ROHIT R NATH

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Education

Indian Institute Of Technology, Madras **SEP 2024 - Present**
Masters in Industrial Artificial Intelligence, Chemical Engineering Chennai, India

Cochin University Of Science and Technology **AUG 2013 - JUN 2017**
Bachelors in Electronics and Communication Engineering Chengannur, India

Technical Skills

Programming: C/C++, Python, Data Structures and Algorithms (DSA), Linux System programming, IPC, Shell Scripting
Domains: Computer Vision, Deep learning(vision), Edge AI, Embedded Software, ADAS Perception and Planning, V2X, Robotics
Frameworks, Libraries: PyTorch, Tensorflow, Keras, ONNX, HuggingFace, Scikit-learn, OpenCV, GStreamer, AWS - EC2, Lambda, Qualcomm - SNPE, QNN, FastCV
Machine Learning: Object Detection and Tracking, Depth Estimation, Segmentation, Classification, Autoencoder, VLMs (ViT, CLIP, StableDiffusion), Quantization, Pruning
Miscellaneous: JIRA, Git, GDB, Wireshark, Data Visualization, CARLA Simulator, Sensor Modeling

Experience

Technical Lead, Autonomous Driving **OCT 2023 – Present**
KPIT Technologies Pathpartner, Bangalore

- Designing and developing real-time perception and planning solutions for ADAS.
- Technical guidance, collaboration with stakeholders, incremental product development, sprint execution, feature design and development are my daily tasks.
- Leading a team of 9 engineers for surround view and autonomous parking solution development for HPC
- Developed a deep learning based path planning solution for autonomous parking
- Developed test suites based on Carla simulator and rFpro simulators for demonstrating the 360 surround view and auto parking solutions
- Sensor modeling of fisheye cameras using cubemap to fisheye projection with kannala-bandth distortion which matches with the physical camera calibrations.
- Designed sensor fusion and sensor synchronization modules for Camera and Radar fusion

Senior Research Engineer, Autonomous Driving **OCT 2021 – OCT 2023**
KPIT Technologies Pathpartner, Bangalore

- Optimal implementation of low complex DL models and porting to QC platforms using Qualcomm's AI SDKs (QNN and SNPE)
- Optimization and Quantization of DL models using AIMET without loss in accuracy.
- Integrated the developed model with multi-camera applications running on qualcomm QNX hardware.
- Developed light-weight deep learning models for various ADAS applications including object detection, parking slot segmentation and monocular depth estimation.

Software Engineer, V2X Applications **DEC 2018 – SEP 2021**
Danlaw Inc Bangalore, India

- Developed V2X (Vehicle to Everything) based ADAS applications such as FCW, IMA, BSW, RLVW etc.
- Developed **core algorithms** of safety applications including Red-light Violation Warning (RLVW), Pedestrian Detection (PEDINX), and Signal Request for Emergency Vehicles (SRA), enhancing road safety and traffic management
- Developed vehicle misbehaviour detection algorithm to detect the cyber threats in the V2X network
- Implemented a real-time pedestrian detection leveraging **YOLOv4 tiny**
- Implemented a custom ligh weight autoencoder model for road map reconstruction from the minimal surround information for V2X applications.
- Developed various middleware applications for V2X adhering the microservice architecture.
- Developed GNSS Manager module, a common interface for various GPS protocols(UBX, NMEA) and deployed on OBU(On Board Unit) having high-precision GPS sensors such as Ublox M8U and M8L.
- Developed Vehicle Gateway module to read vehicle CAN data over socket-CAN and real-time abstraction of the vehicle data required by safety applications.
- Leading a team of 3 engineers for V2X HMI development, also provided guidance and mentorship.
- Introduced CARLA based HIL setup for V2X safety application testing which drastically reduced the in-vehicle testing dependencies.

Resource Person, Fablab **Jan 2018 – May 2018**
CEC Chengannur, Kerala

- Conducted training programs on IOT, embedded systems, PCB design and project design.
- Project Mentor for Diploma, B.Tech and M.Tech students for their academic projects.

Open Projects

ClipVision DriveSense - Data selection tool for vision application **APR 2023 - MAY 2023**

Self Research

- **ClipVision DriveSense** is a proof-of-concept designed for seamless data selection for perception model training, particularly in the automotive industry.
- Using the power of the Open CLIP model, the app efficiently filters relevant images from videos based on prompts.
- **Tools:** Pytorch, CLIP Model, Huggingface, Streamlit

No-Code AI Web Application for Researchers **FEB 2021 - APR 2021**

Derbi Hackathon

- A simple easy to use deep learning model trainer. You can train your model without any knowledge on deeplearning or programming.
- The web application supports Image classification and gradCAM visualization for explainable AI. This platform is useful for Researchers in Medical domain.
- **Tools:** Pytorch, Gradcam, Image classification AWS EC2, Lambda, HTML5

Advanced Time Series Analysis **NOV 2024 - DEC 2024**

Advised by Prof. Babji Sreenivas

- investigates time series modeling techniques applied to two distinct datasets:Airline passenger traffic and Nifty50 stock market index.
- Employing statistical methods such as ARIMA, SARIMA, and the deep-learning based Prophet model.

Monocular Depth Estimation and Segmentation **JAN 2020 - MAR 2020**

Advised by Prof. Rohan Shravan

- Monocular Depth Estimation and Segmentation A custom CNN model, CNN-Network that can do monocular depth estimation and foreground-background separation simultaneously was build.
- My custom autoencoder model consist of dilation kernels, depthwise separable convolutions, Atrous convolution and pixel shuffling.

GPS based Autopilot system **SEP 2016 - MAR 2017**

Advised by Prof. Liju Philip

- We have developed an Autopilot system based on GPS and magnetometer (electronic compass). The system can be mounted on a UAV Drone or a boat or even a submarine or a car (RC toys).
- **Tools:** Atmega328, GNSS - Ublox Neo-8l, Magnetometer - HMC5883l, Differential mototr driver, C/C++,Python, Kalman filter, Trignometry, geo-fencing

Achievements

- **Growth and Learning Champion - KPIT 2024**
- **The Distinguished Contributor - KPIT 2023, 2024**
- **Danlaw Order of Excellence – Platinum 2019.**
- **Wit-Hustle hackathon winner.**
- **Topper in EVA4 phase 1 and phase 2**
- **Listed in India's top 10 Arduino developer freelancers to hire in Upwork for June 2017.**
- **IEEE robotics society R&D team coordinator 2015-16.**

Courses And Certifications

- **Advanced Embedded System Certification from Vector India, Bangalore.**
- **Extended Vision AI(EVA4), Inkers.ai (theschoolofai.in)**
- **Reinforcement Learning Specialization by University of Alberta**
- **Control Of Mobile Robots by Georgia Institute of Technology.**
- **Robot Localization with Particle Filters**
- **Zero to GAN in Deep Learning by Jovian.ml**