A Gesture-Based PVP Game

Qiyuan Aixinjueluo
Department of Computer Science
Binghamton University
qaixinj1@binghamton.edu

Yue Pan
Department of Computer Science
Binghamton University
ypan13@binghamton.edu

ABSTRACT

Nowadays, Internet of Things becomes a popular topic in our life, all of things base on IOT such as smart home makes our life more comfortable. And we also need some game for entertainment. So we built a project called gesture-based PVP Game, the rule of game is based on paper, rock and scissor game. By using IOT device Leap motion controller and android smart phone, we can implement and play this interesting game.

KEYWORDS

Internet of Things ,Gesture capture, Android application

1. INTRODUCTION

Our team want to build a game with IOT technology. So we search on the internet to find some interesting game which can be implement by us based on the device we have. Finally we found the Paper-Rock-Scissor Game, which is one well known game in our childhood. The rule of this game is very easy, paper can beat rock, rock can beat scissor and the scissor can beat paper. Because we just have one leap motion controller, we decide to use android application us another input part, so that people can play game by showing gesture on leap motion part and also can using app to join in this game.

2. DESIGN

2.1 Hardware Components
2.1.1 Android Phone

XiaoMi6 is an android smart phone, which is used to run a client for this PVP game. This phone is enough to run our android application, and It is very easy to use this phone for testing the application because of its good performance. We also use the network module of this smart phone for socket transform.

2.1.2 Leap Motion Controller

The Leap Motion Controller is a small USB device using LED lights and infered camera sensors to track both hands and all 10 fingers, the special software detects your hands and fingers and translates the data into information for your computer.
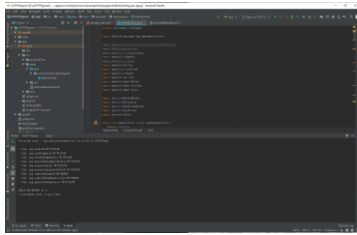
2.1.3 Amazon Lightsail

Lightsail is an easy-to-use cloud platform that offers you everything needed to build an application or website, plus a cost-effective, monthly plan.

2.2 Software Used
2.2.1 Android Studio

Android Studio is the official intergrated development environment for Google's Android operating system,built on JetBrains' IntelliJ IDEA software and designed specifically for Android development. It is available for download on Windows, macOS and Linux based operating systems.It is a replacement for the Eclipse Android Development Tools (ADT) as the primary IDE for native Android application development.

2.2.2 IOT PVP game Android application
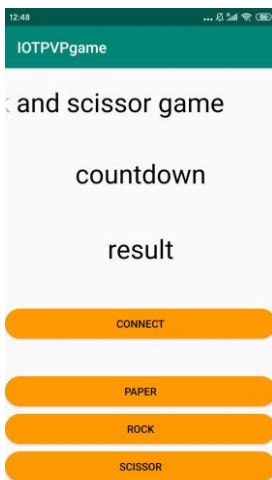
PVP game is an android application, Used as one client of our game, this application is implement by ourselves by using Android Studio.

2.2.3 Leap Motion Application
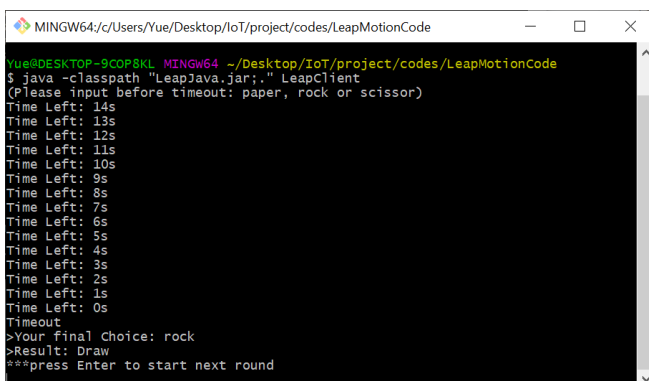
With Leap Motion SDK and Java library, my Java application extracts information of fingers frame by frame. In each frame, a finger is an object, and I use grabAngle() methods to get the angle of fingers. I recognize 3 gestures based on angle of fingers. After receiving countdown message from the server, the application starts to count down. It also prints gestures when the player changes gesture. After timeout, the final gesture is sent to server. Then the application print the result from server and wait for another round.

2.2.4 Lightsail Server
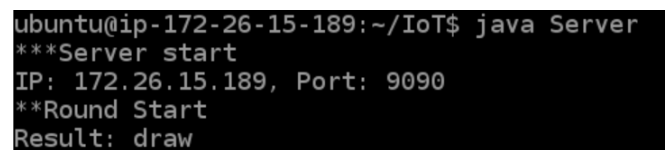
A Java server runs on Amazon Web Service lightsail. It waits for connections from two clients and matches up. Server sends countdown message to clients for synchronization, and receives inputs from client. It compares two inputs, determines who is the winner, and sends result to both clients.

2.3 OVERALL SYSTEM DESIGN
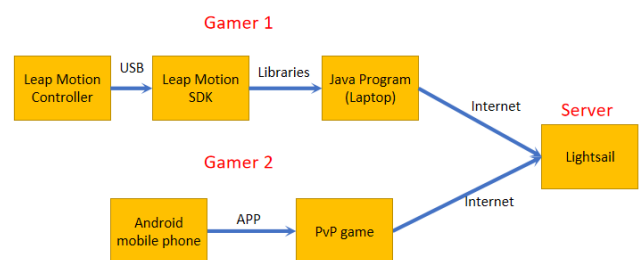
This figure shows our project design, we will have two client, one is our android mobile phone, another one is a laptop which connects to leap motion controller by USB port. Our server is running on Lightsail, which is used to decide who win this game. Each client is a gamer, with doing some gesture or click button, the scissor, rock and paper will be sent to the Server, after computing the server will send the result to both client.
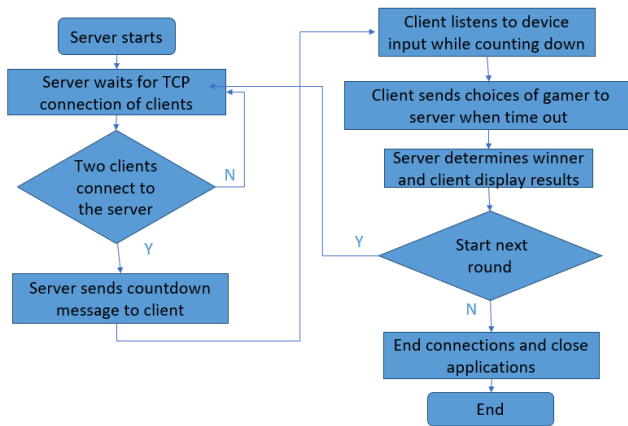
3.IMPLEMENTATION

The overall implementation is shown by this figure. Two gamer can make their choice when the connection is built success. There will be a countdown after both client connect to the server, each gamer can make their choice when client countdown. When the time out, clients will send their choice to the server and waiting for result. When the server get the both choices, it will determine the winner and send the result to both client. Then the clients can do next round or end this game.

4. CONCLUSION AND EVALUATION

In this report, we basically fulfilled the implementation of PVP Game. Based on TCP/IP protocol, we success to send data from PC client and Android phone client to our server, and then get the game result from the server. In general, we can play this interesting game already. You can also see our demo from the YouTube video.

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