NAVODIT CHANDRA

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EDUCATION

Carnegie Mellon University (CMU)   Pittsburgh, PA
Master of Science in Mechanical Engineering - Advanced Study   Dec 2022
GPA: 4.0/4.0
Selected Coursework: Machine Learning and Artificial Intelligence, Deep Learning, Computer Vision, Trustworthy AI Autonomy

Indian Institute of Technology Kanpur (IIT Kanpur)   Kanpur, India
Bachelor of Technology in Mechanical Engineering | Graduated with Distinction   May 2021
GPA: 9.1/10.0

SKILLS

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

EXPERIENCE

Carnegie Mellon University   Pittsburgh, PA
Summer Research Internship, Mechanical and Artificial Intelligence Lab   May 2022 - Aug 2022
- Generated a dataset consisting of **RGB images** and **LiDAR point cloud** operating autopilot mode on CARLA simulator
- Reduced **number** of **trainable parameters** in **Transformer-Based Sensor Fusion** model by modifying neural network architecture and introduced **learning rate decay** to boost training
- Refined **image** and **point cloud** feature maps processed by ResNet neural network architecture by introducing **Convolutional Black Attention Module**
- Improved **driving score** 1.5 times and **route completion score** 2 times by replacing **self attention** module by **cross attention** module in transformer block used to combine intermediate feature maps

Indian Institute of Technology Kanpur   Kanpur, India
Students-Undergraduate Research Graduate Excellence Fellow, Energy Conservation & Storage Lab   May 2019 - July 2019
- Studied effects of gas velocity, operating current, surface wettability and capillary number on a **PEM Fuel Cell** operation by means of a **parametric study**

ACADEMIC 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 electronic devices depicting decimal numerals in a seven-segment display format
- 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   Apr 2022 - Apr 2022
- Found **depth** of each pixel from a **disparity map** produced by a pair of parallel **stereo images** to calculate distance of objects present
- Generated a colored **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

Identification of Abnormal Breasts as Potential Cancers using Machine Learning   Oct 2021 - Dec 2021
- Applied **feature engineering** leveraging **shallow machine learning** algorithms in a joint effort with 2 colleagues to estimate minimum number of features to predict whether tumors were malignant or benign

Extended Kalman Filter for Simultaneous Localization and Mapping of Vehicle   Nov 2021 - Nov 2021
- Implemented Extended Kalman Filter for **localization** of a self-driving car in **absence** of default **sensor input**
- Achieved position in **top 20%** of class in terms of **completion time** of driving track