Honors Research Project Proposal

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Goals and Objective

Electroencephalography (EEG for short) is a process that measures brainwave activity in the user wearing the measurement device. This is most used in studies and medical diagnostics. However, there are instances where the EEG devices have been used as to control electronic components using their brainwaves. Such examples include Honeywell's mind-controlled airplane in 2016 and Mercedes-Benz's concept car introduced at the IAA Mobility 2021 show.

The goal of this William Honors College research project is to explore the utility of EEG for consumer markets. This is to compare the device with present control methods used with computers and electronics. It will also focus on the biggest issues that a device may have when entering a wider consumer market and try to address these issues.

Methodology

The primary process to reach the goal of this paper is to combine other researchers' published experiences concerning EEG technology. This information will then be providing an image for where present EEG devices are in their development. The research will then compare common devices such as computer mice, keyboards, game controllers, etcetera to the EEG technology.

Intended Timeline

- Present: To gather relevant sources and begin drawing patterns on how EEG devices are used and treated.

- November 20th: Have the introduction completed.

- December 4th: Have visual aids to clarify comparisons between devices.

- January 10th: Have initial draft to provide to provide to readers.

- April 15th: Have final copy finished to submit on time.

Outcome

The target audience for when the research is completed includes those developing EEG hardware and software engineers who are interested in applying different controls to their interactive programs. The final product the audience should receive from this research will be a guideline of what pitfalls to be warry about and some suggestions on how to make use of EEG technologies' strengths.

Academic Impact

This research expands my experience and knowledge of computer science because it makes use of foundational components of computers and their code. The computer science major focuses on how to write efficient code that is either to be used by consumers or other software engineers. To research the topic of a potential input device can set the groundwork on how future software engineers should treat this in their code.

There are multiple courses within the department that this research succeeds on. The course that most relates to this course is Interactive Game Design, which introduces students to the creation of software that interacts in real-time with users that handle a variety of control methods. An optional application within that course was to work with irregular controllers to create different input functions. Another course which this research builds off is Software Engineering. Software Engineering introduces students to the real-world skills necessary to work with consumers with variable understandings of how computer code operates.

In conclusion, this research project will be expanding on approaches of how to introduce electroencephalography to a wider market that consists of both consumers and other software engineers. This builds from the computer science studies by making use of interactive input devices and by taking in account the consumer's viewpoint on such a device.

Sources Used in Proposal

Stewart, J. (2016, November 15). *I used only my mind to fly a plane around Seatte*. Wired. Retrieved October 24, 2021, from https://www.wired.com/2016/11/used-mind-fly-plane-around-seattle/.

Mercedes-Benz Vision AVTR: Operating the user interface with the power of thought. MBUSA Newsroom. (2021, September 21). Retrieved October 24, 2021, from https://media.mbusa.com/releases/mercedes-benz-vision-avtr-operating-the-user-interface-with-the-power-of-thought.