Aryabrata Basu

Research Statement

"It is only through failure and through experiment that we learn and grow." - Issac Stern

Origins

The year was 2001-02, and I was drawn to the brand new Physics textbook my Junior year at High School. I was very keen on learning the principles of thermodynamics. As a physics enthusiast, I had all the vigor to learn new content but lacked the rigor to follow up on unclear concepts. At the time, I recoursed to my Applied Physicist uncle Debabrata, who told me to forget the textbook for a moment and told me to observe the Airconditioner as an example. He then started explaining thermodynamics' principles in a very relatable way, methodically building upon ordinary everyday machines operating around us. Quite inspired by this incident, I then went on to teach 'Special Theory of Relativity' to Sophomores at my High School on Teacher's day, for which I got awarded the best teacher for that year. These incidents sparked a lifelong appreciation for more accessible pedagogical techniques and methodologies.

Teaching Experience

My teaching journey began formally during graduate studies at the University of Georgia, where I taught introductory computing courses. Later, at Emory University and currently at the University of Arkansas at Little Rock (UALR), my courses emphasize interactive learning and real-time visualizations. I integrate cutting-edge tools, such as Unity, into my courses, including Computer Networks, Database Concepts, Distributed Computing, and Computer Architecture, enhancing student engagement through practical, real-time experiences.

My past teachings at Emory University involved instructing students in 3D modeling, texturing, and interactive visualization using Unity. Students learned practical asset development, real-time rendering, VR/AR visualization techniques, and basic scripting with C. Course projects culminated in personalized immersive experiences deployable on the web, emphasizing best practices, accessibility, sustainability, and open-source principles.

At UALR, I've significantly integrated Unity's real-time game engine into courses such as Computer Networks, Distributed Computing, and Computer Architecture, creating an interactive learning environment that bridges theory and practical application. Students actively engage in programming, visualization, and immersive interaction techniques, developing skills highly relevant in both industry and academia. Through carefully designed project-based assignments, students are encouraged to think creatively, critically, and collaboratively, enhancing their problem-solving abilities and effectively preparing them to tackle real-world technological challenges. This approach

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fosters deeper learning by allowing students to immediately visualize the outcomes of their work, iterate rapidly based on feedback, and gain confidence in their technical and creative capabilities.

Teaching Philosophy

My teaching philosophy centers around creating interdisciplinary, accessible learning environments. Inspired by my early experiences, I design courses that welcome students from diverse backgrounds and skillsets, emphasizing practical skills, inclusivity, and active engagement. Grading is conducted incrementally, recognizing honest efforts, growth, and reflection rather than focusing solely on final outcomes. I actively integrate student feedback to continuously improve the learning experience and ensure relevance to their academic and professional goals.

My general rule of thumb regarding grading is to grade the student's honest intentions and subsequent actions taken towards the final project. I typically like incrementally building my course to trace back each student's progress throughout the course accurately.

Teaching Innovation and Curriculum Development

In alignment with current industry standards and the rapidly evolving technological landscape, I introduced innovative curricula integrating the Unity game engine in courses like Distributed Computing, Computer Networks, and Computer Architecture. Unity provides a practical, interactive learning environment, allowing students to immediately test and visualize their work, fostering deeper understanding through immediate feedback and iterative refinement.

This approach has multiple benefits, including enhanced student engagement through interactive, real-time feedback, and strong industry relevance that prepares students for future technological careers. It promotes interdisciplinary collaboration by integrating programming, art, design, and storytelling, and offers scalability and accessibility, enabling tailored learning experiences for diverse skill levels. Emphasizing project-based learning, it encourages creativity, problem-solving, and practical application, ultimately strengthening students' technical skills and readiness for collaborative, innovative careers in technology.

Mentoring and Student Engagement

I actively mentor graduate students, guiding research at the intersection of VR, immersive visualization, Human-Computer Interaction (HCI), and cybersecurity. My mentorship focuses on personalized guidance, critical thinking, and interdisciplinary research, resulting in student-led projects recognized for their creativity, rigor, and societal impact. I have supported students in projects that improve accessibility in VR, explore spatial decision-making, analyze privacy concerns, and address gender biases in immersive technologies. My mentoring approach emphasizes developing critical, creative, and ethical researchers prepared for impactful careers.

Evaluation of Teaching Effectiveness

Consistent with best practices discussed in the institution's "Community of Transformation," I prioritize incremental and reflective assessment methods designed to accurately capture student learning, progress, and growth throughout each course. My evaluation approach emphasizes recognizing students' demonstrated efforts, their ability to incorporate feedback, ongoing improvements, and active engagement with course materials. By routinely soliciting and integrating feedback from peer reviews, student course evaluations, and professional pedagogical training programs, I ensure that my teaching practices remain dynamic, responsive, and continually evolve to effectively meet both

student needs and broader institutional goals. This reflective approach not only enhances teaching effectiveness but also fosters a supportive, inclusive learning environment.

Future Goals

Looking ahead, I aim to further integrate real-time interactive frameworks into computer science curricula, particularly at the intersection of Artificial Intelligence, Robotics, and advanced immersive visualization. I remain committed to fostering an inclusive, innovative, and interdisciplinary learning environment that prepares students to address complex, real-world technological challenges with confidence and creativity. I look forward to teaching bright and eager young minds now and then.