FATE WEAVER

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U0746929 Final Game Pitch

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Introduction

Fate Weaver is an augmented reality game. In this game, the scene happens on the table and the tablet/smart phone in front of the player, and the player interact with the game using his/her fingers, hands, head even the whole upper body.

I am very interested in augmented reality. I believe in the word "game is becoming real", augmented reality is definitely a direction. Because the augmented reality head mount is still in the early stage, cheap device like Oculus Rift hasn't been out to public yet, so the game would basically be based on the cheap devices already out: touch screen tablet or smart phone, and Kinect for Windows. The game changes the way we looking at the touch screen game, we interact with the object above the screen instead of on the screen.

Target Audience

The target audience would be casual gamers who are interested into non-core fun game play, ages from teen and above.

Requirement

Kinect for Windows

Touch screen tablet with rear camera, and QR code stickers on the back

A table(plane)


Figure 1 a QR code sample

Connection & Calibration

Tablet and Table Detection

All devices would be connected to the same Wi-Fi LAN to reduce the lag. Kinect should be mounted above the table to see the player's upper body and the table. Tablet is put on the table, screen showing QR code and color to do the calibration. After the calibration, the system would know the location and size of the tablet/phone, the location and the range of the table.

Game would show the player the table and tablet detected for the second check.

Table World

After the player left, the game would take a picture, and when the player arrives, the player would not be in the screen. So the game goes on the table, but in the game player cannot see himself in the screen
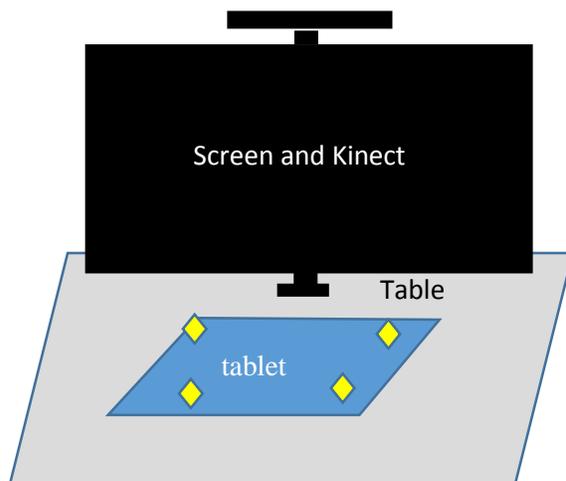
Figure 2 With the QR code on the tablet screen, the computer can know the location of the tablet

Fake Touchscreen

Player is also required to use sticks to point out the four corners of the screen, so the game would know the location of the four corners of the screen.
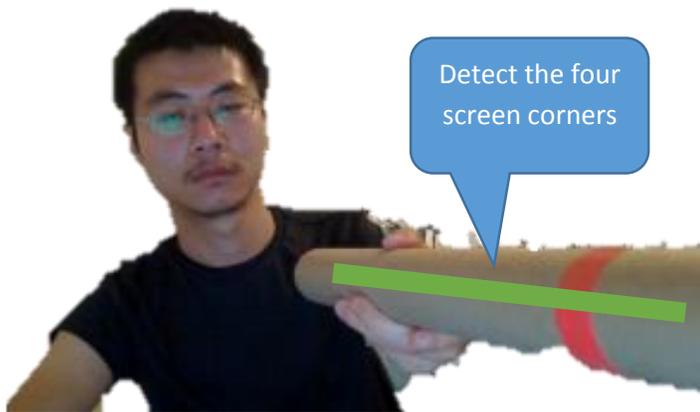
Figure 3 What Kinect sees when the player is pointing at the left top corner using a stick, later it can predict what the player is pointing at by only seeing the player's arm

During the game running, we could use the color on the tablet screen to do the re-calibration, to make sure the tablet/Kinect stays accuracy even if it got moved on the table.

Figure 4Example for mounting the Kinect for Windows, The screen and Kinect are on the same plane, to make sure Kinect can predict what the player is pointing at the screen

Basics Data Input

Hands Interaction Detected by Kinect

The player can interact with the game by the following ways: hands gestures, hands in the air, head moving, shout out loud. The game mainly use the upper body tracking.

Arm Direction Predicted Touchscreen Gesture

Player can touch the computer screen to select the object they want to use, control the menu and so on. Although the PC may not have a touch screen, as long as we keep the touching tiles big enough, the Kinect depth mapping can still figure out which part the player is trying to touch by seeing his/her arm. If this is a touch screen, things become much easier. Usually putting tiles not far from the four corners would increase the accuracy.

Data from Multi-finger Touchscreen Tablet

The player can interact with the tablet. Because tablet has multi-finger touching gesture detection built in hardware, it is much more accurate and faster than the gestures detected by Kinect.

Interface

In the beginning of the game, the player can choose start a new game, or select a level he already started. These are shown on the tablet.

