Using Virtual Reality to Augment Distance Learning

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Inspiration and Motivation

Traditional methods of online and distance learning leave something to be desired. Interaction between the teacher and students is limited, and students oftentimes miss out on many of the benefits of being present for a live lecture. This project proposes a method of allowing rich interaction between teachers and students participating in online and distance learning as depicted in Fig. 1.

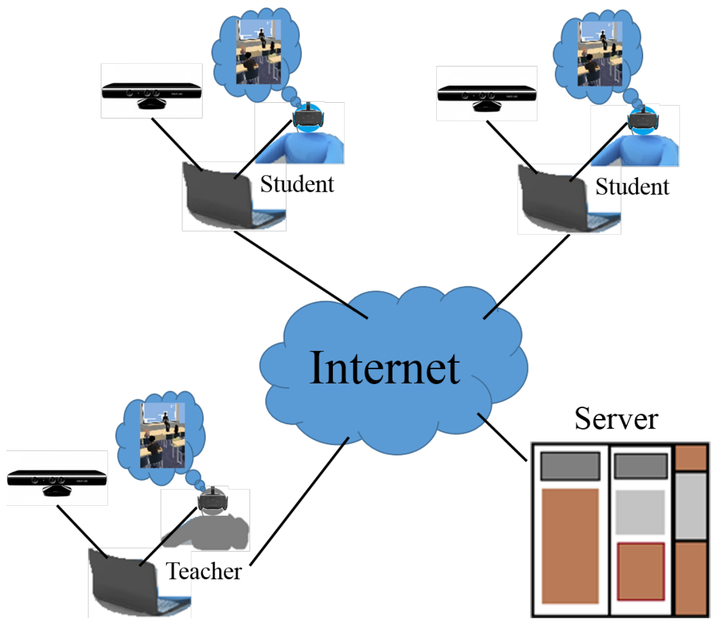

Figure 1. Diagram of how students and teachers connect and interact

Methods

Most of the work put into this project so far has been towards making the system as immersive as possible, since the goal of this project is to create a virtual, immersive environment to be used to make online learning more relatable. To this end, three major goals have been accomplished as follows. 1. Immersivity in Presence: The closer the virtual representation of the users mimics the users themselves, the more immersed the users feel. 2. Immersivity in Interaction: Server software was created that keeps track of the state of an environment, allows new users to connect to it, and routes data about each user through the network of connected computers so that all of the users are present in the same environment. Any action that a user takes is visible in real time to all other users in the same connected environment. 3. Immersivity in Realism: In order for an experience to be truly immersive, not only must the users have a virtual presence in the simulation, they must believe that they are in the simulation.

Figure 2. Remote instructor and students in the virtual classroom.

Results

We have successfully created a virtual environment in which multiple students and teachers can meet and interact. As it can be observed in the Fig. 1, online students have logged in remotely and have entered into the class. Each avatar is associated to a student who has logged in. Instructor has also remotely logged in as her avatar is initiated. In the Fig. 3, a student who has logged in remotely raises his hand to ask a question. His avatar as we can see in mimicking his action by raising his hand. Using motion tracking hardware and a head-mounted display, a student is placed into a virtual classroom, where an avatar representation takes their place. This virtual classroom is hosted by a server application, which is what allows the students to exist in the same environment and interact with each other.

Future Goals

While the work that has been completed so far is very promising, it is far from completed. We plan to expand the amount of interaction supported in the virtual environment, which will lead to an even more immersive experience. Additionally, we intend to flesh out the software with several features such as conversation mechanics, recorded lectures, and multimedia support. Eventually, the goal is to advance this project to the point where it will be used to teach online classes at Florida Tech and elsewhere.

Figure 3. A remote student raise his hand to ask a question and his avatar mimics him in the class.

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