

## Brave: A Virtual Reality Game

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**Abstract**—Virtual Reality has a wide range of applications whether it be in educational, medical or gaming. There is a huge demand for Virtual Reality in gaming industries as due to this immersive technology gamer feels he/she is part of gaming environment rather than a mere observer. VR game is a powerful tool to depict mental illness of the patient as mental illness is often underestimated and misunderstood. This will help to educate masses about it and in a way create awareness and eradicate its stigma. We trying to develop a game on the theme based on social anxiety.

**Keywords**- Blender; Unity; Social Anxiety; C #; Virtual Reality

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### I. INTRODUCTION

As computer and video games have exponentially increased in popularity over time, they have had a significant influence on popular culture. Gaming can both be entertainment as well as educational. Gaming industry is still a growing industry and has great potential to deal with more educational and serious type of games. When games are not just about entertainment but also provide a larger, more serious purpose, like educating about social issues, behavioral changes (such as to improve health), they are called **serious games**.

An application area with much potential is when games are used for mental illnesses. Games provide an interesting way to educate masses about such serious issues through entertainment.

However, not all parts of such issues are generally seen as "entertaining," and so it remains a question whether games are always appropriate.

A way to make these games more immersive and interactive is using virtual reality. VR provides higher user involvement. This is done through stereo visualization, body interaction, large playing spaces, etc. Apart from all of these, VR provides greater degree of immersion. Virtual reality has a property called 'transparent immediacy' [1] which allows users to forget the existence of media and believe that they are in the virtual world.

Mental illness can be a tough battle for anyone to fight, and the social stigma that often accompanies mental illness can make someone's struggle even more challenging. One of the hardest things about depression is getting a non-depressed person to understand what you're going through. It can be exhausting to explain why you can't just "cheer up" and that what you're feeling is more than just "the blues". Games that operate as actual representations of depression can not only help you better explain what you're going through more effectively, but seeing your struggle recreated by someone you've never even met can help you feel less alone and better understood [2].

VR games can help cope with psychological issues, such as, anxiety. Hence, in this game, we are trying to inculcate these concepts in a story revolving around the protagonist's

life and their struggle with an anxiety disorder, and how it affects their decision making, which in turn will provide an insight into such disorders and cause awareness.

We are using Unity Engine and Blender software to develop the characters and environment for the game [3].

### II. INVESTIGATING RELATED WORK

Comparison of technologist used and their advantages as follows "Table.I" [3]

Referenc e No.	Technology Used				
	Unity 5.3	VR Gear (Samsung )	Blende r	Wireless Electroc ardiogra m (ECG)	C#
[4]	Yes	Yes	NA	NA	Yes
[6]	NA	NA	Yes	NA	NA
[7]	NA	Yes	NA	NA	NA
[8]	NA	NA	NA	Yes	Yes

Table I. Comparisons of Technology Used

Refer ence No.	Advantages				
	AI navmesh generatio n	UV mappin g	Social inclusio n	Sculptin g/Painti ng	Enviro nmenta l Educat ion
[4]	No	No	No	No	Yes
[6]	No	Yes	No	Yes	No
[7]	No	No	Yes	No	No
[7]	Yes	No	No	No	No

Table II. Comparisons of Technology Used

### III. PROPOSED SYSTEM

In this game we will be creating certain scenario which will be in situation form. Now user will take decision based on his/her understanding this decision is will generate other predefined situation and user will again have to make choice. In between, mini games are provided to keep the player interested. The scenarios are designed with the help of a psychiatrist to get accurate representation of situation and questionnaire will be provided to user and his/her answer and behavior will be recorded. Now system will analyze user choice and give him end result. The flowchart “Fig.1” of the proposed system is as shown.

