Comparison of control schemes in a top-down tank-game

1 Introduction

1.1 Overview

This project as part of the course "3D User Interfaces" aims to test various control schemes for the top-down tank-game "TankMania" developed during this semester's Computer Games Laboratory. The player is given control of a small tank which is able to move, aim and shoot in a given scene. For these three simple performable actions, this project is intended to find a control scheme which is most preferred by players while making use of different input devices. This is done by a user study evaluating which control scheme performs best in the eyes of the players who are asked to rank their preferences.

1.2 Types of Control Schemes

A set of control schemes for various controller devices has been developed: Namely, schemes involving *Keyboard & Mouse, Gamepad (Xbox™Controller), Nintendo Switch Joycons™* and *Mobile Touch Screen* were used. While even more control schemes than presented were implemented, some were cut to make the survey evaluation feasible.

The three mobile schemes involved a controller-like, drag-to-aim as well as a directed auto-shoot version.

2 Evaluation

2.1 Survey Strategy

The evaluation of user preferences was done via an online form and a playable demo which was also presented at the faculty's Demo Day. The demo was available as a PC version, featuring the three non-mobile schemes, and an Android App with the remaining three touch-based methods. Users were asked to play the game with all six control schemes and then fill out the form to rate their preferences and categorize the corresponding schemes (most fun, most precise, most difficult to play, etc.).

A minor differentiation between mobile and non-mobile schemes was also considered due to the fact that it is difficult to directly compare mobile touch on a smaller screen with schemes on the PC. Thus, people were also separately asked to rate their favorite mobile controls.

Due to technical and performance issues, the results collected during the Demo Day were discarded. Therefore the survey as well as the demo game were redesigned and a second round of survey results was collected. In total, we collected 31 responses. 11 during Demo Day and 20 during the retake.

2.2 Results

In the general rating of control schemes for TankMania, there were two immediate things one could observe: First of all, mouse & keyboard as well as mobile input were both on first place when asked which control scheme people would choose to play the game.

However, at the same time, while keyboard & mouse was also placed better by all participants of the study (average placement 2.1 out of 4.0), in comparison, the touch controls scored worst considering the entire survey group (2.7 out of 4.0).

Drag-to-aim was generally seen as the most difficult to play *(45%)*. Motion Controls were rated as the most fun *(35%)*. The schemes with analog sticks were categorized as the ones with the best movement *(60%)* and mouse & keyboard was seen as the most precise *(55%)* and efficient *(45%)*.

3 Conclusion

All in all, we can see a clear trend towards traditional schemes involving keyboard & mouse for aiming as well as gamepads with analog sticks for movement. This does not come as a surprise. Interesting is, however, that many users expressed quite some enjoyment for the Switch motion controls even though they were not seen as very precise nor efficient. Regarding mobile, we see a divide between people who appear to enjoy mobile gaming above other forms and the general preference of playing TankMania on the PC.