# Krishna Kannan Srinivasan

kk3146@columbia.edu | 929-353-9009 | Fremont, CA| www.linkedin.com/in/krishnaksrinivasan
https://github.com/k-k-s

**Technical Skills**

- Languages: **Python, C, C++**, **MATLAB.**
- Environments and Systems: **ROS, TensorFlow, OpenCV, Raspberry Pi, Linux**, **Arduino.**

## Education

**Columbia University | MS in Robotics and Controls | Dec 2017**
**Courses:** Applied Robotics and Algorithms, Control Theory, Dynamical Systems, Modeling and System Identification, Advanced Machine Dynamics, Physiological Control Systems, Mechatronics and Embedded Microcomputer Control.

**BMSCE, Bangalore, India | BE in Mechanical Engineering (Robotics)| Aug 2015**
**Courses:** Robotics, Linear Algebra, Design of Machine Elements, Dynamics of machines, Hydraulics and Pneumatics, Kinematics of Machines, Finite Element Methods, Vibrations.

## Work Experience

**Deep Racing group, CA** **May 15 - Present**

- Implemented behavior cloning on a 1:16 scale RC car (autonomous around the track).
- Developing computer vision pipeline for lane detection and passing.
- Integrating IMU into the neural network to predict throttle.
- Exploring mapping and localization using visual odometry and IMU.

**Graduate Student Researcher, Columbia University** **Feb 17 – Dec 17**

- Studied the performance of higher order polynomial models on data to explain lung mechanics.
- Selected ARX, ARMAX, OE and BJ model structures for estimation.
- Estimated the parameters of the different models using the MATLAB System Identification Toolbox.
- Compared the effect of model order and variable combinations in explaining the dynamics of the dataset.
- Established the effect of noise dynamics in the prediction of lung mechanic variables in the dataset.

## Projects

**State-Space Control of Propeller Arm – Tom Sawyer Labs** **Dec 18 – ongoing**

- Built a propeller arm setup from MIT 6302 course.
- Worked with photo-interrupters, photo-transistors, photo-resistors, rotary-encoders.
- Applying State-space control techniques to control position of arm.

**Udacity Self-Driving Car Term 1 – Computer Vision and Deep Learning** **Jan 18 – Apr 18**

- Applied computer vision techniques like HOG, color and gradient thresholding to identify lane lines in a video.
- Classified cars in a video stream.
- Classified German Traffic Signs using Le-Net architecture.
- Cloned driving behavior by training End-to-End “cov-nets” using a simulator.

**State Estimation of Robot Pose using EKF and Particle Filter, Columbia University** **Dec 17**

- Programmed the Extended Kalman Filter to estimate a simulated robot pose in ROS.
- Explored Particle Filter in terms of resampling techniques.
- Observed the difference between EKF and particle filters in predicting the robot pose.

**Stepper Motor Control in C, Columbia University** **Dec 17**

- Modeled the motion of Stepper motor in various modes as a State Machine in embedded C.
- Implemented the motion control for Unipolar and Bipolar configurations in full step and wave drive.

**Solenoid Control in Assembly, Columbia University** **Nov 17**

- Built the controller circuit for the solenoid motion control system.
- Programmed the motion control instructions of different modes in MicroChip Assembly environment.

**Motion Planning using RRT, Columbia University** **Nov 17**

- Programmed Rapidly Exploring Random Tree (RRT) algorithm in ROS with multiple obstacle difficulty levels.
- Utilized MoveIt! package to check for collisions and Inverse Kinematics.

**Analog Control of Magnetic Levitation, Columbia University** **Oct 17**

- Built an analog compensator circuit to balance a ball under magnetic levitation.
- Gained an intuition of control system design parameters by tuning the lead-lag circuit for system response.

**Design of Controller in Frequency domain, Columbia University** **Mar 17**

- Designed a custom higher order controller which outperformed the off-the-shelf PID in satisfying time and frequency domain requirements like time constant, settling time, and, phase and gain margins.
- Applied concepts such as Smith detector to handle system delay and Popov-stability criterion for non-linearity in actuators.

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