Jayant Teotia

Research Assistant
IISc Bangalore

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Education

Indian Institute of Technology Roorkee, Uttarakhand, India — *Jul' 16 - Jul' 20*
Bachelor of Technology, Mechanical Engineering — **GPA: 8.043/10**

DAV Public School, Shreshtha Vihar, New Delhi, India — *Jul' 13 - Apr' 15*
Senior Secondary School - Class XII (CBSE) — **Score: 474/500**

Work Experience

Robert Bosch Centre for Cyber-Physical Systems, India Institute of Science Bangalore
Research Assistant, Supervisor: Prof. Suresh Sundaram — *June '22 - present*

- Developing an algorithm for Spatio-temporal resource allocation problem using supervised learning to solve the scalability issue of traditional mathematical solutions.
- Developing rotation equivariant backbones for object detection in remote sensing images to better detect small instances of objects.
- Despeckled Synthetic Aperture Radar(SAR) images using Vision transformers and GANs to increase the detection accuracy.

AI and Robotics Technology Park, IISc Bangalore
Research Assistant, Supervisor : Prof. Suresh Sundaram, Badrinarayana Rangarajan — *June '21 - May '22*

- Trained object detection models- YOLO v3, Faster RCNN, SSD, for underwater object detection achieving 93% accuracy, and developed GaborNet utilizing Gabor filters for object classification.
- Improved inference time of YOLO v3 using model pruning and knowledge distillation from 0.02s to 0.012s on Nvidia A6000.
- Developed 'search monitor' for a swarm of UAVs algorithm with online 'target drone' detection and tracking. The areas for the search were divided using Voronoi distance optimization and minimum spanning tree coverage was used for path planning.
- Developed server and client-side programs using gRPC for bi-directional data streaming through the wifi network to reduce the dependency on predefined APIs of Airsim and ROS.

AI and Robotics Technology Park, IISc Bangalore
Research Internship, Supervisor : Badrinarayana Rangarajan — *Mar '21 - May '21*

- Performed simulations of stand-alone and multiple UAVs using MAVSDK and Airsim integrated with object detection.
- Teleoperated a ground robot - VOLTA, and used ROS navigation stack for navigation.
- Feasibility study: Vision-based navigation of a ground robot using depth information.

Robert Bosch Engineering and Business Solutions Private Limited
Summer Internship — *May '19 - July '19*

- Investigated the optimization strategy used for Model Predictive control in the software - VIATOC.
- Simulated the non-linear mathematical model of overhead crane for obstacle avoidance using Model Predictive Control.
- Responsible for bench-marking of the generated 'C++ code' for various linear and non-linear constraints on Raspberry Pi 3B.

iX Energy Private Limited
Summer Internship — *May '18 - July '18*

- Developed the model consisting of Electrical and Mechanical system of the vehicle including Battery and Motor cooling system.
- Developed the ECU code for start-up sequence and error handling with the help of state-flow charts which further included the CAN communication between different modules.

Academic Projects

Mechanical and Control System Design of Human Assisting Droid
Bachelor Thesis, Supervisor : Prof. S.P. Harsha — *Aug '19 - June '20*

- This project incorporated the designing and fabrication of a warehouse robot that consists of a stationary robotic arm structure and a four-wheeled differential drive bot.
- Designing the electrical circuit and the control algorithm of the bot for its teleoperation via Bluetooth.
- Algorithm was successfully incorporated into the simulator for autonomous obstacle avoidance of the four-wheeled differential drive bot in the ROS framework. SLAM and gap following strategy (for obstacle avoidance) were implemented.

IIT Roorkee Motorsports
Vehicle Dynamics and controls Engineer, Indian Institute of Technology Roorkee *July '17 - June '20*

- Lead the Vehicle Dynamics division of Formula SAE team of our college for developing the formula style electric race car *RMS E-19*.
- Designed the algorithm for implementing Simultaneous Localization and Mapping (SLAM) and Model predictive control for the simulation of an autonomous Formula Student car.
- Developed vehicle dynamics models for performance simulation, and lap-time simulator, which helped improve the design parameters and decrease the lap-time by 2 seconds.
- Responsible for developing a detailed mathematical steering model on MATLAB/Simulink.

Technical Skills

Languages: Python, C++, LaTeX
Packages: Tensorflow, Pytorch, Scikit-learn, ROS, pyBullet
Simulation Tools: Airsim, MATLAB, Simulink, Solidworks

Awards & Achievements

Secured **First rank in acceleration event** and **Third rank overall** in formula student competition - Formula Green 2020
Received **MCM Scholarship** for a period of 2 years, awarded by IIT Roorkee
Secured an **All-India-Rank of 1986** in JEE Advanced 2016 amongst 150,000 candidates

Areas of Interest

AI for Computer Vision, NLP, Deep Reinforcement Learning, Motion Planning

Extra Curriculars

National Service Scheme: Responsible for teaching high school and senior secondary school students. Organized various social events such as blood donation camp and awareness rallies.

Unnat Bharat Abhiyan(UBA), IIT Roorkee: Initiative leader for Mushroom Production Initiative to create awareness among the people and help them train for Mushroom production which is high ROI(return on investment) with low-risk factor. Member of the team which carried out the Adolescence Awareness Initiative for students of the village Chharba.

Student Mentorship Program: Mentored 7 freshmen year students of branch Mechanical and Industrial Engineering as a part of this Program.

Hiking: Been on various treks and hikes to the *Himalayan Ranges*.

References

Dr Suresh Sundaram
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Dr. S.P. Harsha
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MIED, IIT Roorkee
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