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UCSC : MS in Human-Computer Interaction

Statement of Purpose

Teaching is a powerful tool. It shapes our core consciousness about a concept and influences our worldview. In secondary school, I witnessed how different learning tools helped shape our abilities. During a physics class about electric circuits, most of us struggled to understand current flow through wires and how different resistors and batteries affected the current and voltage. Our teacher guided us to the computer room and used a simple circuit simulator to enhance our understanding. We experimented with different circuits and understood how series and parallel circuits work and how resistors affect the current and voltage. This experience helped me realize how a practical and gamified approach with computer-based simulations helped people visualize and learn concepts much more quickly.

Keen to explore the potential of this domain, I started learning technologies which helped design and create similar games and visualizations. I started with 3D modeling in Blender and built games in Unity and Unreal Engine. I encountered two powerful and immersive technologies during this process: Augmented Reality and Virtual Reality. I created simple applications like an AR-based Greeting Card and AR-based windshield navigation. Then, I ideated and worked on two simple prototype projects, ExploAR and DiscoVeR, which helped students visualize subject-specific concepts like our solar system with the help of AR and VR Technology.

Additionally, during my internship at e-Yantra, IIT-Bombay, I gained invaluable experience and insight into practical education. My technical project encompassed designing and developing a 3D Virtual Museum website. The virtual museum dynamically expands based on the number of artifacts stored in the database. These models were made by school students who participated in e-Yantra's Virtual Museum competition, which involved researching and scanning local artifacts using photogrammetry to effectively teach history by encouraging research and practical learning. During this internship, I also worked on a non-technical project to research how to teach robotics to school children in an immersive and exciting manner. I received an opportunity to impart a session on the "sense-act-think" paradigm with 50 Bhutanese school students from the Royal Academy of Bhutan. Additionally, I received an exciting opportunity to develop a 3D Virtual Museum into a Virtual Reality concept and present the same as a part of e-Yantra's team at the NEP 2022 Akhil Bharatiya Samagam Exhibition. Here, I interacted with students, parents, teachers and government officials and discussed the opportunities and development of the VR Virtual Museum.

These experiences and interactions helped me realize how vital a visual and gamified medium is for effective education. It also cemented my goals of pursuing a career in creating and building design systems that aid in the education of students using visualization and gamification. Thus, my short-term goal is to research games and applications that can help students learn concepts in a more accessible, fun and immersive manner. An integral part of my goal is to build systems specifically aimed at helping people with learning disabilities learn independently.

In tandem with building learning mediums, I will also work on adding more immersion to AR and VR experiences by adding more control for the users to interact. To illustrate, during my internship at EvolutionCo, I worked on a Virtual Reality application for the German Elevator Company Schindler. The purpose of the application was to create an immersive and customizable experience for architects and designers to visualize different elevators, elevator walls, and panels. This experience enhanced my insight into how HMDs were used to make applications immersive. It also raised another question: How can these spaces be more immersive? How can we increase the human interaction aspect in this field?

These hurdles motivated me to learn about computer systems that are highly interactive and immersive. Thus, I am researching an application that can use an external camera to teach Martial Arts using VR and AR with full body tracking capabilities. It uses Machine Learning and Computer Vision to track the body and display the entirety of it in the Virtual Reality headset. This tracked body can also be viewed separately using Augmented Reality from a mobile phone.

At this juncture, I believe that a Master's degree at UC Santa Cruz with a well-rounded, interdisciplinary HCI course will bridge the gaps in my repertoire and allow me to gain finer expertise in understanding how I could make systems and applications for meaningful interactions between humans and computers. Therefore, I am keen to undertake a master's degree at this juncture in my career and learn about psychology and design, along with a focus on technical knowledge.

The multi-faceted curriculum and the path-breaking research undertaken by your department are commendable. I would also like to broaden my horizon by working with Professor Aviv Elor at UC Santa Cruz to aid in the research and development of augmented reality based assistive technologies for physical education . I resonate with the curriculum at your institution and would love to explore subjects like “Modeling & Simulation” and “Psychology of Play”.

At UC Santa Cruz, I will find a stable footing in the technology-driven world. As a persevering individual, I work harder than most people to stay motivated in reaching a goal. Thus, I have the potential to apply myself wholesomely to the program. The course is adept in modern cutting-edge technologies, including brilliant concentrations and a wide range of electives that will enable me to craft the perfect skillset. At UC Santa Cruz, I am confident I can demonstrate my zest, tenacity, and dedication to meet and exceed your university's high academic standards and mission statement. Given an opportunity, I will make meaningful strides in developing innovative solutions to positively contribute to society and emerge as a purposeful and knowledgeable individual.