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Personal History Statement

Right from the childhood days my favourite subjects to learn in school were computer science programming and mathematics. I am fond of the process of applying what I have learned to solve problems and questions as if they were pieces of a logical puzzle. Since middle school, my learning style was not just textbook oriented but researching and exploring the subjects. My inquisitive nature made me explore all the subjects even outside my curriculum. I would constantly nag my parents to buy me new encyclopaedias and books. In fact, my childhood favourite book is actually “What If?” by Randall Munroe, where he attempts to answer hypothetical questions like “Would happen if you try to hit a baseball pitched at 90% the speed of light“ , by using science and mathematics. These give rise to hilarious scenarios and the book is one of my most favourite books. It teaches you these interesting concepts and also keeps one entertained.

However, the rote-learning and strict syllabus meant that I had to at times compromise on my logical thinking and research interest, and instead memorise the textbooks for the answers. The only respite I had was maths and computer science class, where there was less memorising and more logical and analytical application. Despite this, I continued to learn and explore whatever piqued my interest. Being naturally inquisitive meant that I would end up asking lots of questions to my teachers. This would often lead me to get bullied by other students for being a “nerd” and satisfying my curiosity. But this didn't deter me from being inquisitive and asking questions. In fact, my computer science teacher used to help me research more about the field, and gave me a ton of programming questions. Even to this day I'm thankful to her for inspiring this interest in computer science, and I will never forget the joy I got from solving those questions given by her.

This interest in computer science led me to pursue a Bachelors of engineering in information technology. Since my undergraduate college was scheduled to start during 2020, the covid lockdown caused it to be delayed by a couple of months. Since a lot of classes and exams were conducted online this resulted in a lot of free time which I directed towards learning and exploring different technologies. I started with some basic web development and a certification course in artificial intelligence and machine learning. I was also an avid gamer and hence decided to explore the game development field. I started by learning 3D modelling in blender and then moved on to Unreal engine and Unity 3D. This resulted in helping me uncover my passion for design thinking, user interaction and utilised my natural skills for this subject for game development, augmented reality, and virtual reality. I wanted to use these newly learnt skills to design and create something interesting and fun.

During the initial days I used these newly learned skills and tools to make interactive tools and greetings for gifting my friends on their birthdays. For a friend who was at that time really interested in the process of making a “perfect“ sandwich, I made him an animation video in Blender 3D about what can be described as a perfect sandwich. I developed a 2D platform game for another friend's birthday. The game consisted of completing different challenges and retrieving certain items and bringing them to the end of the game. All the important items that the player had to retrieve and collect were a part of the wonderful collective memory we recounted as friends. I also created an Augmented Reality based greeting card using Unity3D and Canva. This greeting card consisted of a simple 3D animation that included a lot of our inside jokes and memories.

Even in undergraduate college, I always used to research more than what the syllabus entailed for the subjects. For example, during our Computer Network Security class, our professor told us that AES uses a table for substitution while encrypting a message. I asked the professor for this, and his answer did not satisfy me. So I looked them up, and came across the proposal paper for the Rjindael Cypher by Joan Daemen and Vincent Rijmen. I understood how they are created and how they are resistant to quite a lot

of cryptanalysis attacks. When some courses I wanted to take, like AR/VR, were not available as choices, I took to the internet to learn them and become proficient in them.

I also wanted to mentor students who had this similar passion for technology but couldn't get the resources or support to get them started. So a group of my friends and I decided to co-found Hacktech, a club for students where we would organise workshops and training sessions to get them the knowledge they required. Eventually, I was also able to become our college's Google Developer Student Club AR/VR Lead, where I could further mentor more students in the field of augmented and virtual reality.

Apart from this, I participated in a lot of college and inter university competitions with my friends at college. One of the most impactful competitions was the annual e-Yantra Robotics Competition, which is a sort of project based learning competition by e-Yantra, IIT Bombay. You choose a theme of a robot like a "Soil Monitoring Bot" or a "Pharma Delivery Bot". It gives you resources to complete a task in robotics, like pulse width modulation, and then you are required to use these for completing a task. The first stage is entirely on robotics and electronic simulators and then if you proceed to get to the second stage, you receive the parts required to make the robot for your theme. The competition involved a lot of problem solving and logical thinking, and while it was something that none of us had worked on before, we still found it fun. The first time we participated, we couldn't get to the finals. The competition was based on VHDL and required strong knowledge and experience of electrical and electronic concepts, which none of us had. We did not give up and researched hard, and got through to stage 2, but unfortunately couldn't get to the finals. For the second time we participated in the same competition, we worked on computer vision and raspberry pi using python. This time, we performed well and were able to do well and got the prestigious opportunity to intern at e-Yantra, IIT Bombay.

During the internship, I delved deeper into the field, leading a technical project to create a dynamic 3D Virtual Museum web based portal. Developed for e-Yantra's Virtual Museum competition, we came up with the concept of creating a dynamically scalable 3D Virtual Museum which can showcase artefacts made by school students, encouraging practical learning. Additionally, I conducted a non-technical project, researching immersive robotics education and also conducted a training session on the "sense-act-think" paradigm with 50 Bhutanese school students from the Royal Academy of Bhutan.

I also developed the VR concept for the 3D Virtual Museum concept and presented the same as a part of e-Yantra's team at the NEP 2022 Akhil Bharatiya Samagam Exhibition. Here, I got the opportunity to interact with students, parents, teachers and government officials and get them excited about the opportunities and development of the VR Virtual Museum as well as the other school related competitions that e-Yantra can provide. I enjoyed the interaction and realised that new age students want to learn how these competitions, puzzles and games assist them learn in a visual and interactive way.

These experiences have sparked a fire in me to work on these new age visual mediums and how they can not just make learning easier for children with learning disability but also take this to far flung corners of the world where there is a lack of teaching infrastructure. I truly believe that educating the world is the best form of making the world population employable and can help eradicate hunger and poverty which in turn can lead to world peace. I want to make learning easy and fun. I want students to actually want to explore and educate themselves in the fields that they want to. I want to use this passion to create learning applications for students. I want to be at the forefront of new technologies for bringing in a revolution in education.