

# Sri Anumakonda

[Website](#) | [Email](#) | [Linkedin](#) | [Github](#) | [Twitter](#) | [Medium](#)

## PROJECTS

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- X-E2E: Explainable End2End Learning for Autonomous Vehicle Systems** Aug. 2023 – Present
- My attempt on solving the explainability problem (XAI) of self-driving systems in order to better understand why autonomous vehicles make the decisions they make
  - Pairing saliency mapping w/ intermediaries in end2end models (semantic segmentation, depth estimation) with multi-modal LLMs to understand the rationale behind end2end models
  - Leveraging the use of Open-AI's GPT-4 API to input intermediaries + predicted steering/speed values in order to create a rationale policy for the ego-vehicle
- CUDA-Optimized Semantic Segmentation for Autonomous Vehicles** | [Github](#) Feb. 2023 – May 2023
- Creating a U-Net-like architecture with Custom Loss Functions to perform semantic segmentation on the CityScapes dataset
  - Leveraging PyTorch's LibTorch C++ API to deploy models from Python  $\Rightarrow$  C++ and run predictions through OpenCV
  - Using Torch JIT's framework to convert PyTorch models into TorchScript for faster pre-processing on CUDA kernels and in C++
  - Future plans: incorporate NVIDIA TAO and other SDK frameworks to deploy the model with the highest FPS possible
- VARS: A Vision-Based Approach to Robotic Self-Driving Cars** Jul. 2022 – Aug. 2022
- **NOTE:** Project on pause due to limited hardware supplies
  - Using a DonkeyKit + hardware customization to create a robotic self-driving car capable of driving on sidewalks on a Raspberry Pi 4
  - Replicating full-stack self-driving software from perception  $\rightarrow$  trajectory generation and control, actively learning about deploying PyTorch models onto the Pi
  - Using OpenCV to take in images of sidewalk lanes and applying Gaussian Blur + Canny Edge Detection to output lane lines (non-Deep Learning approach)
  - Implementing [ORB-SLAM3](#) for Simultaneous Mapping and Localization (SLAM) as the car navigates its way through the world (sidewalks)
- End2End Learning for Lateral Control** | [Github](#) Nov. 2021 – Jan. 2022
- Implemented NVIDIA's End2End Learning Paper from scratch to create a network for lateral control of autonomous vehicles
  - Researched various types of mechanisms and prototyped with several types of networks such as attention networks, interpretable end2end, and lateral control with MPC
  - Broke down end2end approaches of companies such as [Wayve](#) and [comma.ai](#) and created POCs to understand what needs to be true to create fully end2end systems
- DataGAN: Leveraging Synthetic Data for Self-Driving Vehicles** | [Github](#) [Medium](#) Sept. 2021 – Nov. 2021
- Used DC-GANs (FCNs) to take in input images of road scenes from the Cityscapes dataset and understands in-depth features of what is a realistic scene image
  - Trained for 4000+ epochs on more than 2000+ images to generate realistic scene images, following an approach similar to BigGAN
  - The main intention behind this project was to understand what adversarial scenarios (out-of-distribution events) take place when deploying an autonomous vehicle. Using that data, my goal would then be to extrapolate on it, generate several thousands of realistic images, and be able to plug it into a perception/planning module to see how it would react.
  - Future plans include: collecting OOD scenarios whether in simulation or real-world, and be able to scale up and create these closed loop systems
- Become a Self-Driving Car Engineer** | [Term 1](#) [Term 2](#) [Capstone Project](#) [Certificate](#) Mar. 2021 – May. 2021
- Became one of the youngest certified self-driving car engineers in the world, after going through Udacity's nanodegree from start to finish in 12 weeks

- Learned everything there is to know about self-driving, from sensor fusion and localization to trajectory controlling and execution using PID controls
- Written 5+ articles on my medium spanning across the parts of AV software + the technicals behind it including trajectory generation, localization, and kalman filters

## Advanced Lane Detection and Object Detection | [Github](#) [Medium](#)

Mar. 2021

- Using traditional Machine Learning approaches from camera calibration  $\Rightarrow$  lane detection + object detection
- Used Sobel filters to perform edge detection followed by a bird's eye view perspective warp through a fixed ROI which is then fitted to a polynomial curve
- Created a sliding window implementation using SVMs to detect cars paired with a heatmap in order to create bounding boxes for the cars

## EXPERIENCE

### Associate Member

June 2022 – Present

*Masason Foundation*

*Austin, TX*

- Founded by Masayoshi Son, the Masason Foundation is a program that helps young individuals to develop skillsets to create the world of tomorrow, and contribute to the future of humankind
- Support for my research in AI + Computer Vision is given to help solve some of the world's biggest problems and build the future of humankind
- I'm one of the 34 members selected (2% acceptance rate) of the 2022 cohort, currently am pursuing self-driving and AI research there

### Alumni

Sept. 2020 – June 2022

*The Knowledge Society*

*Toronto, ON*

- Underwent human accelerator training for 2 years, where I learned about mindsets and philosophy and gained the skillsets to solve some of the world's biggest problems
- Worked with [Shell](#), [the UN](#) and [Instacart](#) on reducing carbon emissions by 50%, creating post-secondary pathways for women in South Africa, and creating systems to incentivize shoppers and employees respectively.
- Built 20+ AI projects in the space of 12 months, ranging from [Mask Detection](#) to [Skin Cancer Detection](#)
- Full portfolio can be found on my [Github](#)

## MEDIA

- Austin Computer Vision Meetup (sponsored by Voxel51): [Scaling Autonomous Vehicles with End2end Learning, recap article](#) [Nov 2022]
- SiriusXM: [Meet 3 Teens in Canada Who are Changing and Impacting the World With Tech](#) [Oct 2022]
- The Logic: [The Young Canadian innovators getting a boost from Softbank's Son](#) [Oct 2022]
- David Silver: [Sri Builds a Real Self-Driving Car!](#) [June 2021]
- Udacity: [Autonomous Tech Dreams of the 14-year-old Sri Anumakonda](#), [accompanying article](#) [April 2021]

## EDUCATION

### Westwood High School

Austin, TX

*G/T Program with APs*

*Aug. 2022 – May 2024*

### The Woodlands School

Mississauga, ON

*Enhanced Learning Program*

*Sept. 2020 – June 2022*

## TECHNICAL SKILLS

**Interests:** Autonomous Vehicles, Computer Vision, Artificial Intelligence, Deep Learning, Trajectory Generation, Localization, Hardware

**Languages:** Python, C++, Java, HTML/CSS, JavaScript, CUDA, Git

**Frameworks:** PyTorch, Tensorflow, Keras, OpenCV, NumPy, scikitLearn, Matplotlib, AWS

## REFERENCES

**Shreyas Kosuik** - [Assistant Prof at Georgia Tech's George W. Woodruff School of Mechanical Engineering](#)

**Daniel Rothenberg** - [Staff SWE / Technical Lead, Atmospheric Science, Waymo](#)