Multiplayer and Collaborative Virtual Reality

Motivation
• There are many non 3D virtual collaborative applications like Google docs and overleaf where many users can collaboratively complete a shared task.
• However, there are very few applications in 3D virtual space which can be used collaboratively.

Introduction
• A multiplayer virtual reality game is created using photon and unity.
• Unity is used to crate virtual 3D game and export the gaming application to any platform including Windows, Mac, Linux, iPhones and Android phones.
• Photon is used for creating the networking environment so that many users can share their data with each other. Photon free package allows up to 20 players to join the gaming room.
• Unity provides a cross platform manager package so that this game can be played from any device. The players are capable of moving forward and backwards and rotating clockwise and anti-clockwise.
• Moreover, they are capable of shooting bullets at each other and each player has a health bar.

Game Environment

System Design

Survey Questions
• The gaming app was given to 5 groups with two members each and they were asked to rate the app based on following criteria from range 1 to 4.
• Overall User Experience – ratings based on user experience
• Performance/Latency – How good is the performance of the system
  1. Very Bad
  2. Bad
  3. Good
  4. Very Good
After playing the game following interface was presented to users.

System Working
• As shown in system design, the android device, iPhone and computer are trying to communicate with the photon cloud.
• All of them are running a same gaming application.
• The gaming application has a common AppID.
• Hence, they will be able to access the same space in the photon cloud.
• Hence, all the devices can communicate with each other.
• Moreover, the app running on each device has player movement control script and networking scripts.
• Using these scripts the player’s movements and their networking can be controlled on individual device.

Results

Conclusions
• The combination of unity and photon is good for creating virtual reality multiplayer games.
• Photon cloud provides many facilities for creating network. Unity allows to export a game to many different platforms like Linux, iPhone and Android.

Future Work
• The future works involves hosting this game on a big server.
• Currently the game supports at max 20 players at a time. In future, this game should be extensible to more than 150 players at a time.

References