**RAKSHITH SUBRAMANYAM**

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**EDUCATIONAL QUALIFICATION**

**Arizona State University, Tempe, Arizona** Aug 2016 - Current

Master of Science in Electrical Engineering- Major in Control systems GPA – 3.72/4

**SRM University,** **Chennai, India** Aug 2012- May 2016

Bachelors of Technology (B. Tech), Mechatronics Engineering GPA – 8.87/10

**Relevant Courses**: Linear Systems Theory, Computer Control Systems, Feedback Systems, Perception in Robotics, Introduction to Electric and Autonomous Vehicles, Artificial Neural Computations, Multivariable Control Systems, Image Processing, Linear Algebra and Convex Optimization



**SKILLS**

Proficient in ROS, Python, Tensorflow, C++, Arduino, Eagle, Matlab, LabVIEW, Simulink, Solidworks and Linux.



**MASTER’S PROJECTS**

**Self-Driving Car test bed, Master's Thesis, Arizona State University** May 2017 – May 2018

* Made an **emulation of self-driving** car using a swarm of differential drive robots equipped with camera, 8-point IR sensors and odometer.
* Using **Image Processing** Techniques made the robot follow lane, detect changes in traffic lights, detect other cars on the road, predict their current state, communicate with the intersection and the user.
* Established an Ad-Hoc network to enable V2X communication.
* Constructed a miniature test-bed using projections with roads and traffic lights to test human vehicle interaction.

**sUAS Innovation challenge , Arizona State University** December 2017 - May 2018

* Developed a swarm of drones to be used by first responders for performing search operations in a disaster zone.
* The system uses an optimization algorithm to schedule search areas for each drone based on various parameters.
* The drone video is relayed back using a multi hop Ad-Hoc network, the video is used to detect humans.

**Cart-Pole Balancing by Reinforcement Learning, Arizona State University** August 2017 – December 2017

* Wrote a **URDF** (Universal Robot Description Format) to create a cart pole model in ROS.
* Trained **Policy gradient** model in 34 trials to balance the cart pole for 60,000-time steps.

**Facial recognition based home security system, Arizona State University** May 2017

* Used **Harr Cascade** for real time face identification.
* Trained a **LBPH** (Local Binary Pattern Histogram) for classifying faces to unlock a door. Used LBPG to classify facial emotions to control the temperature of lights in a room.

**Centralized Control of Robots Using Active Perception, Arizona State University** Jan 2017 – May 2017

* Designed and constructed a swarm of heterogeneous autonomous robots (aerial and ground) framed over ROS for painting football fields.
* Programed the ariel master to do **real time object tracking** and commanding the ground robots. Ground robots used **PID controller** to track the commands of the master

**Lab2Moon, Arizona State University** Jan 2017 – March 2017

* Designed a **cyanobacteria monitoring system** which actively monitors and maintains desirable conditions for the cyanobacteria to culture on **Moon**.
* Presented the Project in India and secured a launch to moon in December 2017.



**UNDERGRADUATE PROJECTS**

**VAYU-Vertical Take off and Landing Aircraft (Senior Thesis), Chennai, India** Dec 2015-March 2016

* Designed and manufactured a **hybrid VTOL** aircraft using Solidworks based on the principles of delta wing and propeller lift.
* Formulated a self-adjusting **PID tuning algorithm** to stabilize the aircraft in case of propeller failure.
* Engineered a microcontroller board on Eagle which can work both on AC and DC power and can tolerate various signal levels. Made a **dynamic camera stabilization** system using brushless motors and servo motors.

**CanSat Annual Competition, Burkett, Texas** Aug 2014 – June 2015

* Led a multidisciplinary team to build a **miniature satellite** traveling through the planetary atmosphere sampling the atmospheric composition. Secured **world rank 1** in design reviews and managed the end to end project plan and complete finance of $20000.
* Designed a new method of Autogyro landing system for controlling the speed of re-entry of the satellite and developed the control algorithm to stabilize the system.
* Developed a concept of **altitude determination using the magnetic field strength** to aid the barometric altitude sensor during a random variation in the environmental pressure.

**ABU Robocon, Pune, India** Aug 2013- March 2016

* Designed various PCBs in Eagle which were mainly used as Power distribution boards and Microcontroller interface boards.
* Engineered a low-cost shuttle detection mechanism using long range IR Sensors for badminton playing robots.
* Developed mapping algorithms for arena mapping and implemented **PID control algorithm** for a smooth robot operation.
* Efficiently managed a $15000 project budget and was awarded with the *Best Economical Robot award*.



**PROFESSIONAL EXPERIENCE**

**ACS Lab, Arizona State University, Tempe, USA** January 2017-Present

Graduate Student Researcher

* Developing human stations for the self driving car test bed.
* Wrote a program based on TCP/IP to control a swarm of robots using a single joystick.
* Working on converting the programs written on Arduino to ROS for Pheeno, a swarm robotic research platform

**Luminosity Lab, Arizona State University, Tempe, USA** August 2016-Present

Hardware Design Engineer.

* Created multiple house models in ROS resembling a house to train a ML model to aid blind people navigate.
* Programing a educational ground robot to do face recognition, trajectory control and controlling a 3 DOF robotic arm.
* Wrote a program that creates a **hexagonal map of ASU** campus and distinguishes fly and no fly zone using the data of building elevation.
* Developed a human monitoring system based on **IOT** which includes a camera, health monitoring system and active ambience control system.
* Conceptualized an autonomous coffee shop based on work shop autonomy.
* Designed electronics for a Smart interactive mirror and wrote the rudimentary code for the Linux background system.

**Lab Designer and Teaching Assistant,System Dynamics and Controls, Arizona State University** Summer 2017

* Included instructional introduction to applied robotics to the undergraduate course MAE 318.
* Scripted an experimental system identification method and controller design for a differential drive robot.

**E-Board- Startup, Chennai, India** June2014 – July 2016

Co-Founder.

* Was the Lead Technical and Electrical design head for designing and manufacturing electric vehicles.
* Developed a novel mechanism for reversing a BLDC motor which operates on the command of the user via Bluetooth.