

Sai Bhargav AVULA

Computer Vision and Perception Engineer | Technology Innovation Institute

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I am currently working as a Computer Vision and Perception Engineer at Technology Innovation Institute(TII), Abu Dhabi where I am developing and deploying state-of-the-art Computer Vision algorithms in the context of semantic segmentation and tracking both in Visible and Thermal Domain.

Prior to this I worked at Qualcomm and MathWorks where I had an amazing time solving several Computer Vision problems. My research interests solving real-world problems in robotics, and computer vision intertwining with Deep Learning. When I am not working on Computer Vision problems, I read, watch and write.

EXPERIENCE

September 2022 Present	Computer Vision and Perception Engineer, TECHNOLOGY INNOVATION INSTITUTE, Abu Dhabi, U.A.E. <ul style="list-style-type: none">Developing and deploying state-of-the-art Computer Vision algorithms in the context of semantic segmentation and tracking both in Visible and Thermal Domain. <div>C++ Python ROS PyTorch TensorFlow Docker CUDA TensorRT MATLAB GIT</div>
June 2022 September 2022	Senior Machine Learning Engineer, QUALCOMM, Hyderabad, India <ul style="list-style-type: none">Worked on the SNPE framework to enable Qualcomm SOCs to inference various deep neural networks. <div>C++ SNPE PyTorch TensorFlow GIT</div>
June 2020 April 2022	Deep Learning Software Engineer, MATHWORKS, Hyderabad, India <ul style="list-style-type: none">Developed Deep Learning features for Automated Driving Toolbox, Computer Vision Toolbox, Lidar toolbox and Deep Learning Toolbox.Developed deep learning layers for MATLAB.Provided code generation support for both CPU and GPU targets to the functions developed.Developed Deep Learning workflows as MATLAB Examples. <div>MATLAB C++ PyTorch TensorFlow GIT</div>
June 2019 June 2022	Engineer in EDG, MATHWORKS, Hyderabad, India <ul style="list-style-type: none">Developed domain adaptation workflows to address data scarcity and labeling problem of real world data, majorly in the context of semantic segmentation.Solved several customer workflow related issues. <div>MATLAB C++ PyTorch TensorFlow GIT</div>
October 2018 May 2019	Motion Planning Intern, MATHWORKS, Hyderabad, India <ul style="list-style-type: none">Developed a Traffic simulator for testing MATLAB's Navigation and ADAS toolbox features. This project is the extension to my Master's thesis work for Multi Agent systems <div>MATLAB C++ PyTorch TensorFlow GIT</div>

KEY SKILLS AND COMPETENCIES

C++, Python, MATLAB, Pytorch, Linux, GIT, Deep/Machine Learning, Computer Vision
ROS (Robot Operating System), Docker, TensorFlow, Optimization
BASH
CUDA, ROS2



EDUCATION

2016-2019	MS by research in Robotics , International Institute of Information Technology, Hyderabad, India	GPA : 9.00/10.00
2012-2016	B.Tech in Electronics Design and Manufacturing , Indian Institute of Information Technology, Design and Manufacturing	GPA : 8.36/10.00

JOURNAL PUBLICATIONS

Reactive Navigation under Uncertainty through Hilbert Space Embedding of Probabilistic Velocity Obstacles	RAL-ICRA 2020
Jyotish, Bharath Gopalakrishnan, Bhargav , Arun Kumar Singh, K.Madhava Krishna and Dinesh Manocha	[Project-Page] [Video]