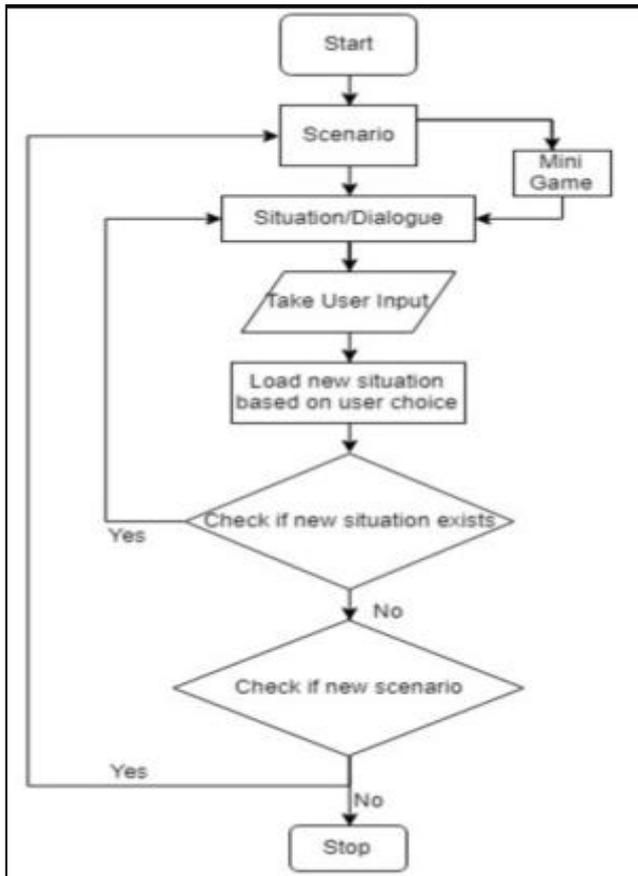


Fig 1 Flowchart of the proposed system

### IV. IMPLEMENTATION

We are using Unity Engine and Blender software to develop the characters and environment for the game. Unity is, in short, a closed-source, cross-platform game development application. You create your game by manipulating objects in 3D and attaching various components to them. Scripts are written in C# (recommended), Boo or UnityScript and attached to 3D objects as components. Big game titles including "Fallout Shelter," "Temple Run," "Monument Valley," "Battlestar Galactica Online," "Assassin's Creed: Identity" and "Hearthstone: Heroes of Warcraft" are made with Unity.

Blender is a professional, free and open-source 3D computer graphics software toolset used for creating animated films, visual effects, art, 3D printed models, interactive 3D applications and video games. Blender's features include 3D

modeling, UV unwrapping, texturing, raster graphics editing, rigging and skinning, fluid and smoke simulation, particle simulation, soft body simulation, sculpting, animating, match moving, camera tracking, rendering, motion graphics, video editing and compositing. It further features an integrated game engine.

The block diagram "Fig.2" of the proposed system is as shown.

