NAVODIT CHANDRA

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EDUCATION

Carnegie Mellon University, College of Engineering Pittsburgh, USA
Master of Science | Specialization in AI and Robotics Dec 2022
GPA: 3.97/4.00
Selected Coursework: Machine Learning and Artificial Intelligence, Deep Learning, Computer Vision, Trustworthy AI Autonomy

Indian Institute of Technology Kanpur Kanpur, India
Major in Mechanical Engineering | Minor in Electrical Engineering May 2021
GPA*: 9.1/10.0*

WORK EXPERIENCE

Qualcomm Hyderabad, India
Computer Vision Systems Engineer June 2023 - Present

- Implemented an algorithm for rendering shallow depth of field effects on an all-in-focus video stream using classical computer vision
- Developed a convolutional neural network architecture for depth estimation from a single image suitable for meeting real-time latency, power and memory requirements
- Implementing quantization techniques on a deep learning model for optical-flow

SKILLS

Programming Languages: *Proficient*: Python, C++, *Familiar*: SQL, Java, HTML
Libraries: PyTorch, OpenCV, Gym, NumPy, Pandas, Matplotlib, Scikit-learn
Software and Tools: Linux (Ubuntu), CARLA, MATLAB, MAPLE, Arduino, Git

RESEARCH EXPERIENCE

Carnegie Mellon University Pittsburgh, USA
Graduate Researcher, Mechanical and Artificial Intelligence Lab May 2022 - Dec 2022

- Generated a dataset consisting of **RGB images** and **LIDAR point cloud** in autopilot mode on CARLA simulator
- Refined **image** and **point cloud** feature maps processed by ResNet neural network architecture by introducing **Convolutional Block Attention Module**
- Improved **Driving Score** evaluation metric by **9.5%** by implementing **Additive Attention** for computation of alignment scores in **transformer block** used to combine intermediate image and LiDAR feature maps
- Experimented model performance in simulation by replacing **Self-Attention module** with **Cross-Attention module**

RELEVANT PROJECTS

End to End Learning for Self-Driving Cars Feb 2022 - Apr 2022

- Predicted **steering angle** of a self-driving car from images captured by it by developing an **end-to-end** learning pipeline
- Accomplished reasonably good performance on training and testing tracks by executing **CNN** and **CNN-LSTM** neural network topologies in a team of 2

Modeling and Study of Adversarial Attacks Arising from Deceiving Perception in Car Autopilot Feb 2022 - Apr 2022

- Collaborated in a team of 3 and simulated a **real-life incident** of tricking a self-driving car to misidentify **moon** as a **yellow traffic light** deploying a targeted **adversarial attack algorithm**
- Executed **PGD algorithm** to trick autopilot system and carried out adversarial training as an effective **adversarial defensive technique** to avert such safety-critical scenarios

Seven Segment Digit Recognition using Computer Vision Mar 2022 - Apr 2022

- Collaborated with 2 colleagues and developed an **algorithm** to take readings from devices using seven-segment display
- Enhanced **accuracy** by **7.8%** and **speeded up** process of taking readings by **10.4 times** in comparison to average computer typists by utilizing **image processing** operations and **computer vision techniques**

Depth Estimation leveraging Stereo Vision and Generation of 3D Point Cloud Mar 2022 - Apr 2022

- Found **depth** of pixels from **disparity map** produced by pair of **parallel stereo** images to compute **distance** of objects
- Generated a **3D point cloud** for visualization and verification of correctness of **scaling ratio** used to find depth

Edge Detection Apr 2022 - Apr 2022

- Detected edges in images by implementing a **Sobel filter** from **scratch** and applying **Canny edge detection** with **increased performance** by tuning parameters

Semantic Segmentation for Drivable Area Detection May 2022 - May 2022

- Applied semantic segmentation on BDD100k dataset for detection of **drivable area** and **adjacent lane**
- Implemented **DeepLabv3+** neural network architecture involving a combination of spatial pyramid pooling and encoder decoder structure for **enhanced** performance

Identification of Abnormal Breasts as Potential Cancers using Machine Learning Oct 2021 - Dec 2021

- Applied **feature engineering** leveraging **shallow machine learning** classfication algorithms in a joint effort with 2 colleagues to estimate **minimum** number of features to predict whether tumors were malignant or benign