Angel vs Devil

Project Idea Summary

Are you ready to fight with your internal (Devil/Angel) out? 'Angel vs Devil' is a nail-biting mix of fight between Angel and Devil. This game lets you equip either of your character with the weapons and armors that you can use as per your flexibility of gestures. Crush your enemy and be the victorious. Do you have what it takes to punch, stab & fence and slash your way to victory?

Project Details

We have developed an android based two-player game named 'Angel vs Devil'. You can play it with your friends over peer-to-peer network formed using WiFi-Direct without any internet connection! On first launch, you have to train the character and equip him with weapons as per your desired gestures. You have to train all the gestures according to the weapons/moves shown and once trained, repeat the moves and beat your enemy until you win the war between angel and devil. A background music is also added to make the environment feel like a real war between the characters.

Literature research

This is more a research-based project than a game. We have done literature research on different topics and studied the algorithms and modified it where we think it needs to be adjusted or altered as per our needs.

1. Gesture Research

For gesture recognition, we have analyzed *Wiigee* that was developed as a student project at University of Oldenburg, Germany and for the reason, defined in detail below, we have not used it in your project and instead used another tool/algorithm written by *German Research Center for Artificial Intelligence GmbH*.

a. Wiigee (a Java-based gesture recognition library for the Wii remote)

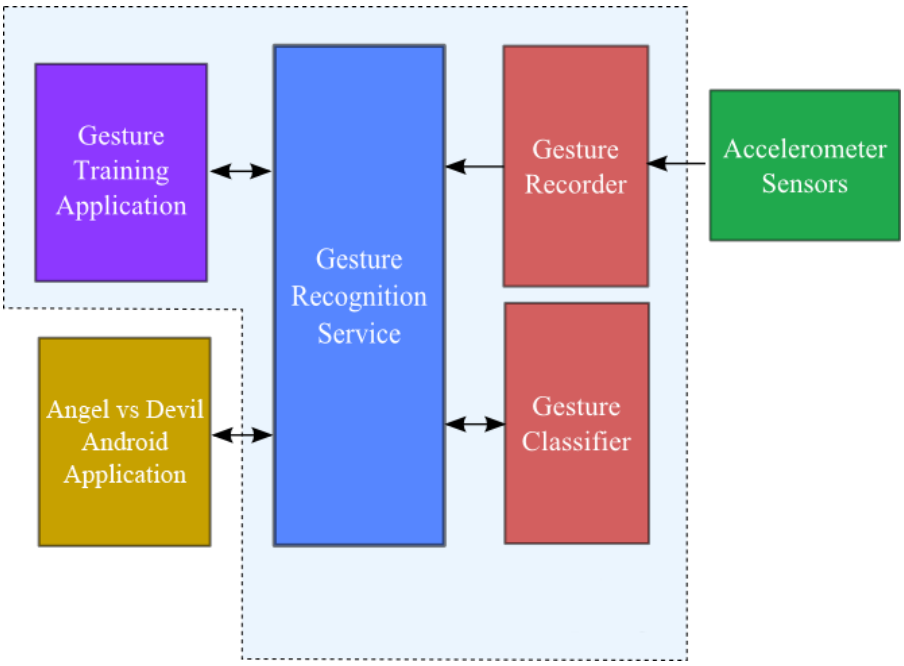
Wiigee has been developed as a student project at Media Informatics and Multimedia Systems Group at University of Oldenburg, Germany. Its main goal was to allow the training and recognition of arbitrary gestures using the *Nintendo® Wii™ remote controller* by utilizing state of the art probability theory methods. It delivers reliable results in a fast and efficient way and was made publicly available with the publication of the paper *'Gesture Recognition with a Wii Controller'* at the2nd International Conference on Tangible and Embedded Interaction in February 2008 [1].

Despite of its high accuracy, efficiency and fast results, and the best is that it requires the minimum amount of training the gestures and work quite near to perfection. We still have not taken this library to next levels since its accuracy was achieved if combined with high caliber

sensors in Wii controller *Wiimote* only and is not much accurate and fast using the sensor built-in mobile. Even we have not used this library, we got a little help in improving the other implementation we have used, using the implementation techniques in this algorithm/library.

b. Gesture Recognition Tool by German Research Center for Artificial Intelligence GmbH

This algorithm along with the library is a work of the master thesis at University of Saarland, Germany. It allows to record hand movement gestures by exploiting the accelerometers of an android smart phone [2]. We analyzed this algorithm and used its library in our project, the main flow of how we've record and classify the gestures using this library is defined as a flow diagram below. We have modified the library as per our need, as it is originally designed to return one of the trained gesture that it thinks is the best match and we made it to work and return the gesture only if it matches with some recorded gestures or should not return anything otherwise.



This library is responsible for training of gestures initially and store them for later use, also while the gameplay, when we need to classify/match the gestures and hit the opponent.

