MU researchers working on groundbreaking VR classroom

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Recent University of Missouri research sponsored by the National Science Foundation titled “A Networked Virtual Reality Platform for Immersive Online Social Learning of Youth with Autism Spectrum Disorders” (NSF CNS-1647213) has been focused on understanding the benefits in the use of virtual reality to aid the special education of students with autism.

Electrical Engineering and Computer Science faculty Prasad Calyam and Henry He, Thompson Center for Autism and Neurodevelopmental Disorders Associate Director and Professor of Special Education Janine Stitcher and several graduate students such as Sai Shreya Nuguri are working on vSocial, a cloud-based virtual reality platform intended to create virtual classrooms and curricula for students with autism, particularly those in rural areas with less access to specialized curricula. This project is breaking new ground in distance learning in terms of both educating children with autism and the emerging field of social virtual reality, which is building upon advances in wearable devices such as HTC Vive and Oculus Rift.

The concept combines Calyam’s cloud computing/networking acumen with He’s pose estimation skills and Stitchers expertise with children with neurodevelopmental disorders and creating special education curricula.
“Over the last year or so, we have built a full-fledged system which integrates the cloud, VR content, a lot of the learning session management needed to get the students into the VR session and a progress tracking program for the various units, and we actually developed course content,” Calyam explained.

Using VR to provide educational resources with remote network access to children with autism is presently uncharted territory, so what the team has been working on much of the last year is exploring exactly what is possible in this realm, both good and bad, and working to hone a safe, user-friendly and impactful system.

The goal is to build a system that is not only cloud-based, but also has safeguards to protect student data. Calyam explained that additional safety concerns the team is working on include safe use of the VR devices, creating the proper environment for the students so as not to cause any undue emotional distress and creating an environment that does not negatively impact the rest of a student’s day.

The team has published their early work in a paper that appeared in the proceedings of the IEEE CCNC conference [http://faculty.missouri.edu/calyamp/publications/vrle-socialvr-ccnc18.pdf], and several papers and demonstrations on the topic are being prepared based on the results from the early stages of testing both the system and the curriculum.

“Social VR and the curriculum content we are building has the potential to enable these kids generalize things that we take for granted,” Calyam said. “The goal when we first wrote the NSF proposal was very broad. What we realized is nobody’s ever done this!”

The next step is to pilot the system with actual users and remote schools/universities, and assess the impact it has on students’ well-being and education and begin to tweak the networking and system design based on those results.

“We’re figuring out what the new Social VR technology is capable of doing in a next-generation distance learning context, both good and bad. It’s the biggest learning lesson we’ve set out to achieve at this point,” Calyam said.