# Software Requirements Specification

**for**

# Fire Ball Game

**Version 1.0 approved**

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**Team 5**

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# 1. Introduction

## 1.1 Purpose

*The purpose of this document is to enlist the requirements for the game Fire Ball, created for the Department of Multimedia development revolving around Metaverse and Omniverse.*

## 1.2 Intended Audience and Reading Suggestions

*This document is for all the members of team 5. This includes Aishwarya Reddy Mannem, Rakshana Bagavathi, Aneerban Chakraborty, Anirudh Reddy Gotike, Rohan Maheshkumar Aswani, and Manak Rajeev Agarwal. This document is also for the Project Director Ms. Simranpreet Kaur and Dr Aznam Yacoub. The SRS should be used by the team for the complete pipeline.*

## 1.3 Product Scope

*This project aims to provide a fun and engaging game for all individuals. It will incorporate the concepts of Augmented Reality to make the game feel more intuitive to play. This focus on Augmented Reality also gives the opportunity to the user to interact with real world objects in a virtual setting, fulfilling the Metaverse and Omniverse need of the user. The project also aims to add a multiplayer feature that will allow the users to interact with each other and meet new people virtually. The multiplayer mode is focused to promote mental health in the post-pandemic era and promote healthy interactions with others. The game is also based on physical movement by the user, promoting health and fitness, through its facial tracking for the user input.*

# 2. Overall Description

## 2.1 User Needs

*The planning to develop this game has been done by keeping in mind the things that were required by the customer and our analysis of how the game could help other people. The requirement of having a game in metaverse or omniverse, it was decided to make a game in Augmented Reality (AR). The game should be a stress buster for those who are not able to go out due to the pandemic, it should also involve physical activity and interaction with the outside world digitally. So, we propose to make a game that will solve all of these problems. The game will be played on windows devices and can be played solo or multiplayer and even in localhost and online. To score in the game, the user will have to dodge the fireballs and collect the in-game currency.*

## 2.2 Operating Environment

*The first phase of development, which is the ten-week period focusses on the Windows PC version of the game. Additionally, the game is planned to be ported to both Android and iOS platforms. It will be developed using C# and Unity engine for cross-platform support.*

## 2.3 Design and Implementation Constraints

*The project is on a strict timeline with limited workforce. The team is only a group of six engineers that will be working on this game for eight weeks, putting 500 hours altogether on the project. Any adjustments or requirement changes that go beyond this document will take a longer time.*

# 3. Features and Requirements

## 3.1 Functional Requirements

1. *The game must include a component of "metaverse" or "Omniverse".*
2. *It must allow users to interact with the real world.*
3. *It must have the functionality to interact with other players.*
4. *It should be able to access a live video feed of the user's environment using a webcam or camera for the AR component.*
5. *It should allow and encourage users to move around in their environment.*
6. *It should be fun and engaging.*

## 3.2 External Interface Requirements

1. ***Camera**: The game requires a webcam/front facing camera on the device to function.*
2. ***Computation**: The game uses face-mesh deep learning algorithm based on TFLite to allow smooth functioning on mobile devices.*
3. ***Internet Connectivity**: The multiplayer mode requires good internet connectivity for a smooth experience.*
4. ***Surroundings**: Being an AR game, the user surrounds play a part in the gameplay, therefore it is recommended to have ample space to move around in the camera frame.*

## 3.3 Software Interfaces

1. *Game Environment and Application: Fire Ball is a free-to-play game that will be launched on Windows PC and ported to iOS and Android in later stages of the development. It works in an Augmented Reality setting.*
2. *Pick your Look and Customize your character: Players enjoy having a say in how they look, and this is something that can be seen in this game. Players have the option of selecting their favourite character as an "Avatar". The player can use their in-game currency to unlock/purchase their favourite character, which can be a fun way to spend money on something they truly desire.*
3. ***Promotes physical Health:** This game is a simple and inexpensive technique to encourage physical activity, Players can manage their stress in a better way and can enjoy the game.*

4. ***Helps to socialize while self-isolating:*** *This game serves as a potent opportunity for players to socialize with new friends.*
5. ***Language and framework used:*** *This game will be created in Unity using the C# programming language.*
6. ***Target users:*** *Fireball will be played by users of all age groups.*
7. ***Levels of the game:*** *The game is an endless genre game. The difficulty gradually increases with the player's score.*
8. ***Start camera:*** *The game can be accessed through the camera, which can be the webcam or the front camera, depending on the user's device.*

### 3.4 Communications Interfaces

*<Describe the requirements associated with any communications functions required by this product, including e-mail, web browser, network server communications protocols, electronic forms, and so on. Define any pertinent message formatting. Identify any communication standards that will be used, such as FTP or HTTP. Specify any communication security or encryption issues, data transfer rates, and synchronization mechanisms.>*

## 4. System Features

1. ***Room****: It is defined as a virtual session where at most 2 people can connect using a single 6-digit code. The code must be generated by one of the game participants and the room code must be communicated to other game participants explicitly.*
2. ***Action Reflection****: When the players are in a room, their score and body movement will be reflected on each game participant's screen.*
3. ***Avatars****: For the detected body in the video feed, the face can have a filter from a given list of filters already provided by the game. Each individual face filter is termed an Avatar. The number of avatars is limited to 10.*
4. *Modes: The game will provide three modes of play:*
   a. ***Single Player****: This mode is defined as one person playing the game standing inside the bounds of the camera frame.*
   b. ***Multi-Player (Online)****: This mode is defined with a maximum of 2 people joining into 1 room and playing together. Action Reflection will perpetuate to all the participants.*
   c. ***Multi-Player (Random)****: This mode is extension of (b) and is defined by the pairing of a user with another user randomly online.*
   d. ***Party Mode (Local Multiplayer)****: This mode is defined with a maximum of 2 people standing within the camera frame and playing the game together.*
5. ***Menu****: The menu of the game is defined as the options visible to the user where he can navigate to choose the* ***game mode, create a room, see the high score, choose an avatar.***

## 5. Other Nonfunctional Requirements

### 5.1 Performance Requirements

*The game should function smoothly without any errors, meeting the demands of the majority of users, and the processes will be monitored to maximize performance.*

## 5.2 Compatibility

*Initially, the game will be a PC standalone version and later followed by mobile platforms like iOS, Android. Updates will be issued on a regular basis, and compatibility with the majority of versions will be ensured.*

## 5.3 Software Quality Attributes

*The application must deploy all the features listed in the game menu without latency or glitches, and it must be extensively tested by the testing team.*

## 5.4 Availability

*We don't require any specialized, expensive, or difficult-to-acquire devices for this game, so users may play it simply on a PC or a mobile phone.*