LETTER OF RECOMMENDATION

With great pleasure, I am writing this recommendation for Shreyas to support his application for admission to your university's Ph.D. program in Computer Science & Mathematics. Shreyas has a deep passion for Computer Science and Mathematics and is one of the most innovative individuals I have encountered in my 25 years of teaching and research experience as a Professor at the K. K. Wagh Institute. I have worked closely with Shreyas as an advisor for his senior year project and have taught him several courses over two semesters in Machine Learning and Data Analytics.

I first encountered Shreyas during his sophomore year when he spearheaded an ambitious project about Galaxy Morphology classification, which was a comparatively complex problem to undertake at his level. Even though I was not directly involved in the project, I supported Shreyas whenever he needed help understanding a topic. Unlike other Computer Science students who often focus on the implementation details, he was more interested in the theoretical concepts, like manifold representations and the geometry of the data objects, typically introduced in Graduate school. His questions were thought-provoking and reflected his deep understanding of the complex mathematical concepts of calculus of variations & partial differentiation that make backpropagation work. I observed how he approached the problem and was immediately impressed with his critical thinking. He took ownership of the project and was highly nimble in his decision-making. People have cited his pre-print multiple times. Furthermore, the fact that he did all of this as a sophomore makes it much more impressive. This work showed his passion and cemented him as a budding researcher early in his career.

Shreyas has never failed to surprise me with his ardor for Science. Moreover, it is not only limited to Computer Science. Another instance of his abilities as a researcher came forth during his time working on an open-source project called EinsteinPy. The project required understanding many concepts of The General Theory of Relativity and advanced topics in Differential Geometry and Tensor Calculus. The fact that he studied the General Theory of Relativity and the relevant mathematics behind it in such a short period, all on his own, shows how much of a protean learner he is.

Academically, Shreyas is a strong student. He has excelled among his peers, his overall GPA is the highest across the institution, and he has received an award for academic excellence. I have found him to be an intelligent, motivated, and conscientious student in class. He often participated in class discussions and asked questions to ensure he understood the topic well. Shreyas is a self-motivated and hard-working student who can excel in a competitive academic environment.

As part of his Senior year project, I worked with Shreyas on applying the concepts of Generative Adversarial Networks to the domain of astronomical images. We worked on algorithms that would automate the processing of underprocessed images in extensive astronomical archives. Shreyas was

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resourceful in coming up with ideas to gather the data required and quickly implement various scripts that would enable scraping the archives. He and his teammates studied the literature on GANs extensively and were quick at implementing the discussed algorithms. I was pleased to see how efficiently he managed the team and ensured the uninterrupted progress of the project. He used project management techniques like Kanban to manage the project's workflow, and his critical thinking and decision-making had improved owing to his past experiences. I observed his leadership skills firsthand and found him to be respectful, open, and enjoyable among his teammates. He played to their strengths and delegated the tasks accordingly. Shreyas presented this study under the title *"Astronomical Image colorization and up-scaling with Conditional Generative Adversarial Networks"* at the *Informatik 2022* conference in Hamburg. The paper was published in the *Lecture Notes in Informatics (LNI), Gesellschaft für Informatik, Bonn 2022*. It was a commendable achievement as an undergraduate researcher.

Beyond his academic excellence, Shreyas is a charming individual who is respected and liked by his peers and faculty. He would stop by the teachers' cabin whenever he needed help, and we would chat about his latest developments, events in school, and various other topics. He managed his time effectively, participated in various school activities, and delivered lectures to his peers and juniors. I attended one of his lectures on Neural Networks, where he demonstrated excellent teaching skills as he simplified the topic's enigmatic aspects of Linear transformations and the chain rule in calculus while explaining the complex operations carried out during forward and backward propagation. He bagged the Best Outgoing Student of the Computer Department award for his achievements and multifaceted personality.

Overall, Shreyas exhibits excellent qualities of a leader with ample research experience. He is a hard-working, intelligent, and well-rounded individual with the maturity and the resolve to succeed in any endeavor. He emanates confidence and has a friendly personality, allowing him to get along well with others in any setting. I admire his honesty, sincerity, and intelligence and am impressed by his discipline as an independent learner. He is a promising research prospect worth investing in, and I strongly recommend his application to your esteemed university. I wish him all the best in his future endeavors.

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