

Thesis Portfolio

The Role of Software in Providing Funding for After-School Programs

(Technical Report)

Current Limitations of Virtual Reality Technology Regarding Human Senses

(STS Research Paper)

An Undergraduate Thesis

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Table of Contents

Sociotechnical Synthesis

The Role of Software in Providing Funding for After-School Programs

Current Limitations of Virtual Reality Technology Regarding Human Senses

Thesis Prospectus

Sociotechnical Synthesis

Introduction

Although not too closely related, two different projects were set up initially: technical project and STS research project. A technical group project that helps out The After-School Association of America and an STS project that researches limitations of virtual reality technology regarding human senses are the two projects in this portfolio. Regarding the technical project, The After-School Association of America, also known as ASAA, is a nonpartisan association created to assist schools that provide after-school activities to students. Their mission is to provide financial assistance to schools in an effort to increase participation of students after normal school hours. They exist to remove financial barriers in the way and transportation issues for students and their parents so more students can participate in and enjoy school activities. A major problem the organization had was a lack of infrastructure. There was no proper managing tool to receive application from organizations, nor proper data gathering tools to keep track of financial and statistical information. In order to solve this difficulty, the capstone project team worked together to create a software system that fulfills all the given requirements by the owner of ASAA.

Regarding the STS project, virtual reality is a rapidly growing field in computer science that allows a user to interact with 3D images created with computer simulation. The ultimate goal of virtual reality is to provide a real-world experience in an artificially created environment. However, the current virtual reality system possesses several limitations regarding usability of human perception, which leads to a huge discrepancy between real world and formulated virtual reality experience. Therefore, STS research was conducted in order to reconfirm limitations to current virtual reality systems to find out possible solutions to those limitations.

Technical Summary

The system created for the After-School Association of America allows users to create applications so that owners and supervisors can approve applications, deny them, or request for more information. The system puts the entire process in one easy-to-use location. The system will have the ability to have several different user classes for the purposes of providing funds, receiving funds through an application creation portal that allows users (schools and students) to create applications in a simplified manner, and for administrators to approve, deny, or request further action when reviewing applications and managing funds allocated to users who receive funding. The system will integrate a central database with encrypted information for security purposes to easily monitor school and funding data for all parties who use the new user interface. Lastly, the system will also analyze the data inputted into the database and provide useful statistics for the founder.

STS Summary

Virtual reality is often defined as a simulated environment that gives an interaction between system and users. However, the current virtual reality system available in the market still is far different from a real-world experience that could utilize all human perception. The problem lies with the system providing only two limited perceptions: sight and hearing. Providing a full virtual world experience will be difficult as long as other human perceptions are not existent in the system.

What are the major limitations in implementing basic human senses such as touch, smell, and taste? To answer the question, this research is organized using case study analysis to find out possible alternative solutions to utilize other human perceptions. Along with those two research methods, a paradigm shift will be a main STS framework. Upon finding limitations of

current virtual reality system, possible alternative solutions for future implementation of virtual reality in human perception could be suggested. Although it will be difficult to implement such solutions, it would give a significant impact to overcome the limitations that the virtual reality systems while shifting paradigm to the engineering field.

Conclusion

The major problem while doing two projects was the connectivity between each other. The projects did not share any common feature, thus there was no synergy between each project. Working on two different projects at the same time was definitely challenging. For the capstone project, everyone worked as a team. There were many obstacles the team initially faced to deliver a product. By finishing the requirements and being on time for each meeting, the project taught me how to act as a professional. Doing a project over a long period of time requires better communication from each member, which made me learn how to work better as a team. On the other hand, I learned how to work alone while doing an STS research paper. Doing research by myself requires more self-motivation and responsibility. Collecting specific information for the research taught me how to classify information based on its usage.