

Amirtha Varshini A S

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EDUCATION

- **Georgia Institute of Technology**, Atlanta, GA Aug. 2021 - May 2023
Master of Science in Computer Science (ML Concentration) **GPA: 4.0/4.0**
- **National Institute of Technology Tiruchirappalli**, India Jul. 2014 - May 2018
Bachelor of Technology in Electronics and Communication Engineering **GPA: 8.90/10**

TECHNICAL SKILLS

- **Languages:** Python, C, C++, C#, SQL, HTML, CSS, JS, PHP, Bash, TCL
- **Frameworks:** PyTorch, TensorFlow, Scikit-Learn, SciPy, Pandas, Numpy, OpenCV, Linux, QNX, ARM V8, CUDA, Unity

EXPERIENCE

- **Amazon Robotics**, Westborough, MA - *Software Engineer Intern* May 2022 - Aug. 2022
 - Performed object tracking on packages in a warehouse by integrating with segmented shipping labels returned by AR-ID, an ML, and CV-based solution. Successfully enabled AR-ID to process multiple packages using this tracking.
 - Developed an app using Augmented Reality(AR) in Microsoft Hololens 2 to identify the current package picked or stowed, based on the collision of the tracked package's hologram with a spatially anchored hologram mesh.
- **Qualcomm**, Bengaluru, India - *Software Engineer* Jul. 2018 - Aug. 2021
 - *ADAS platform team* - Designed Minidump feature on QNX Real-time operating system to capture a snapshot of system post-crash. Also built a GDB-based Python and C parser to extract debug information from the RAM dump.
 - Brought down the dump download time by **70%** and the size from **12GB to 300 MB**, enabling faster analysis.
 - Developed FastRPC to offload high-compute tasks from CPU to Digital Signal Processors, improving performance.

ACADEMIC PROJECTS

- **Explainability for Proactive Robot Assistance via Semantic Object Tracking** Aug. 2022 - current
 - *Advised by Prof. Sonia Chernova* - Developing explainability for a dynamic graph neural network (GNN) that performs spatio-temporal object tracking and models the future movement of daily-use objects in a home environment.
 - Experimenting Layer-Wise Relevance Propagation and attention, to beat benchmarks GNNExplainer and PGExplainer.
- **Video Prediction using Latent Diffusion** Aug. 2022 - current
 - Trained a transformer to predict the sequential frame embeddings of a video using Stable Diffusion Image encoder **Link**
 - Predicted embedding sequences are denoised and decoded to produce future frames conditioned on input text and video.
- **Deep Reinforcement Learning (RL) based autonomous driving** Jan. 2022 - May 2022
 - Built a model-free RL algorithm TQC (Truncated Quantile Critics) with experience replay and increased rewards by **17%** for navigation in self-driving simulator Donkeycar, outperforming benchmark algorithms DDPG, SAC, and PPO.
 - Improved rewards by **42%**. by training a Variational Autoencoder to compress input into a latent space representation
 - Generated a semantic segmentation mask using a pretrained autoencoder to visualize the model for interpretability.
- **Semantic Similarity and Toxicity Detection of Questions in Quora** Sep. 2021 - Dec. 2021
 - Using PyTorch, compared the results of BERT, Bi-LSTM, Bi-RNN, and Bi-GRU models with NLP word-embedding techniques TF-IDF Vectorization and Word2Vec to predict intent similarity and toxicity of questions on Quora. **Link**
 - Achieved F1-score of 0.7 by fine-tuning BERT to predict question sincerity and accuracy 0.89 for questions' similarities.
- **Computer Vision Tools for Non-verbal Communication in Interviews** Aug. 2021 - Dec. 2021
 - Devised a K-Nearest Neighbours(KNN) model to estimate head pose in videos with accuracy **83%**. Obtained features as the difference in minima and maxima of first-order pitch differences, from OpenFace Keypoints output on AMI corpus.
 - **Runner-up at Innovation Competition 2022**, an Entrepreneurial challenge of VentureLabs, Georgia Tech. **Link**
- **Low-cost intelligent vision in automotive (LIVA)** Jun. 2019 - Oct. 2019
 - Collected dataset of depth images using Kinect V2 mounted on a moving car. Achieved object detection accuracy **85%** in real-time to recognize pedestrians and vehicles by fine-tuning YOLO V3 model with depth images and COCO dataset.
- **Real-Time Hand Gesture Recognition system** Jan. 2018 - May 2018
 - Fine-tuned Inception V3 Architecture on ASL dataset to detect gestures with 98% accuracy and controlled a robotic arm
 - A.S.Amirtha Varshini,"Real-time Hand Gesture Recognition for Robotic Arm and Home Automation", (**ISEEIE 2021**)

EXTRACURRICULARS

- Mentor in BridgeUP STEM AI program (sponsored by NCWIT) and teaching Assistant in CS 6603-AI, Ethics and Society
- Recipient of **K. C. Mahindra Scholarship** for Post Graduate Studies Abroad, 2021