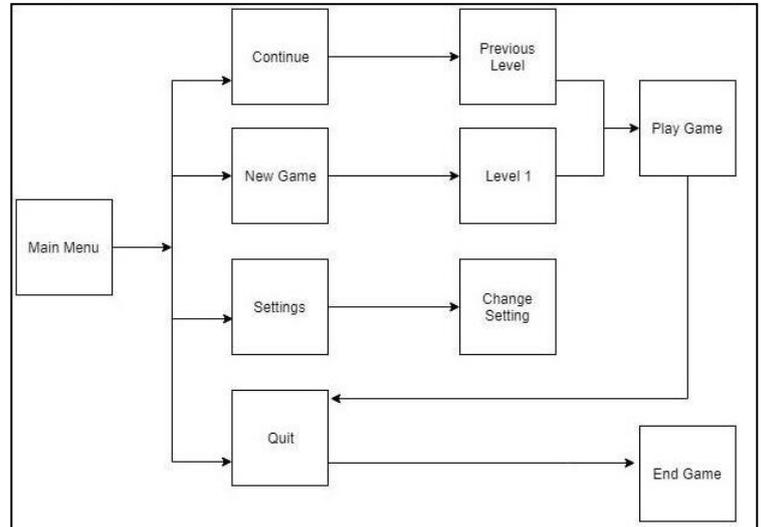


Fig 2 Block diagram of the proposed system

#### A. Design

The workflow of this project started with some initial basic design concept. Our goal was to create a simple character who was going to be our protagonist. We then created a base mesh. New polygons and faces were added where necessary. To increase detail and decrease processing time, a Multiresolution Modifier was used. This generated a Normal Map. Then we added textures and color, other minute details were added to the model. After texturing the modelling, lighting was added, and details optimized. Then rendered a high-quality snapshot of the created 3D model.

The base mesh for this model is that of a typical human face. The modelling started out as a single plane and basic 2D mask like design was obtained, “Fig.3”.

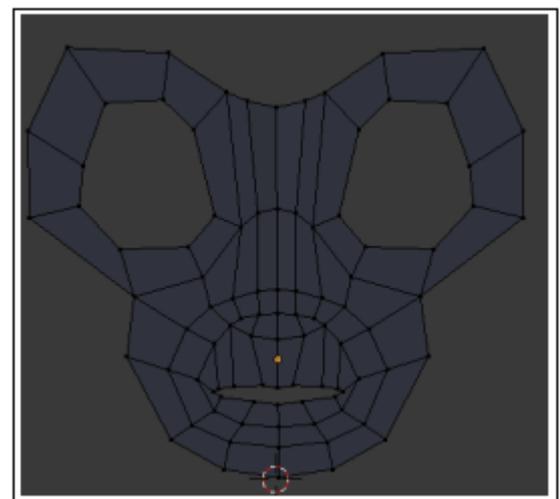


Fig.3

Then this structure was used to build a 3D model of the face, “Fig.4”.

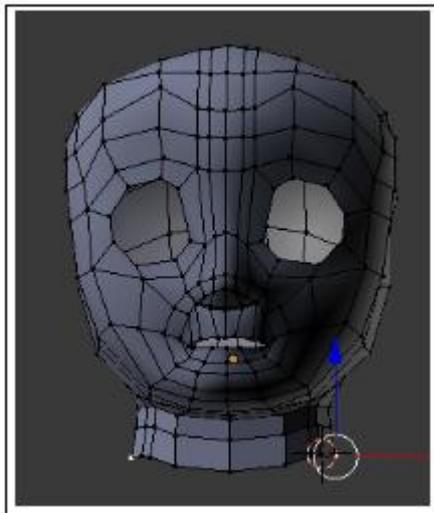


Fig.4

Then we modeled the entire body by extruding the faces and scaling when needed. The final model looked as follows, “Fig.5”



Fig.5

Then we added texture and rigged the model. Rigging basically means adding control points to object for animation purpose. Final product after rigging is as follows “Fig.6”.

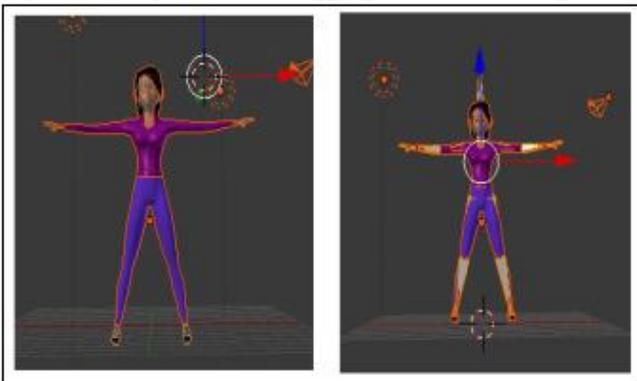


Fig.6

The different animation phases like idle, run and jump are added to the object using Blender. In blender object can be animated in many ways such as changing the position of whole object, changing position of certain points in object or relative movement of object based on another object. The animated model looks as follows “Fig.7”.

