**The -.Shadow Fighter VR**

This is a game that we developed. Named Shadow Fighter VR. This game is straight out of a Sci-fi movie. Anyone who has heard of the Hugh Jackman movie, Real Steel may know what i am talking about. We have recreated the Shadow boxing Experience that Hugh jackman took over to his hand on the last round of the boxing match.

**What does it do?**

So you stand in fornt of the webcam connected to a PC. The webcam reads the video and using an opensource program called posenet our program reads your position. On the screen you can see the fighting arena and you can see your avatar. This avatar can be any one from our list. (Any 3d .obj model from the internet can be added as an avatar). You can see the opponent as another avatar (this is configurable too). The posnet reads your position and maps them to your avatar. So, when you kick or punch, your avatar in the game does the same. So now you have the basic idea.

**The GamePlay**.

The gameplay is simple. Here user can choose between two modes, 2 player, 1 player.

For 1 player mode:

the user stands a bit from the cam and the PC shows the digital arena. He uses a VR headset with our app running. The app shows him the first person perspective of the game. The app is in sync with the PC running the game. The Player then plays with punches with the opponent avatar and all the collisions are considered as points. In this 1 player case, the opponent is trained using a reinforcement learning algorithm. This helps in giving a immersive and intuitive gameplay. As we are using a pose estimation so we will score the player on what punch he uses and where he hits. The damages can thus be estimated for both the player and bot.\

For 2 player mode:

in this case it is assumed two players will fight against each other. So both the player follows the similar protocol to setup the game. Now in this case we will use cloud architecture to authenticate and match the players. The game will run on the players’ local machine. But again the cloud architecture is used to share the game information transmission between players and syncing. All the rest part of the gameplay remains the same, starting with full health bar. Each collision of punches will result in damage to the opponent and score to the hitter.

**TechStack**

we have used various technology lying in the given tracks for the hackathon. The posenet uses object detection and recognition that is JavaScript wrapped in python. The game on the PC is coded on C#.NET. The VR application is developed using Unity and Android. The opponent is driven and made to fight using Reinforcement Learning Algorithm.

**Beside The Game**

This technology of pose estimation and using the value in other works opens up many possibilities. It can be used to train people in martial arts or sports.

Using your natural pose to interact with the real world can be really useful and efficient at industry.

No controller can be more intuitive than human gestures. We can use this pose and gesture to move machines and vehicles. This would make the control more human and intuitive.

**Making Things Better**

The entire product can be revamped or reimagined in these following ways

1. PoseNet allow 15fps pose estimation. So the game is a little jittery. We are in talks of using a proprietary tech wrnchAI that uses better algo to visualise and estimate industry level pose estimation. This will allow the users a better user experience.

2. Using mutiple cameras for better accuracy and 360 degrees pose estimation. This can be easily done using mutilple webcams tied to one computer. This can be done using angle wise intermediation.

3. Using Augmented Reality adds a totally different sause this project and opens up many possibilities. But in return it takes away the immersiveness of VR. Using AR helps us to connect to the real world and interact with it. It widens the use of the technology. For example this can be useful for the dancers trying to collaborate or sport lesson from your fav player or learning self-defense. The usage is limitless.