MANASA SATHYAN

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EDUCATION

University of Pennsylvania, School of Engineering and Applied Sciences **Philadelphia, PA**
Master of Science in Engineering, Robotics, May 2023

GPA: 3.90/4
Courses: Applied Machine Learning, Computer Vision, Machine Perception, Learning in Robotics
Roles: Teaching Assistant for Applied Machine Learning

PES University **Bangalore, India**
Bachelor's in Technology, Electronics and Communication, Jul 2020

GPA: 9.27/10
Courses: Machine Learning, Data Science, Image Processing, Linear Algebra, Algorithms, Data Structures, Database Management, Operating Systems (OS)

PROJECTS

- **Optimization of Image Embeddings for Few Shot Learning** - Improved quality of image embeddings of an existing state-of-the-art few shot learning solution for **image classification** using Graph Neural Networks (GNNs) by proposing alternate **Deep Learning (DL)** architectures. Experimented with architectures such as UNet, InceptionNet, and SqueezeNet on PyTorch. Published a research paper titled "Optimization of Image Embeddings for Few-Shot Learning" at the *International Conference on Pattern Recognition Applications and Methods (ICPRAM'21)*, Springer, Malta, 2021.
- **3D Human Pose Estimation from Single Images** - Implemented a **Generative Adversarial Network (GAN)** to predict 3D human poses from 2D joint locations in single images. Used OpenPose to generate key-points (x,y coordinates of joints) which are fed into the GAN to predict z-coordinates. The Generator and Discriminator of the GAN are Multi-Layer Perceptrons trained using Binary Cross Entropy Loss. Additionally, a Heuristic Loss was implemented for the generator to account for the occasional generation of inverted 3D poses. Visualized the generated 3D poses using Plotly.
- **Monocular Depth Estimation from Single Images** - The problem of **Monocular Depth Estimation** from RGB images was studied for a multimodal Visuotactile-Proximity sensor. A new dataset was created from the sensor in which the data collection was automated using a desktop robot arm, perturbation object, a NVIDIA Jetson Xavier, and the sensor. The performance of existing monocular depth estimation models such as UNet and ResNet were trained and compared on our dataset.
- **Indoor Object Retrieval using Swarm Intelligence** - Developed an indoor positioning and region division algorithm for a **multi-robotic system** to facilitate swift **object detection** in an indoor workspace. Implemented a two-bot system, each driven by a Raspberry Pi Zero W. Published a research paper titled "Object Retrieval in an Indoor Environment using Swarm Intelligence" at the *International Conference on Computing, Communication and Networking Technologies (ICCCNT'20)*, IIT Kharagpur, 2020.

EXPERIENCE

Itron India, Pvt., Ltd., Firmware Engineer, Aug 2020 - Jun 2021 **Bangalore, India**

- Programmed a time synchronization module for Itron's smart IoT embedded router - IoTR based on the Chrony implementation of Network Time Protocol. Packaged the module using Canonical's snapcraft package manager for integration into the main framework. Deployed in Release 1 of IoTR.
- Set up a mesh network consisting of IoTRs acting as edge routers and access points to test networking functionalities of the router. Enabled and tested Peer-to-Peer (P2P) communication between the endpoints over the mesh.

SKILLS

Programming Languages: Python, C, C++, MATLAB, Verilog, Assembly Language, SQL
Softwares/Frameworks: PyTorch, OpenCV, Linux, Wireshark, Git

EXTRA CURRICULARS

- Core Committee Member and Founder of IEEE Robotics and Automation Club of PES University.
- Creator of a dance YouTube channel that currently has over 41k subscribers and 14 million views.