CONFERENCE PUBLICATIONS

SROM : Simple Real-time Odometry and Mapping using LiDAR data for Autonomous Vehicles	IV 2020
Nivedita Rufus, Unni Krishnan R. Nair, A. V. S. Sai Bhargav Kumar , Vashist Madiraju, K. Madhava Krishna	[Project-Page]
PIVO : Probabilistic Inverse Velocity Obstacle for Navigation under Uncertainty	ROMAN 2019
Jyotish, Yash Goel, A. V. S. Sai Bhargav Kumar , K. Madhava Krishna	[Project-Page]
IVO : Inverse Velocity Obstacles for Real Time Navigation	AIR 2019
Jyotish, Yash Goel, A. V. S. Sai Bhargav Kumar , K. Madhava Krishna	[Project-Page]
Gradient Aware - Shrinking Domain based Control Design for Reactive Planning Frameworks used in Autonomous Vehicles	AIR 2019
Adarsh Modh, Siddharth Singh, A. V. S. Sai Bhargav Kumar , Sriram N. N., K. Madhava Krishna	[Project-Page]
Motion Planning Framework for Autonomous Vehicles : A Time Scaled Collision Cone Interleaved Model Predictive Control Approach	IV 2019
Raghu Ram Theerthala, A.V.S. Sai Bhargav Kumar , Mithun Babu, K. Madhava Krishna	[Project-Page]
Novel Lane Merging Framework with Probabilistic Risk based Lane Selection using Time Scaled Collision Cone	IV 2018
A. V. S. Sai Bhargav Kumar , Adarsh Modh, Mithun Babu, Bharath Gopalakrishnan, K. Madhava Krishna	[Project-Page]

PROFESSIONAL SERVICES

2020 :	Reviewer, IV(IEEE Intelligent Vehicles Symposium).
2019 :	Program Committee, ROBIO(International Conference on Robotics and Biomimetics)
2019 :	Reviewer, CASE(International Conference on Automation Science and Engineering)

HONORS AND AWARDS

2016-2019	IIIT Hyderabad research fellowship , Awarded a fellowship to cover tuition and living expenses during my Masters, Total value (approx.) : INR 350000.
2012-2016	Merit Cum Means Scholarship , Awarded a scholarship to cover tuition during my Bachelors, Total value (approx.) : INR 200000.

LANGUAGES

English	● ● ● ● ●
Telugu	● ● ● ● ●
Hindi	● ● ● ○ ○
Tamil	● ● ○ ○ ○

INTERESTS

- > Driving
- > Reading
- > Writing
- > Watching

PROJECTS

SELF DRIVING CAR - MAHINDRA RISE CHALLENGE

2016 - 2019

 tinyurl.com/selfdriveMRC  tinyurl.com/selfdriveMRC2

- › Developed the Motion Planning and Localization pipeline.
- › Implemented and Integrated the Sensor Fusion stack.
- › Developed the cross-sensor calibration package for Camera and LiDAR.
- › Integrated the other pipelines and deployed the code base.
- › Led to publications in IV (Intelligent Vehicle Symposium-18) and AIR (Advances in Robotics-19)

C++ Python ROS PyTorch MATLAB

INVESTIGATION OF NON-PARAMETRIC UNCERTAINTY IN MOTION PLANNING

2019-2020

 tinyurl.com/nonparam

- › Developed efficient algorithm for solving a class of chance-constrained op- optimization by representing the non-parametric uncertainty as functions in Reproducing Kernel Hilbert Space(RKHS).
- › Developed computationally efficient implementation of the proposed idea in C++ and its deployment on Bebop drone to conduct real-time experiments.
- › The efforts for this work got published in RA-L with ICRA 2020.

C++ Python ROS MATLAB

MULTI AGENT SYSTEMS

2017 - 2019

 tinyurl.com/IVOCC

- › Developed both deterministic and stochastic variants of the egocentric version of the famous velocity obstacle(VO).
- › Reformulated the velocity obstacle to adapt to an egocentric framework and deployed the real-time experiments on the Bebop drone.
- › Led to publications in AIR (Advances in Robotics-19) and ROMAN(International Conference on Robot and Human Interactive Communication 2019).

C++ ROS MATLAB

RISK AWARE MERGING

2017 - 2018

 tinyurl.com/RiskAwareMerge

- › Developed a risk-aware merging behavior, for a traffic-like scenario.
- › Developed a framework that has a two-layer structure that ensures generating a collision-free merge maneuvers even in a dense traffic scenarios
- › The efforts for this work got published in IV(Intelligent Vehicle Symposium-18,19).

C++ ROS MATLAB

LOCALISATION AND NAVIGATION IN GPS DENIED ENVIRONMENT.

2016 - 2017

 tinyurl.com/GPSDenied

- › Developed an algorithm that fuses the sensor data from a visual sensor and an IMU to estimate the robot's current location and navigate the robot to its destination with obstacle avoidance in GPS denied environment.
- › The planning stack was implemented using the RRT planner from the MRPT toolkit in Tory Parameter (TP) space, was deployed on Clearpath A200 mobile robot, and tested for its efficacy.

C++ ROS Python