Mouse vs. Gamepad: Comparing Game Controllers regarding Target Selection and Player Performance in Shooter Games

Thema:
(WIP) Mouse vs. Gamepad: Comparing Game Controllers regarding Moving Target Selection and Player Performance in Shooter Games
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Hintergrund

In recent years, video games have become more and more widespread and are part of everyday life. With the growing popularity of video games, numerous platforms that use different game controllers and a variety of game genres have been established. The most used game controllers include the gamepad, mostly used on consoles, and the mouse for PC. These controllers are mainly used in shooter games, a genre that is gaining popularity these days. Both game controllers offer advantages and disadvantages. Although the computer mouse and gamepad are the most used input devices in shooters, it is not clear which of the two devices is more effective and can offer more precise target selection and higher player performance.

Previous works mainly investigate the effects of latency with different input devices and its effects [1,2,3,4]. An example is Claypool's study in which a custom game was created to select moving targets, while the delay and movement of the targets can be controlled [5]. Over a latency range of 50-300 milliseconds, the distance between the mouse and the target and the time required to select the target can increase linearly, while player performance also decreases by a factor of 4 [6].

So far, numerous input devices have been compared in terms of latency. However, there has not been a study yet that examined and compared the mouse with the game controller for efficiency and player performance in target selection. The research question of this study is important as the choice of input device can affect player performance and players may experience disadvantages due to their choice of input device. In addition, Target Selection and accuracy are essential elements in shooters to achieve the goal of the game.

Zielsetzung der Arbeit

The aim of the study is to examine and compare the effects on Target Selection and Player Performance in Shooter games when using a mouse and gamepad. The advantages and disadvantages of the two devices as well as the potentially more efficient device should be identified. Possible solutions should be formulated for the less efficient device, considering and examining existing suggestions like Aim Assist, Dead Reckoning or Boundary Boxes, for example. These approaches can be improved and, if necessary, new solutions for game development can be introduced.

Konkrete Aufgaben

- Research and preparation of the literature
- Definition of the research question
- Study design
- Select participants
- Define functions and criteria for the game to be developed
- Development of a shooter game
- Implementation and evaluation of the study
- Analysis of the results

Erwartete Vorkenntnisse

- Experience with Unity
- Basic programming in C#
- Design, implementation and evaluation of empirical studies

Weiterführende Quellen

[1]Long, M., & Gutwin, C. (2019). Effects of Local Latency on Game Pointing Devices and Game Pointing Tasks. https://doi.org/10.1145/3290605.3300438

[2] Claypool, M., Eg, R., & Raaen, K. (2016). The effects of delay on game actions: Moving target selection with a mouse. In Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts (pp. 117-123).

[3]Claypool, M. (2018). Game Input with Delay—Moving Target Selection with a Game Controller Thumbstick. ACM Transactions on Multimedia Computing, Communications, and Applications, 14(3s), 1–22. https://doi.org/10.1145/3187288

[4] Lenz, K. M., Chaparro, A., & Chaparro, B. S. (2008). The effect of input device on first-person shooter target acquisition. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 52, No. 19, pp. 1565-1569). Sage CA: Los Angeles, CA: SAGE Publications.

[5] Claypool, M., Cockburn, A., & Gutwin, C. (2019). Game input with delay: Moving target selection parameters. In Proceedings of the 10th ACM Multimedia Systems Conference (pp. 25-35).

[6]Claypool, M., Cockburn, A., & Gutwin, C. (2020). The Impact of Motion and Delay on Selecting

Game Targets with a Mouse. ACM Transactions on Multimedia Computing, Communications, and Applications, 16(2s), 1–24. https://doi.org/10.1145/3390464