Computer Science Seminar

Navigating a maze differently - a dissection of human spatial decision making in Immersive Virtual Reality

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Abstract: Navigating spaces is an embodied experience. Examples can vary from rescue workers trying to save people from natural disasters, tourists finding their way to the nearest coffee shop, or a person solving a maze. Virtual reality can allow these experiences to simulate in a controlled virtual environment. However, virtual reality users remain anchored in the real world and the conventions by which the virtual environment gets deployed influence user performance. There is currently a need to evaluate the degree of influence imposed by extrinsic factors and virtual reality hardware on its users. Traditionally, immersive virtual reality experiences uses Head-Mounted Displays with powerful computers rendering the virtual environment's graphical content. However, user input has been facilitated using various human interface devices, including Keyboards, Mice, Trackballs, Touchscreens, Joysticks, Gamepads, Motion detecting cameras, and Webcams. Some of these HIDs have also been introduced for non-immersive video games and general computing. Thus, a subset of virtual reality users has greater familiarity than others in using these HIDs. Virtual reality experiences that utilize gamepads (controllers) to navigate virtual environments may introduce a bias towards usability among virtual reality users previously exposed to video gaming. For widespread adoption, we must offer generalizable interaction paradigms to users of all shapes and forms, including video-gamers, non-video-gamers, and everyone else. To establish universality, the field must first understand the different ways users engage and perceive virtual spaces. ¡br¿¡br¿ In this talk, we will be observing an evaluative user study conducted using our ubiquitous virtual reality framework with general audiences. Among our findings, we reveal a usability bias among virtual reality users who are predominantly video gamers. Beyond this, we will overview a recent work on dissecting deeper into the human spatial trajectory and uncovering a set of observed dynamic parameters affecting user performance. Lastly, we will end this talk by briefly summarizing plans to explore Long short-term memory (LSTM) neural networks to investigate human spatial trajectories' hidden parameters that affect their spatial decision-making capability. ¡br¿¡br¿ Biography: Aryabrata Basu is the Staff Research Scientist at the Emory Center for Digital Scholarship (ECDS). Basu creates, modifies, and configures 3D models using various computer modeling, simulation software, and geospatial data in this capacity. In partnership with faculty and ECDS staff, Basu prepares aesthetically composed digital media through graphic design, image processing, and data visualization for use in ECDS-supported digital scholarship projects. Basu primarily researches and explores new methods of visualizing data platforms, including virtual reality, augmented reality, and mixed reality.

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