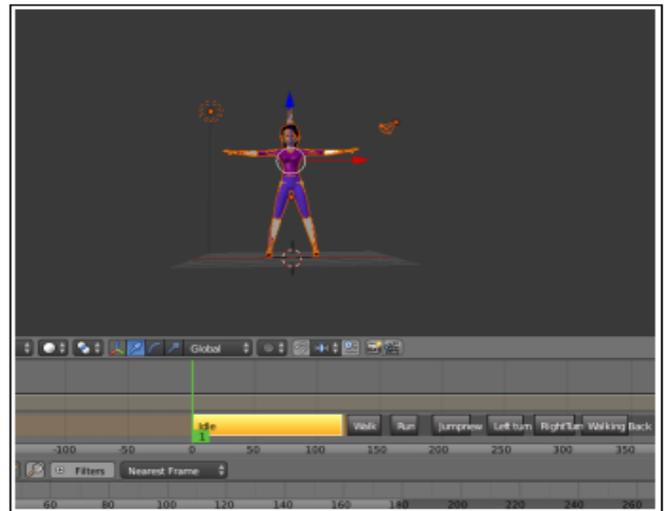


Fig.7

Environment is designed using blender as well “Fig.1”



Fig.8

### B. Integration

The character modeling and environment designing is done in modules and for the game to be a continuous system these modules are integrated together.

The character and environment file are exported as .fbx files, which are then imported in Unity for integration. After file was imported in Unity we had connected the required animations in Animator provided by Unity, here we can control how animation follows in our project and is default animation of object. Now, this animation is triggered using C# script. As shown in following figure “Fig.9” we can see transformation of animation from one to another after a certain key is pressed.

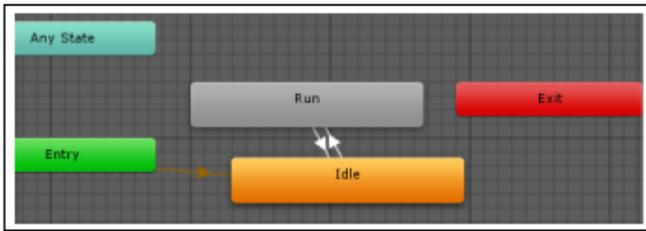


Fig.9

VR camera is set as character child in the game so that it always follows the character. The final scene looks as follows “Fig.10”



Fig.10

After the character is set in the environment, the collider, gravity and rigidness are added to an object. By doing this object behaves as real life physical object i.e object is subjected to all laws of motion.

In our game the protagonist is suffering from social anxiety, as a result thing like giving a speech in a class is a big deal for her. She is in a classroom where she comes to know that she has to give a speech as an assignment, for which she has go to the auditorium. While going to auditorium a mini-game is triggered, which represents her mental turmoil. Here she has to tackle hurdles in her path by jumping or changing direction. If she fails to do this game will be over or game will move to next level.

We have designed the first version of the game till now and in future we look forward to adding more mini-games, and an in depth story with dialog. Final game scenes are shown as following “Fig.11” to “Fig.15”

Menu screen of the game.

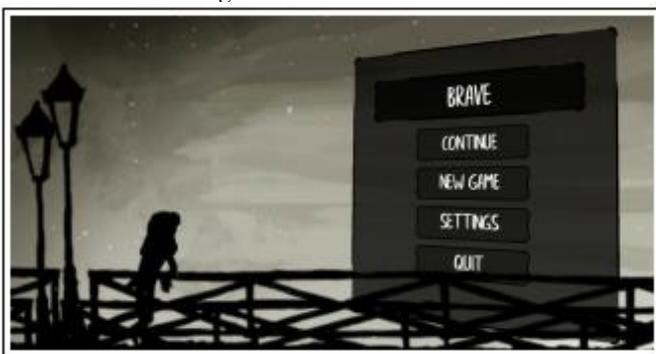


Fig.11

Here “Fig.12”, the character is in the classroom from where the game begins and she comes to know that she has to go to the stage to give a speech. During her way from classroom to

the hall, she comes across many hurdles and puzzles which in a way represents her mental turmoil and anxiety.



