

LETTER OF RECOMMENDATION

I am writing to recommend Mr. Vaibhav Varshney, who was my student at MIT World Peace University. As his professor, I taught him a Deep Learning course and evaluated his mini-project on “Tomato Plant Disease Detection” and poster presentation on “SimCLR: A Simple Framework for Contrastive Learning of Visual Representations,” and observed him as a hard-working and diligent student.

In the mini group project, “Tomato Plant Disease Detection,” Vaibhav was able to show how he approaches the problematic issue of plant disease detection by applying complex machine learning methodologies. Although this project started with tomato plants, Vaibhav later expanded it independently. Realizing that these ideas could be applied to many other domains, he defined the project as “Plant Disease Detection” and used a Kaggle set of 70,295 images in 38 different classes of crops. Vaibhav utilized tools and technologies to complete his work. He coded in Python, implemented convolutional neural networks (CNNs) using TensorFlow and Keras, and applied augmentations to improve image processing. To enhance his network, he used transfer learning, in which the layers of the pre-trained models were adjusted to better respond to the nature of his dataset. He used Matplotlib and Seaborn for data distribution and model accuracy and loss visualization helped him gain better insight into the learning patterns of the model. He developed a real-time web application with Streamlit, allowing users to upload images and get instant predictions. This solution provided an understanding of how he could create, optimize, and deploy machine learning models efficiently.

What sets Vaibhav apart is his proactive learning and outreach to the community. He went out of his way to interview local farmers to get firsthand information and interesting things they experience regarding plant diseases. The insights that he gained were of immense value in tweaking and expanding the service into a much broader service for detecting diseases in plants. His connection with the community depicts his commitment to using technology effectively for real-life applications.

Additionally, Vaibhav conducted extensive research on plant disease detection using deep learning techniques and published a paper titled “Advancements in Plant Disease Detection Technologies” in *YMER* in 2024. The paper was based on employing object-detection localization and classification algorithms to the recognition of plant diseases on multiple crops through image analysis. Although this was an independent research project, it demonstrated his grasp of how he could apply computer vision to agricultural health, a field that seeks to conquer crucial challenges in the farming industry. The publication showcases his proactivity and how he writes up practical experiences to share with the academic and research fraternity.

Vaibhav showcased his expertise through a presentation on SimCLR, where he explained the contrastive learning framework using PyTorch and Scikit-learn. He demonstrated how SimCLR enhances feature representation with limited labeled data.

With solid technical capability, creative problem-solving skills, Mr. Vaibhav Varshney stands as an outstanding candidate. Vaibhav has always been able to understand machine learning deeply and translate theory into practical solutions for solving problems in the working world. His analytical acumen, unremitting commitment to work, and cooperative personality will enable him to excel in a strenuous academic environment. I strongly believe that he will excel and emerge as a leader and an asset to the institution. If you have any more questions, please do not hesitate to reach out to me.

Sincerely,
Ms. Anita Gunjal
Assistant Professor
MIT World Peace University