Avi

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Education

Carnegie Mellon University **Aug'22 - Present**

Master's of Science, Artificial Intelligence Engineering GPA: 4.0/4.0 Pittsburgh, USA

Coursework: Deep Learning, Visual Learning & Recognition, Computer Vision, Multi-modal Machine Learning

Indian Institute of Technology Kanpur **Jul'18 - Apr'22**

Bachelor of Technology, Mechanical Engineering GPA: 8.0/10.0 Kanpur, India

Coursework: Optimal Control & Reinforcement Learning, Bayesian Models, Data Mining, Robot Motion Planning

Experience

Carelog **Aug'23 - Present**

Machine Learning Engineer Remote

- Developing Deep Learning algorithms on ECG signals to enable early diagnosis and help manage clinical conditions
- Implemented Masked Auto Encoding for 12 Lead ECG Signals for Ejection Fraction and Arrhythmia Classification

Signify (Philips Lighting) **June'23 - Aug'23**

Machine Learning Research Intern Burlington, MA

- Designed a Pet Monitoring system utilizing Clip Based Zero Shot Activity Recognition and Automatic Prompt Generation
- Created CLIP classes using prompt engineering for LLMs by providing Objects recognized by YOLOX and VQA
- Added Multi-Modal Audio Detection model to the Monitoring System to identify different kind of pet noises
- Used DeepSORT to identify time-stamps when the Activity Recognition Model should be used to reduce computational load
- Developed an app using Streamlit with a timeline for seeing highlights for a long video

BioRobotics Lab CMU **Jan'23 - April'23**

Research Assistant Pittsburgh, PA

- Learned, linearized and encoded the dynamics of human movements while cooking for a robot using a VAE
- Performed trajectory tracking for human trajectories on the robot using Time-Varying Linear Quadratic Regulator

A.T. Kearney **Dec'20 - Jan'21**

Analyst Gurugram, India - WFH

- Designed a rating system for retail outlets based on text analysis of reviews and ratings provided by customers
- Implemented Aspect Based Sentiment Analysis for categories obtained using BERT(Bidirectional Encoder Representations)

Technical Skills

Languages: Python, C++, C, Matlab, SQL

Softwares and Libraries: Pytorch, Pandas, Numpy, Scikit-learn, Matplotlib, Spark ML, Tensorflow, OpenCV, Open3D

Projects

Attention-based Fusion Network for 3D Semantic Segmentation Jan'23 - May'23

- Designed a non-convolution model for sensor fusion using cross attention for 3D Semantic Segmentation for Point Clouds
- Obtained a mIoU of 45.5 with a FPS of 24 after training for only 30 hours on a single A40G GPU
- Used hinting loss for pretraining the sensor fusion module for faster and more efficient training

Physics Informed U-Shaped Neural Operators Aug'22 - Dec'22

- Implemented UNet architecture of varying depths with spectral layers to solve Darcy's equation on a 2D Domain
- Optimized solution using Physics Informed loss for particular instances achieving L2-norm loss of 0.18

Detecting Cracks on Phone Screens Aug'22 - Dec'22

- Created a dataset of masks of mobile phones in user clicked images using Labelme to train an UNET for segmentation
- Detected Cracks on Segmented Phone Screens using Canny Edge detector and transformations to get uniform mobile screens

Prediction and classification of network attack in MQTT(IOT) dataset Aug'22 - Dec'22

- Utilized PySpark for data engineering and sparkML for training a random forest classifier with 0.88 accuracy
- Used Cloud SQL, Docker, Postgres SQL, Google Cloud Engine on Google Cloud services to host the project

Solving Patch Foraging Tasks with Reinforcement Learning Apr'21 - Aug'21

- Collected and Assessed data of a patch foraging task and found trap-line for individual data tuples utilizing REGEX
- Built a Q-learning model with various exploration techniques which correctly figured out optimum trap-line

Melody Estimation from Polyphonic Music Signals Jan'21 - Apr'21

- Proposed an Semi-supervised learning (SSL) method applying teacher-student models for dominant frequency extraction
- Trained on MIR-1K dataset and achieved Raw pitch accuracy of 0.66 and Raw chroma accuracy of 0.70 on MIREX-05

Achievements

Won the Best Intern Award at Signify in the Summer'23 Internship Program

All India Joint Entrance Examination Advanced (2018): All India Rank 1413 (out of 1.3 million students)

Course Assistant for Machine Leanrning for Engineers, CMU: Responsible for Grading and Holding office hours