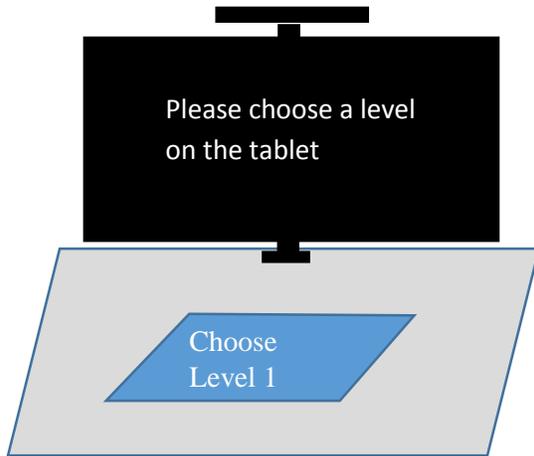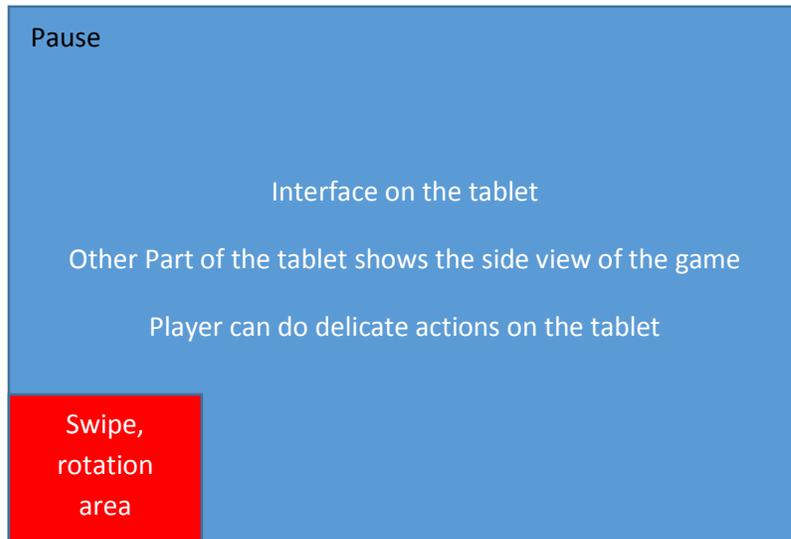*Figure 5 Screen notice the player to pay attention to the tablet*

Figure 6 In the game, the hero trying to overcome challenges, and the player's body indicator. The hero is drawn on the table in the real world. Player cannot see himself in the game (it is just a photo without player), but can see how can he interact with the game. The player eliminates the dangers to make sure the hero would keep going.

In the game, on the top left corner of the tablet, there is a pause game button. After pause the game, menus and options are shown on the tablet.

On the left bottom corner of the tablet, the player can change the camera by zoom, rotation and swipe gesture in the game. They are all detected by multi-finger touchscreen in the tablet.

Pause

Interface on the tablet

Other Part of the tablet shows the side view of the game

Player can do delicate actions on the tablet

Swipe, rotation area

Figure 7 Basic Tablet Interface

Putting the gesture area on the left bottom corner of the tablet would make sure the player can do gestures without looking at the tablet. Most of time player would just looking at the screen, not the tablet.

Player could use the swipe and rotation gesture to move the table world on the table, to get a better view. The camera automatically move towards the hero's moving direction as the hero moves, or stay static (Player can change this in the settings menu). The game is always on the table plane.

Gestures

Pat & Hold

There is a small monster on the table, player can pat it with his/her hand, so the hero can pass.

There is a trap on the table, player can put his/her hand on the trap, so the hero can step on player's hand instead of the trap.

There is a missile flying towards the hero, player can use hand/arm to hold it so it would not fall on the hero.

There is a long gap between mountains, the player can put his/her hand in the air so the hero can jump to player's hand, then jump again to go to the other side.

There are bullets flying towards the hero, the player can use hand/arm to form a triangle, and make the hero inside it to give the hero protection.

Figure 8 Player can use hand to offer the hero a shelter, picture comes from internet

Tablet Moving

Player can move the tablet to change the tablet location, so he/she can do further step.

There is a big monster on the tablet, move the tablet back and forth when holding a finger on the tablet (pretending nail) on the table (shaking), to make the monster lose the balance and fall.

The hero is about to fall, shake the tablet with a finger on the tablet to make sure the hero does not fall.

There are fires on the road, flip the tablet and hold to bury them and wait for the hero to pass.

Figure 9 Picture of an insect net, picture comes from internet

There is an insect net on the tablet, take the tablet up so some monsters would be captured in the net.

Tablet Eye

Player can take the tablet up and face the back of the tablet towards the Kinect. The tablet would use the rear camera to get video of the table, and player can see the virtual game objects on the table through the tablet screen. Player can do some remote action through this. For example, player can use the tablet as a machine gun to keep shooting at a monster.

