# Hitesh **Kumar**

Deep Learning Researcher · Autonomous Vehicles · Robotics

*New Delhi, India*

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*"A healthy mind is an inquisitive mind."*

## Personal Profile

As a self-taught and passionate individual, I want to pursue a Master's in Robotics/AI. Currently, I am a seasoned Deep Learning Engineer with over three years of experience in AI. I am keen to work into research areas for AI strategies on autonomous vehicles and robotics. My strong determination and vision for research have been further enhanced after working on projects involving Autonomous Vehicles, AI for Smart Cities, and Mars Rover prototype-like challenging and fruitful themes. **In long term, i envision is to be the best in what i do. I believe an MS and a great lab environment will help me get there**.

## Research Interests

- Perception for Autonomous driving
- Computer Vision on Robotics
- Deep Learning
- Visual odometry

## 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 Radar, 4D Radar, 2D Lidar, 3D Lidar, Intel Realsense, IR Sensor, Ultrasonic Sensor, Hall effect Sensor etc. |
| **Programming** | C++, Python, Golang |
| **Languages** | English, Hindi, Korean |

## Relevant Professional Experience

### Euler Motors (EV startup)

*New Delhi, India*

Deep Learning Engineer, Computer Vision (Member of Technical Staff - I) - Autonomous R&D — *Aug. 2022 - Present*

- Key contributor in **building real-time ADAS (Advanced Driver Assistance Systems)** using pure C++; optimized for Nvidia Jetson Nano And infotainment system. Implemented forward collision warning with over **85% precision normally and over 90% precision at higher speed**.
- 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.
- Spearheaded the creation of a **model versioning system from scratch**, fostering improved model deployment and management practices for the whole team.

### SynergyLabs (AI startup)

*New Delhi, India*

Deep Learning Engineer - R&D — *July. 2021 - Aug. 2022*

- Trained and customized classification & object detection models with data augmentation; achieved **14% increase** in performance.
- Designed and implemented **automatic number plate detection** pipeline in Python to flag overspeeding vehicle.
- Developed Vehicle Detection System deployed on highways; attained **<6% speed error** in detection.
- Co-developed attention-based OCR model for license plates; achieved **over 95% accuracy** on standard plates.

### SynergyLabs (AI startup)

*New Delhi, India*

Deep Learning Intern - R&D — *Feb. 2021 - July. 2021*

- 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.
- **Debugged issues** and maintained error resolution documentation, saving teammates 3+ hours.
- Developed ATCS product configuration UI with PyQT; reduced manual effort by 3x.

## Education

### Delhi Technological University (formerly DCE)

*Delhi, India*

Bachelor of Technology in Mechanical Engineering — *2016- 2020*

- Relevant courses like "(PE413) Robotics and Automation", "(MOOC403) Introduction to Self Driving Cars".

# Tech Activity

**Society of Robotics DTU** *India*

Core Member *2016 - 2018*

- 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)** *India*

Software Head (Autonomous) *2018 - 2020*

- Led autonomous tech team (5+ members) 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*

Member *2017 - 2018*

- Developed TensorFlow-based CNN model for animal detection on roads.
- Designed real-time pedestrian detection algorithm using OpenCV for Raspberry Pi 4b.
- Enhanced lane detection algorithm for improved performance.

# Key Technical Projects

**Simplified Visual Odometry [LINK]** *India*

Github *2023*

- Created a documented roadmap of the core fundamentals for visual odometry to help me and others.

**Structure from Motion - Clean [LINK]** *India*

Github *2023*

- An attempt to write clean and readable code for SfM pipeline unlike all the other implementation

**ReID Tracking using yolov8 [LINK]** *India*

Github *2023*

- Integrated yolov8 with bytetrack and strongsort tracking algorithm to address re-identification problem.

**Light object detection [LINK]** *India*

Github *2023*

- An in-development package which aim to wrap up the lightweight object detection model for edge device inference.

**Self driving vision stack [LINK]** *India*

Github *2020*

- A simple primary self driving vision stack including Lane detection, Car detection, Traffic light detection, Pedestrian detection.

# Research Papers

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

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

# MooC

2023 **Build a Modern Computer from First Principles: From Nand to Tetris - (ongoing)**, Coursera
2023 **Visual Perception for Self-Driving Cars (University of Toronto) - (ongoing)** , Coursera
2020 **Robotics: Aerial Robotics (University of Pennsylvania)**, Coursera
2019 **Introduction To Self Driving Cars (University of Toronto)**, Coursera
2020 **Data Visualization**, Kaggle
2020 **AWS Machine Learning Foundation Course**, Coursera
2022 **Robotics: Perception (University of Pennsylvania)**, Coursera
2019 **Internet History, Technology, and Security**, Coursera