NAVODIT CHANDRA

navoditc@andrew.cmu.edu ♦ 412-954-8627 ♦ linkedin.com/in/navoditchandra/ ♦ github.com/navoditc

EDUCATION

Carnegie Mellon University (CMU) Pittsburgh, PA

Master of Science in Mechanical Engineering - Advanced Study GPA: 4.0/4.0 Dec 2022

Coursework: *Machine Learning and Artificial Intelligence, Deep Learning, Computer Vision, Trustworthy AI Autonomy, Modern Control - Theory and Design, Robot Dynamics and Analysis, Numerical Methods*

Indian Institute of Technology Kanpur (IIT Kanpur) Kanpur, India

Bachelor of Technology in Mechanical Engineering (Graduated with Distinction) CPI: 9.1/10.0 May 2021

Coursework: *Robot Motion Planning, Data Structures and Algorithms, Fundamentals of Computing*

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

Graduate Student Researcher, Mechanical and AI Lab (Prof. Amir Barati Farimani) May 2022 - Present

- Achieved **state of the art performance** on tasks of **shape classification**, **part segmentation** and **semantic segmentation** by implementing **Point Cloud Transformer** framework
- Generated a dataset consisting of **RGB images** and **LiDAR point cloud** using autopilot mode on CARLA simulator
- Reduced **number** of **trainable parameters** in **TransFuser** model by modifying neural network architecture and introduced **learning rate decay** to improve training
- Augmenting neural network architecture with **Convolutional Black Attention Module** to **navigate** road intersections with **improved performance**

Indian Institute of Technology Kanpur Kanpur, India

Students-Undergraduate Research Graduate Excellence (SURGE), Energy Conservation & Storage Lab (Prof. Malay Das) May - 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** using simulations

PROJECTS

End to End Learning for Self-Driving Cars, CMU 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
- Achieved reasonably good performance on training and testing tracks by implementing **CNN** and **CNN-LSTM** neural network topologies

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

- Worked in a team of 3 and simulated a **real-life incident** of tricking a self-driving car to misidentify the **moon** as a **yellow traffic light** using a targeted **adversarial attack algorithm**
- Implemented **PGD algorithm** to trick the 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, CMU 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
- Improved **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 using Stereo Vision and Generation of 3D Point Cloud, CMU 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, CMU Feb 2022

- Detected edges in images by implementing a **Sobel filter** from **scratch** and using **Canny edge detection** with **enhanced performance** by adjusting parameters effectively

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

- Applied **feature engineering** leveraging **shallow machine learning** classification algorithms on Wisconsin Breast Cancer Data Set in a joint effort with two colleagues to predict whether tumors were malignant or benign
- Achieved an **implementation time** of **4.61 ms** and an **accuracy** of **100%** using a single feature with the K-Nearest Neighbor algorithm found to be best at making predictions