To Whom It May Concern

Sub: Reference Letter for Ketan Anand

This is to certify that *Mr. Ketan Anand (USN: 1MS18EI020)*, pursuing his Bachelor of Engineering in Electronics and Instrumentation Engineering at M. S. Ramaiah Institute of Technology, Bangalore has worked at *Intelligent Mobility Labs, Bangalore* under my supervision, as a *Perception Engineer* since 6th May, 2021. He has been an active member of two teams: First, working on *self-supervised monocular depth estimation and object detection* and at present, his efforts are focused towards implementing a novel *visual odometry* model to improve upon DeepVO (ICRA 2017) in the context of traffic scenarios on Indian roads. He is also serving as the *head of the Perception team* of Intelligent Mobility Labs, effectively leading a team of 15 members. Alongside technical work, Mr. Anand spearheaded the process of obtaining funding from ARTPARK at the Indian Institute of Science, Bangalore through their Ignite incubation program, securing an initial funding of *two lakh rupees* (approximately $2600).

The projects Mr. Anand worked on required good knowledge of machine learning, computer vision, control theory, sensor fusion and SLAM. The literature surveys he conducted for both these projects were presented by him to a team of 40 members, with clarity and command over the problem at hand. The architecture he developed for self-supervised monocular depth estimation and object detection involved implementing SAFENet (CVPR 2020) with a novel Generative Adversarial Network loss function that he formulated, followed by integration with the Multi-task Learning (MTL 2.0) stack. This model was then trained on the KITTI dataset and tested on data collected on Kolkata's roads obtaining an accuracy comparable to that of state-of-the-art models, the outcome is presented in this video: https://www.linkedin.com/posts/intelligent-mobility-labs_indian-street-activity-6834375620462489600-3n8o.

Mr. Anand's present project aims at improving traditional visual odometry techniques. He has been successful in implementing a deep recurrent convolutional neural network architecture that improves upon the DeepVO framework. Over the next few months, Mr. Anand along with members from the Perception team are keen on preparing a submission for CVPR 2022, to present this novel VO framework along with the MTL 2.0 model.

Throughout his tenure at Intelligent Mobility Labs, Mr. Anand has been a consistent and hard-working member. His research-oriented approach has helped keep the team up to date with new developments in his domain of focus. We appreciate his valuable contributions to the Perception team as well as the sponsorship group.

Yours truly,

Omkar D Ray

Omkar Debadarshi Ray
Co-Founder of Intelligent Mobility Labs