2. Communication Research

For the communication and message-passing between the devices to make the war feel like in real time, we have researched on three different types of communication techniques used in games for communicating data. Using a centralized server, to which the devices can connect and share the communication messages, or simply connecting over Bluetooth and using WiFi Direct. We have analyzed the scenario and used the best available solution. Below is the detail of why we do not used each or for what we have selected that.

a. **Using a centralized server on WiFi**
   For this we have to write the service using which the devices will connect to each other, this is an overhead to pass message over the internet and will introduce the network delays, and when there is no network available, you cannot play. Which make us think for the other options available.

b. **Using Bluetooth**
   To remove the dependency on internet or setting up some server we had an option to communicate via Bluetooth. This was a good idea but it is low range and most importantly incurs delay as it has low data rate. During our proof of concept (PoC) for communicating over Bluetooth, we found significant delays that is not bearable in games. So we rejected this implementation as well and look for other options again.

c. **Using WiFi Direct**
   Finally we opted-in for WiFi Direct and found it quite reasonable for communication, since it has peer-to-peer connectivity without any additional servers, internet connection or wireless access points and got high data rate for faster communication with a least possible delays, since it communicates over WiFi. It offers its services with greatly reduced setups.

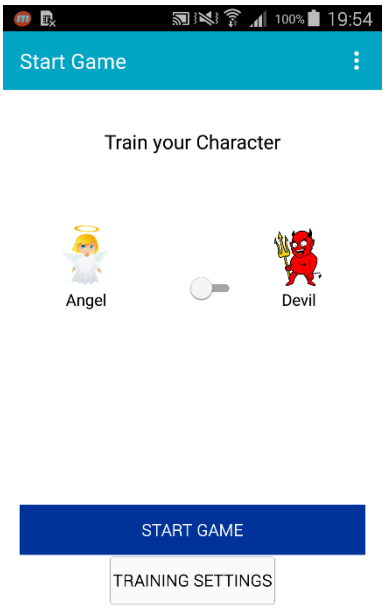
About gameplay

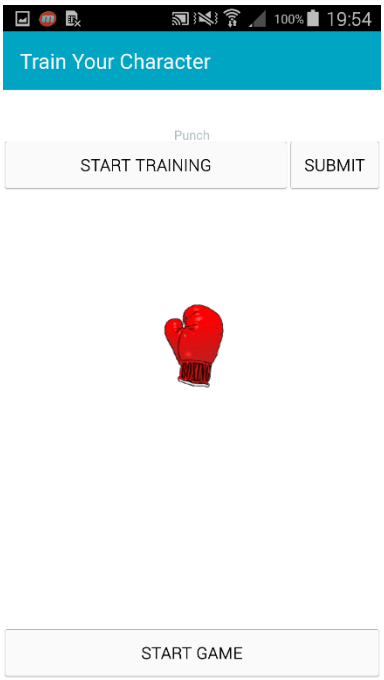
First you have to select the character of your choice, Angel or Devil and then for the first time when you play the game, you have to train your moves by recording the gestures against each weapon and the application will store them for future fights. After training you can then start the game by finding the partners near you within the range of your WiFi, you can select any of the available fighters within the range. The game is started when you both are ready and connected to each other. You make your moves using the smart phone as a weapon by moving it as per one of the recorded gesture(s). Your opponent is beaten upon by you and the specified amount of energy (life points) is deducted once hit. The stamina is required and is reduced on your each hit to the opponent and can regain it while blocking the other's moves. You can block the moves sent by your opponents by pressing the block button. The reason for not introducing the gesture to block the move and instead use a button is that you can hide it from your opponent to know if you're blocking it, or else the other person will not hit by that time and so the gameplay will be badly affected, since than there would be no surprising/thrilling factor left.

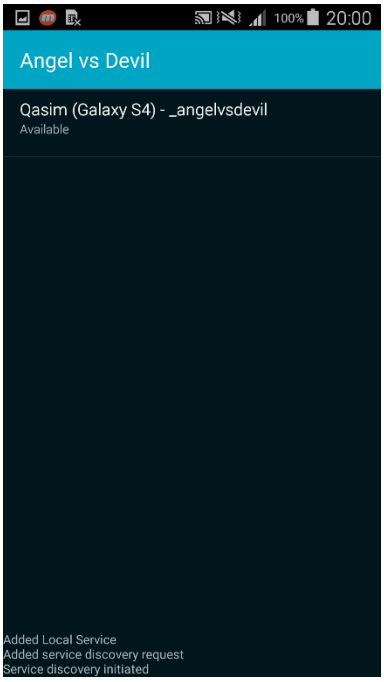
Sword, Knife, Punch or Defensive shield are the weapons, your player would be equipped with and can use either of them during game. For better user experience, use the gesture same as we originally use these weapons and just for fun, you could try different gestures for the weapons to disguise from your opponent and hit him without letting them know what you're up to.

Screenshots

Below are the screenshots/in-game preview of this game.







References

[1] Gesture Recognition with a Wii Controller

2nd International Conference on Tangible and Embedded Interaction (February 2008)

[2] TaKG – A Tool for Automatic Classification of Gestures Saarbrucken (March 2008)

Music Courtesy: The Mass by ERA