The Kinect detect the tablet location by finding the QR code on the back of the tablet. If the game cannot see the tablet well, put more and more noise on the tablet screen to pretend a bad signal situation, and guide the player to the best angle.

Hand Mimicking

Figure 10 The gesture Kinect sees. The player pretend his hands is like a bird and flying.

Figure 11 Game based on the hand mimicking. Picture comes from internet.

Player's hands is a flying bird, and the hero is riding on the bird. The computer screen shows the mountains and monsters, the player helps the hero flying through mountains.

Head Moving

In some levels player would be drawn in the game. The monsters can attack player by shooting at the player's head. Player can move his/her head to avoid damage. Also, player can move his/her head down, and fire the flame to the table (ground) from the mouth.

Figure 12Player shown in the game, and fire the ground (table), picture comes from internet

Basic Story

The hero needs to go to save the princess. However there are a lot of difficulties await him. You cannot control the hero, but you can eliminate the dangers to help him to get the princess. Because the player is the fate weaver, so the hero would always get what he wants…

Power UP

The player learns new gestures whenever they reach a new level.

During the game, the hero may gain life, protection, better equipment etc. Player can get the objects like time slower, danger eliminator to help the player to control the game. Player can use these rewards by touching the computer screen while holding a finger in the swipe/rotation area on the tablet. (Actually pointing at computer screen would also work).

Level Design

Danger Elimination Platform

The hero would keep going, however, there are traps and dangers awaiting him.   The player tries all the ways to help the hero and eliminate dangers.

Racing/Flying

Player use hand to pretend something, and use that to interact with the game. The player can pretend a bird using two hands, and the hero riding on it. Then the player moving the hands to fly through mountains. The screen shows the mountains and rocks, sometimes the player need to use head to knock down some obstacles. The player can pretend a horse running on the tablet (And the tablet is like a treadmill) using one hand (mid-finger is horse head, the other four are legs), and use the other hand to kill the enemies, eliminating dangers, open the road etc.

Castle Attacking

In the level the hero arrives the boss's castle. Now the game shows the avatar of the player and the table plane (virtual), draw the castle on the table, pretending it is on the tablet. Now the player avatar in the screen is attackable by the monsters on the table. Bullets would fly towards the player's head. The player need to kill the monsters, and move the head to avoid damage. The player also can lower the head and shout, in the game fire coming from the player's avatar's mouth. The monsters receive great damage, but after that the player need to keep swiping the tablet to cease the fire in the castle to avoid killing the princess. Player should use hand to offer protection to the hero when setting fires on the ground. (Actually this time the player looks more boss-like than the real boss).

Multiplayer

The multiplayer part has two modes:

Danger Elimination Platform

The two players cooperate with each other to get through dangers. One player controls the hero through the controller, one player is the fate weaver to help the hero. It is like the single player mode, but get harder because no the hero can be controlled. Two players are required to talk with each other while playing the game, otherwise the game would be too hard.

Boss Fight

One player controls a hero fighting against the other player, like in the castle attacking level. The hero can shoot at the other player's head, and the other player can pat, use tablet, and fire flames from the mouth.

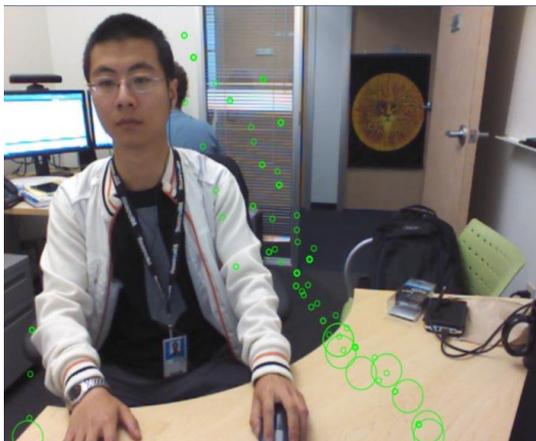*Figure 13 Picture show the hero fighting against the other player. Picture comes from internet.*

Figure 14Prototype: Virtual Objects on the table

Technology Feasibility & Note

Algorithm Speed

Kinect upper body skeleton tracking is too expensive for the real time tracking. Most of the code would be based on depth map and optimized algorithm for a particular tracking purpose. The skeleton tracking would only be used when trying to track the player's head. Head tracking is usually accurate.

Fake Touchscreen

The computer screen can be turned to a touchscreen (fake) by calculating the arm direction. Because the hands can be never seen by the computer when the player touching the screen.

Tablet Interacting

During the tablet moving, tablet can show color or QR code on the screen to help the computer to locate the tablet. When the tablet screen is not facing the camera, the QR code on the back of the tablet would help. The gravity and acceleration meters in the tablet would help the computer to decide the tablet rotation (tracking) and tablet moving speed (shaking). Most of time the game should guide the player to look at the computer screen, and the tablet is more or less an input only device.

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