Fig.12

In this mini-game “Fig.12” the player has to avoid the barrels and reach at the end.



Fig.13

Here “Fig.14” player has to do as directed in the instruction and solve the puzzles.

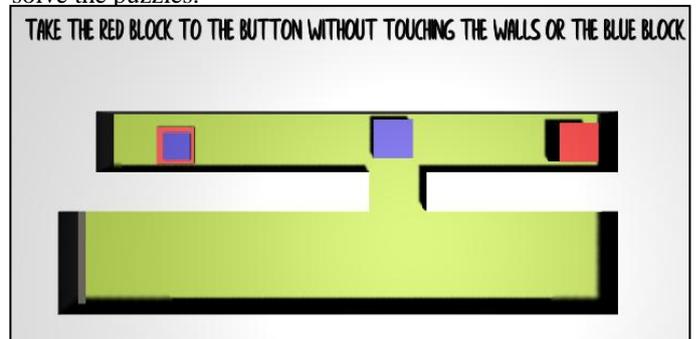


Fig.14

In this part “Fig.15” the player has to cross the bridge without falling in holes or pits.

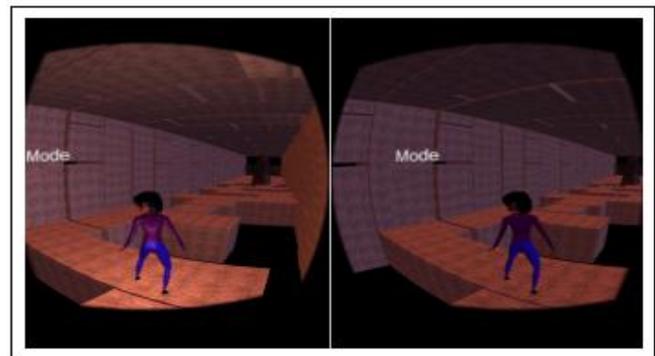


Fig.15

Here "Fig.16" we have our character (The blue light) and her clone(The red light) who imitates the movements of the main character. This clone is nothing but her fear and the anxiety she suffers through. Player has to play in such a way that main character should reach the blue ground without coming in contact with her clone i.e main character and the clone should never collide with each other.



Fig.16

After completion of all the puzzles and mini-games you successfully reach the final scene "Fig.17" will load.

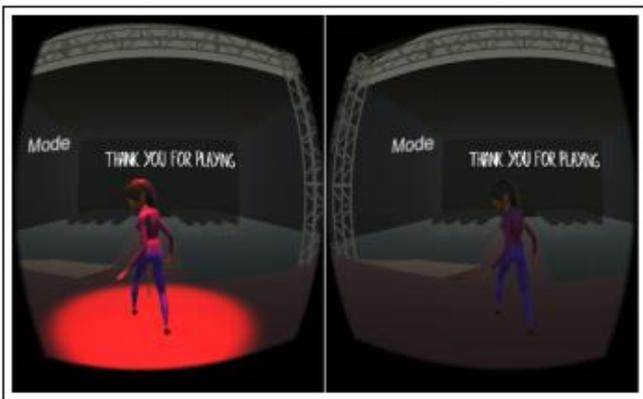


Fig.17

## V. CONCLUSION

This game is aimed at creating social awareness about mental illnesses and also in a way depicts the inner state of a person suffering from anxiety. Also, mini-games in the game help release anxiety for the player. The use of Blender and VR technology makes the game seem more realistic. The game is developed in Unity using C# language.

## VI. FUTURE WORK:

We are currently working on the first version of this game which is yet to be complete. In the future version we will be exploring other psychological issues and different scenarios. Further we want to extend this concept to butterfly effect, where many of the game and choices the player makes will affect the final outcome of the game.

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