Summary of Presentations by Drs. Abujelala and Doolani

In the first presentation which was done by Dr. Abujelala, titled "Learning Environments with Augmentation and Robotics for Next-gen Emergency Responders," he started by giving a background on his journey which took him from completing his Ph.D. at UTA to Yale School of Medicine and to his current position at Texas A&M Department of Industrial and Systems Engineering. He highlighted with his journey that HCI skills can be applied in different fields.

Dr. Abujelala then showcased his current project LEARNER which he explained is a training platform for emergency responders (ERs). Funded by an impressive $5 million National Science Foundation grant, its goals are to accelerate the adoption of Human Augmentation Technologies (HATs) in the ER domain, develop expertise in ERs and provide safer and efficient training for ERs.

He further discussed where LEARNER can be used, mentioning four levels – home/mobile, local field house, regional training centers, and national training centers. LEARNER tackles two main kinds of tasks, namely patient triaging and patient handling. The former is a prioritization system operated with the goal of providing the greatest good to the greatest number of people.

While research with LEARNER involves several areas, Dr. Abujelala's team focuses on adaptive learning. This is as opposed to the area of test-based studies which include VR drone training, AR triage, exoskeletons training, and web-based training. He described the VR drone training study which trains participants to fly VR drone using real-world radio controller and captures performance and biomarkers for various purposes. Having five modules, this study includes performance metrics in such groups as time-based, fine motor control, attention and planning, and deviations from optimal distance trajectory.

He also described the adaptive learning workflow and showed an effective visual of how performance can improve for low performers for their performance to approach that of high performers after study intervention.

Dr. Abujelala discussed AR interaction learning which works to triage patients and find biomarkers to help guide learners. To illustrate training for AR interaction, he used three videos, one to show users selecting near objects, a second for selecting far objects, and the third for moving objects from one place to another. He showed a video for triage AR interaction where a user can use voice commands to take notes and used a picture to show triage paper interaction where the person conducting the triaging completes a paper form including several check box options some with color coding. Still on AR interaction, he covered differences between several groups such as female versus male in order to determine what type of training provides optimal skills to users.

He showed the data collected in VR/AR grouped into performance data, physiological data, behavioral data, and user surveys. He also discussed further details of shoulder exoskeleton training. He concluded by discussing how his work is using computer vision to track posture to see how it correlates with fatigue level, discussing patient handling with exoskeleton including a picture of a real-world, artificial disaster area that TAMU has, and discussing web-based learning as a future goal.

Dr. Abujelala is an interesting speaker who engaged the audience and got several questions. I asked him two questions in class which he answered in detail. The third question I have is "In the video for AR interaction training, slide 16, please what did you call the term for what the user uses to reach and select far objects? Thank you."

In the second presentation which was done by Dr. Doolani, in the first part titled "OGMA: Language Acquisition System using Immersive Virtual Reality," she started by giving her current position at Salesforce after completing her Ph.D. at UTA. She shared that HCI is dynamic and interdisciplinary. She described the motivation for her project which she did while taking this class. Showing that there are different ways of second language acquisition (SLA), she then contrasted the traditional immersion method (TM) to using immersive virtual reality (IVR). She gave several disadvantages of immersion method and the need for a better way noting that while IVR is common now, it was a novel idea then.

She explained the user-centered design process showing a starting point of finding out how the user thinks. The process involves user research, design, build, and then repeating the cycle with user testing to determine usability. Her project used two personas - a professor and a student. She discussed the iterative process that her thesis project underwent to get to the final product. Her thesis addressed the claim that immersive VR systems are a better way for SLA than the TM.

In the first iteration, Dr. Doolani and her teammates conducted an experiment to find the optimal number of words for SLA. They observed users and assessed them immediately afterward using either the TM or IVR and again a week later. In the second and third iterations, they introduced game specification in the former while in the latter, they introduced two phases - learning and playing the game, and progressed from low fidelity prototype to high fidelity prototype to 3D fidelity prototype with apartment designs. They got user feedback using a small user study. In the fourth iteration, they implemented changes based on user feedback in the preceding iteration, for example, they changed the music from having lyrics to instrumental. They implemented a practice room, easy-to-recognize words, no English translations and used ten Swedish words. Results showed that 80% of users thought that the virtual environment was better than picture matching or writing for SLA.

Dr. Doolani discussed more about the experimental setup involving virtual apartments with ten objects to show each object alongside its corresponding word being learned. A user study had 36 participants, aged 18 - 35 years, about 78% of whom were male, and split into traditional versus VR groups. Experimental design had users using flashcards to learn in the traditional method group (TG) while users used VR in the VR method group (VRG). For methodology, in the TG, learning and training were by memorization and by using flashcards respectively while in the VRG learning and training were by exploring the virtual environment and by using the virtual game respectively. Next was testing initial feedback. She played a video of the environment. Experimental results showed that while users in the TG remembered more words immediately compared to those in the VRG, a week later, users in the VRG remembered more words suggesting that retention was much higher in the VRG. She shared user effectiveness and enjoyability ratings which were both high, implications of the work, and highlights of open-ended feedback and that there were abnormalities in the data - familiarity with TM plus newness of VR biased the findings. She concluded this part of her presentation sharing that the VR method showed excellent potential for learning.

In the second part of her presentation, Dr. Doolani highlighted the progression of her work from the class project above to her M.S. thesis and finally to her Ph.D. dissertation from traditional to VR immersive methods to adding interactivity and finally adding intelligence to the system.

Dr. Doolani is an interesting speaker who engaged the audience and got several questions. I had two questions for her. During the process answering my first question she answered my second question which I also mentioned to her.

