Hitesh Kumar

Deep Learning Researcher · Autonomous · Computer Vision

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"A healthy mind is an inquisitive mind."

Personal Profile

As a self-taught and passionate individual, I aim to pursue a Master's in AI/Robotics. Currently, I am a seasoned Deep Learning Engineer with over three years of experience in Deep Learning. My strong determination and vision for research have been further solidified through my work on projects involving Autonomous Vehicles, AI for Smart Cities, and challenging prototypes like the Mars Rover. **In the long term, I envision being the best at what I do. I believe an MS and a dynamic research culture will help me get there**.

Research Interests

Computer Vision, Autonomous, Deep Learning, Perception, Vision Language Model

Technical Skills

Platform/Tools: Linux, Docker, Google Cloud, ROS, CMake
Frameworks: OpenCV, Pytorch, Tensorflow, CUDA, Numpy, Matplotlib, FFMPEG, Git
Sensor/Hardware: ELP USB Cameras, IP Cameras, Nvidia Jetson Series, Raspberry Pi, Arduino, 2D / 4D Radar, 2D Lidar / Lidar, Intel Realsense, IR Sensor, Ultrasonic Sensor, Hall effect Sensor etc.
Programming: C++, Python, Golang
Languages: English, Hindi, Korean

Education

Delhi Technological University (Formerly Delhi College of Engineering) — Delhi, India
Bachelor of Technology in Mechanical Engineering (transcript) — *2016 – 2020*

Publications

1. Hitesh Kumar, Aditya Natu, Kunal Mathur. "Analytical and Computational Modelling of Go-Kart Powertrains". Published at International Journal of Mechanical and Production Engineering Research and Development (IJMPERD) 2020.

2. Hrishabh Jha, Ashutosh Panpalia, Devanshu Suneja, Geetanshu Ashpilya, Hitesh Kumar, and Vijay Gautam "Estimation Of Surface Roughness in turning operations using Multivariate Polynomial Regression". Published at Advances in Industrial and Production Engineering 2021.

Professional Experience

Deep Learning Engineer(Member of Technical Staff - I) - Autonomous R&D — Aug 2022 – till now
Euler Motors — *India*

- Key contributor in **building real-time ADAS (Advanced Driver Assistance Systems)** using pure C++; optimized for Nvidia Jetson Nano and Quectel SC600 infotainment system. Implemented forward collision warning with over **80% precision normally and over 85% precision at high speeds** for commercial electric vehicles.
- Built an ultralight (600kb) classification model using combined center loss and cross-entropy loss, achieving **over 95% accuracy for traffic lights in the wild**.
- Trained and optimized lightweight object detection with mixed precision training and segmentation models; **achieved over 60% and 50% model size reduction**, enhancing low-latency performance
- Collaborated in building **NVA (Night Vision Assist)** system using low light 850 band IR camera assisted with IR booster for forward collision algorithm; improved visibility and safety on foggy nights.

Deep Learning Engineer - R&D
SynergyLabs

July. 2021 - Aug. 2022

Gurugram

- Trained and customized classification & object detection models with data augmentation; achieved **14% increase** in performance on IoT device.
- Designed and implemented **automatic number plate detection** pipeline in Python to flag overspeeding vehicle for safe urban traffic monitering.
- Developed Vehicle Detection System deployed on highways; attained **less than 6% speed error** in detection

Deep Learning Intern - R&D
SynergyLabs

Feb. 2021 - July. 2021

Gurugram

- Collaborated with founder in developing **'Automatic Traffic Counter System (ATCS)'**; deployed across 300+ locations.
- Curated dataset for MobilenetV2 fine-tuning; reduced model size to 2MB, achieving 30% reduction.
- Developed ATCS product configuration UI with PyQT; reduced manual effort by 3x

TECHNICAL LEADERSHIP

Software Head
Inferno DTU : Mars Rover Team

2017 – 2019

- Led a multidisciplinary team for developing rovers for Mars Rover competitions globally. Achievements include 6th Rank in IRC(Indian Rover Challenge).

KEY TECHNICAL PROJECTS

Simplified Visual Odometry | *Github*   2023
○ Created a documented roadmap of the core fundamentals for visual odometry to help me and others.

Structure from Motion - Clean | *Github*   2023
○ An attempt to write clean and readable code for SfM pipeline unlike all the other implementations.

ReID Tracking using yolov8 | *Github*   2023
○ Integrated yolov8 with bytetrack and strongsort tracking algorithm to address re-identification problem.

Light object detection | *Github*   2023
○ An in-development package which aims to wrap up the lightweight object detection model for edge device inference.

Self driving vision stack | *Github*   2020
○ A simple primary self driving vision stack including Lane detection, Car detection, Traffic light detection, Pedestrian detection.

KEY COURSEWORK

Robotics: Introduction to Robotics, Sensing System, Control system & Artificial intelligence
Mathematics: Matrices, Fourier Transforms, Differential Equations, Calculus, Linear Algebra
MOOCs: Introduction to Self Driving Cars, Programming with Everybody (Getting started with Python).

TECH ACTIVITY

Society of Robotics DTU
Core Member

India

2016 - 2018

○ Served as a key organizer for University tech-fest; managed events like Robosoccer, Robofight.
○ Mentored juniors in computer vision fundamentals and career pathways.

InfernoDTU (Project Mars Rover Prototype)
Software Head (Autonomous)

India

2018 - 2019

○ Led autonomous tech team in developing Mars Rover Prototype's autonomous features for competitive events.
○ Utilized ROS in C++/Python for remote rover navigation.
○ Implemented traditional computer vision techniques using OpenCV for obstacle detection and collision avoidance.

InfernoDTU (Gokart) *India* *2017 - 2018*
Member
- Designed real-time pedestrian detection algorithm using OpenCV for Raspberry Pi 4b.
- Enhanced lane detection algorithm for improved performance.

REFERENCES (AVAILABLE UPON REQUEST)

Prof. Yashwant Koli
Assistant Professor
Department of Mechanical Engineering
Malaviya National Institute of Technology (MNIT)
Jaipur, India (302017)
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