adobe

Adobe fuse CC (character creator) is a 3D computer graphics software which is created by Maximo that, allows the users to create 3D characters .It main function is that it create a 3D character. This software is client based product that lets the user to choose and modify character components such as the body parts in real time. User can also customize the characters according to their needs [10].

5.3 Component

The zombie fighting game is developed on unity5 by integrating C-sharp Scripts and other component .There is directional light provided by unity which is act like a sun (lighting the game). There is main camera with the help of which we interact with the real world.

5.4 Language

The language used in our game is C-sharp scripts.

5.5 Communications

All the component are providing functionality to each other .The shooting mechanism provides the shooting functionality to the player ,whereas the implementation of Zombie in real world display our 3D model on our screen .

Chapter 6

System testing and evaluation

Chapter Overview

System testing of a software or hardware is a process testing that is conducted on complete, integrated systems compliance with its specified requirement. Many projects fall down due to bad evaluation .In order to complete the development process of the software is required. Testing ensures that our project developed is working according to the requirement .It will also make it sure that our project is free of any errors .this chapter provide the detail testing technique that are used to check the systems performance .In this chapter we have design our test case that evaluate the functionality and the interactivity of the system.

6.1 Software testing techniques

There are number of testing techniques that can be utilized to test for system accuracy and any errors. The methods we have applied in testing are discussed in detail and projects response is seen under each

6.1.1 Graphical User interface

Graphical user interface testing is an important aspect of testing. The GUI acts as an interactions between the user and the software, it explain the user how to use the system in a sufficient manner. It should be easy and simple to use so the new user can interact with the system easily .In our project, GUI consist of the menu and the interface which run efficiently and correctly

6.2 installation testing

It is one of the important testing. This testing checks the installation of our game .this testing only focus on two things: installation is complete and verification of any functional or non-function characteristics that may be affected

Test case of our application are given below

6.2.1 Test case 1

To check whether the game is installed properly

Test case ID	TC-1
Description	The game is to be installed on an android phone
Application for	Android phone with camera ,GPS and internet connection
Requirements	Game must be installed on an android phone with working GPS
Steps to be taken	Run/open the game on android phones

Expected result	The game is installed and now you can play it
Actual result	The game is installed successfully
Status	Success

[Table 6.1]

6.2.2 Test case 2

To check whether the game launches without crashing

Test case ID	TC-2
Description	The game should start properly
Application for	Android phone with camera ,GPS and internet connection
Requirements	The game should launched when selected from the android phones by the user
Steps to be taken	Select the game from the android phone menu
Expected result	The game should launched without crashing
Actual result	The game is launched successfully
Status	Success

[Table 6.1]

6.1.2 Usability Testing

Usability tests were done to make the user get the best experience with the software, each of the usability principal i.e. visibility, the mapping of conceptual model which provide hints to the new user.

6.1.2.1 Test Case-2

Test case ID	TC-2
Application for	Android phone with camera ,GPS and internet connection

Description	To ensure that the application is executed when installed
Steps to be taken :	Run the game
	Verify if the startup scene is executed
	Verify the game is working or not
	Verify the control and functionally
Expected Result	The game should be working properly
Actual Result	The game is working
Status	Success

[Table 6.2]

Chapter 7

Conclusion

Our game is a first person shooter (FPS) game based on augmented reality in which the user can kill and fight zombie by interacting with the real world .This game is now performing all the feature that we have mentioned in our proposal .The zombie fight game based on augmented reality is a mobile application game that can easily be installed in any android phones.

The implementation of this game started with creating an augmented 3D model with the help of the Adobe Fuse tool. By using the value of longitude and latitude of GPS we had displayed our 3D model at different location in the real world environment. After creating the model we then worked on the animation of the game. Shooting mechanism is used to kill zombie was design by using the Unity5 tools. In the end we worked on the interface and the designing of our game. This game is quite easy and attractive to play around the house. A new user can easily understand the instruction of this game.

In future we will try to enhance our game by developing it into a multiple player game and further we can add different level and mode so it can attract more users. Mode can be of two types: time mode or free time mode .In time mode player will have limited time to kill the zombie whereas in free mode the player will have unlimited time to kill the zombie. Different difficulty will be added to the different levels of the game .We can increased the number and types of the supplies that can be used to kill the zombie .We will try to add different types of zombie.

References:

- [1] The Mobile App Market will be worth \$27 Billion in 2013 as Tablet Revenue Grows, ABI Research, and Research News .Accessed: June 2013.
- [2] Vision Mobile, Plum Consulting. Accessed: September 2013.
- [3] <https://recombu.com/mobile/article/what-is-pokemon-go-game-gaming-ios-android-new-mobile-ar-augmented-reality-explained#> Accessed: Sep 2016.
- [4] https://en.wikipedia.org/wiki/Virtual_reality Accessed Sep 2016
- [5] https://en.wikipedia.org/wiki/Augmented_reality Accessed: Sep 2016.
- [6] “What is augmented reality (AR)?”
<http://whatis.techtarget.com/definition/augmented-reality-AR> Accessed: Sep 2016.
- [7] https://en.wikipedia.org/wiki/Pok%C3%A9mon_Go Accessed: Oct 2016
- [8]. <http://opticsgamer.com/14-amazing-augmented-reality-games-for-android-ios/> Accessed: March 2017
- [9] [https://en.wikipedia.org/wiki/Unity_\(game_engine\)](https://en.wikipedia.org/wiki/Unity_(game_engine)) Accessed: March 2017
- [10] https://en.wikipedia.org/wiki/Fuse_Character_Creator Accessed: March 2017