Jerrin Bright

LinkedIn | Portfolio | GitHub | Mail | Scholar | Blogs

Personal Profile Statement

A versatile and self-motivated engineer highly skilled in Autonomous Systems and Robotic Real-time Perception, focusing on aerial systems and autonomous cars. Driven by the desire for challenges that push me beyond my limits and eventually aid in the advancement of society regardless of affordability and background.

Qualifications

Vellore Institute of Technology, Chennai, India *June 2018-Present*
Bachelors of Technology in Mechanical Engineering *Cumulative GPA: 8.25/10.0*
Chettinad Vidyashram, Chennai, India *June 2003-May 2018*
CBSE – Computer Science *10th CGPA 9.4/10.0, 12th 83.2%*

Professional Experience

Research Intern @ Dep. of Aerospace, Indian Institute of Science, Bangalore, India *July - Nov 2021*

Researcher @ ARTPARK, Indian Institute of Science, Bangalore, India *Dec 2021 - Present*

Autonomous navigation of UAVs equipped with monocular vision systems. A 2D histogram was perceived using an unsupervised depth estimation approach. Model Predictive Control and Control Barrier Functions were used for autonomous navigation **(Supervised by Prof. Suresh Sundaram, Badrinarayanan Rangarajan)**

Globalink Research Intern @ McMaster University, Ontario, Canada *July – Sep 2021*

Designing of a four Degree of Freedom (DoF) soft robotic manipulator in PyBullet simulation engine using Soft Motion (SoMo) toolkit. Supplied sinusoidal torque to the actuators and plotted the velocity, position, acceleration, and input (torque) to analyze different actions. **(Supervised by Prof. Gary Bone)**

Summer Research Intern @ Arizona State University, Phoenix, USA *May - July 2021*

Using laser scanning, photogrammetry to digitize environments via visualizing data collected from sensors fusing into a unified system. DL algorithms are used for automated analysis. The digital representations made will be processed to provide insights to builders, stewards. **(Supervised by Prof. Thomas Czerniawski)**

Autonomous System Developer (ASD) - Intern @ Aero2Astro, India *Oct'20 - April'21*

Developing ROS-based autonomous navigation firmware using Visual Inertial SLAM concepts for indoor environment. Implementation was based on Sensor Fusion techniques, Extended Kalman Filters and is aimed to eradicate the need for GPS thus making the system/ firmware more reliable.

Data Science Intern @ BrainMagic InfoTech Pvt, Chennai, India *May – July 2020*

Automobile fault detection using vision techniques resulting in an IOU of 95%. Dimensional analysis was done to locate defects and monitor them. Later, it was deployed in AWS using Amazon Sagemaker and S3 Buckets.

Project Research Intern @ Yuan Ze University, Taoyuan City, Taiwan *April – June 2020*

Built a robust smart parking system using semantic segmentation with Conv. Conditional Random Fields and Atrous Convolution enhance the visual capability of the system. **(Supervised by Prof. Wei-Tyng Hong)**

Team Captain and Co-Founder @ Atom Robotics, VIT Chennai, India *Jan 2019 – Oct 2021*

Advisory Board Committee @ Atom Robotics, VIT Chennai, India *Nov 2021 - Present*

An Intelligent Robotics and Satellite exploration team consisting of 50+ aspiring young minds. The team focuses on Intelligent ground vehicles, Can-Satellites, and Planetary Aerial Systems.

Research And Publications

International Conference Robotics, Intelligent Automation and Control Techologies [**Paper link**]
Optimization of quadcopter frame using generative design and comparison with DJI F450 drone frame
Journal of Intelligent and Robotic Systems [Submitted]
An insight on autonomous navigation for unmanned vehicles using learning based approaches
International Conference on Artificial Intelligence [In Progress]
SE2M-CapsNet - Squeeze-Excitation for Capsule Networks with EM Clustering

Area Of Expertise

Design and Simulation Tools	AirSim, Fusion360, SolidWorks, Proteus, Gazebo, RViz, MATLAB, SOFA
Programming Tools	C, C++, Python, Embedded System, HTML, CSS, JS, PHP
Machine Learning Tools	OpenCV, TensorFlow, Matplotlib, NumPy, Keras, PyTorch, Scikit
Platforms	Linux Ubuntu, ROS, Raspbian OS, Windows

Accolades And Recognition

Outstanding Research Paper Award	RIACT 2020 International Conference
Recognized Galactic Problem Solver	NASA International Space Challenge
Winner of Line Follower, NIT Trichy	CURRENTS 2020, National Techfest
Second Runner-up, IEEE Hackathon	APOGEE 21, BITS Pilani Campus
Top Ten Internationally	International Planetary Aerial Challenge 2021

Research Project

Autonomous UAV Navigation using Imitation Learning *May - July 2021*

Implemented a simple UAV navigation using imitation learning technique. The policy was trained using the dataset from RRT-MPC-based UAV navigation in cluttered environments using AirSim simulation environments. Attention-based networks were used as the base model to imitate the expert.

3D Pose Estimation using Stereo Visual Odometry *Jan – April 2020*

Development of python package to reconstruct indoor and outdoor environments with diverse texture contrasts using Oriented FAST and Rotated Brief feature detector and descriptor, FLANN for matching, RANSAC for outlier removal, Optical flow, PnP (DLT and Levenberg) for estimating the pose of the robot.

Autonomous MAV enhanced with door-to-door delivery topographies *Jan – April 2020*

Developed a ROSpy based control system for a MAV to transverse to a set of GPSs setpoint autonomously picking and delivering a package. The Control System has two modules namely the Altitude (AC) and the position (PC) controller. AC stabilizes the drone using a PID-based controller. PC takes in the target GPS coordinate has setpoint values and navigates successfully to the desired coordinates.

SLAM embedded AGV for autonomous navigation *Sep – Oct 2020*

Implemented 3D mapping using Kinect and IMU sensors in an indoor environment. The Visual Inertial Navigation System was used to make the 3D map simulated in the Gazebo environment and visualized 2D in RViz. Feature extraction via Oriented fast and Rotated Brief (ORB) was used for extraction and tracking.

Autonomous Planetary System for Mars Exploration *Jan – Feb 2021*

Designed a VTOL-UAV from scratch including CFD analysis for propellers and Aerofoil. Designed and tested PCBs using Fritzing. Communication using XBee 900MHz. ROS was used for Software systems (Visual SLAM and PID Control for rudder, elevator, and ailerons for horizontal and one for R-P-Y during lift).

Robust Chest X-Ray Detection Architecture *July – Oct 2019*

Built a convolutional system for x-ray detection of 14 different chest diseases. Some of the important tools used in the system are transfer learning fusing Residual Networks with UNet, Data Augmentation techniques, and autonomous cropping using contours and extrema.

Competition-based Robots *Jan 2019 – Mar 2021*

Designed and built Intelligent Ground Vehicles, Planetary Aerial Systems, Can-Satellites, Law Following Robot, Obstacle Racer, Robo-Soccer, Maze Runner, Sumo Robot, BattleBots with my team (Atom Robotics).

Extra-Curricular

Machine Learning Contributor *Oct 2020 – Feb 2021*

Contributing ML blogs via CodeSpeedy to various blog-based companies. Have published 13 blogs.

Madras Scientific Research Foundation, NGO *Oct 2020 – Dec 2020*

Spreading awareness on basic robotics and designing in schools amongst unprivileged kids.

National Service Scheme *May 2019 – July 2021*

Active Member of Indian Government-sponsored public service program. Part of several awareness programs – International Coastal Cleanup Day, Community Services, planting of saplings, medical camps.