

## LETTER OF RECOMMENDATION

### To Whom It May Concern

I am writing this recommendation letter for Mr. **Mallikarjun Bhusnoor**. In my capacity as an associate professor at KJ Somaiya College of Engineering, I have known him for over a year, during which I have served as his mentor for his final year project. Owing to the numerous opportunities I have had to assess his capabilities and skills, I can ascertain that he would be a fine addition to your master's program and has my highest recommendation for the same. Mallikarjun possesses sharp technological expertise in areas such as drone technology, machine learning, deep learning, autonomous vehicles, and OpenCV. He collaborated with me on a project titled "Surveying and Mapping of a Geographical Region using UAV Drones," aiming to build a quadcopter for stable flight, achieve drone autonomy via Mission Planner and Pixhawk, and enhance object detection with Raspberry Pi and Mobile-Net integration for remote surveying and forest fire detection. Mallikarjun developed autonomous capabilities through mission planning, deploying MobileNet on Raspberry Pi with integrated Arducam for real-time object detection. Moreover, he conducted both manual and autonomous flight tests to analyze the model's performance with varying speeds and heights of the drone.

I observed that Mallikarjun worked cohesively with his team during the challenges they faced. For instance, he encountered multiple challenges, such as power instability damaging motors, PID tuning, flight instability, and remote issues, along with autonomous flight deviations, GPS problems, and dataset creation complexity. He improved autonomous flight accuracy through redundancy checks and calibration. This project led to approximately three paper publications, namely, "Investigating the Impact of Distance on Object Detection Accuracy in Unmanned Aerial Vehicle Systems Using MobileNetV3," "Optimizing Performance and Cost-Effectiveness of UAV Design: A Comprehensive Guide to Conducting a Cost-Benefit Analysis of Drone Components," and "Unmanned Aerial Vehicle-Based Forest Fire Detection Systems: A Comprehensive Review." Additionally, the team published a dataset on "DroneVision: A Dataset of Aerial Videos for Computer Vision Applications."

Owing to his sound technical aptitude, Mallikarjun was permitted to conduct a 'Drone Manufacturing' Workshop for 10th-grade students. The objective of this workshop was to educate students about drone technology and provide hands-on learning experiences in drone assembly and programming, along with an understanding of drone applications. He was part of my team that worked to restore a damaged large-scale quadcopter for the Indian army. To summarize, Mallikarjun is a hardworking and focused student who not only has an excellent academic foundation but is also skilled at applying it practically. His ability to think beyond the scope of available literature would aid him in becoming a successful researcher. If you need any further information, please feel free to contact me.

Regards,



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