SURAJ MANIYAR

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EDUCATION

- **North Carolina State University, Raleigh, North Carolina** Expected May 2019
  Master of Science in Electrical Engineering GPA: 3.66/4.0
  Courses :- Data Science | Digital Imaging Systems | Probabilistic Graphical Models for Signal Processing and Computer Vision | Spatial and Temporal Data Mining | Design of a Robotic Computer Vision System for Autonomous Navigation | Computer Vision
- **Veermata Jijabai Technological Institute (VJTI), Mumbai, India** Jun 2013 – Jul 2017
  Bachelor of Technology in Electronics Engineering GPA: 7.72/10.0
  Courses :- Signal Processing | Robotics | Image Processing | Computer Programming | Embedded Systems | Control Systems

TECHNICAL SKILLS

Programming Languages	:	Python, C++, Java, Linux Shell scripting
Frameworks & Libraries	:	PyTorch, Tensorflow, Keras, OpenCV
Softwares & OS	:	Robot Operating System (ROS), MATLAB, LabVIEW, Linux (Ubuntu), Windows
Hardware	:	Raspberry Pi, Beaglebone Black, NI-myRio development board, AVR series microcontrollers

PROJECTS

Design of a SLAM System for Autonomous Robot *(ROS, C++, Python, OpenCV)* Jan 2018 – May 2018
- Localized aerial robot blimp using VINS-Mono and ORB SLAM2 algorithms separately
- Incorporated Visual and Odometric data to yield 3D point cloud of environment and real time localization of blimp
- Technology used: NVIDIA Jetson TX1, Raspberry Pi, BNO055 IMU, Raspberry PiCam, Point Cloud Library (PCL), ROS

Activity Recognition to Benchmark Hardware Accelerator *(Python, Keras)* May 2018 - Aug 2018
Independent Study
- Implemented activity recognition using Convolutional and Recurrent Neural Net to benchmark custom made hardware accelerator
- Obtained an accuracy of **70%** for 7 different activities on UCF-101 Dataset

Deep Visual Attention Prediction *(Python, Keras, Tensorflow, OpenCV)* Apr 2018
- Replicated the results from paper titled 'Deep Visual Attention Prediction' which predicts human eye fixation on view-free scenes
- Used Transfer Learning on VGG-16 network and obtained an accuracy of **64%** by incorporating multi-level saliency predictions

Foraminifera Image Segmentation using Markov Random Field (MRF) *(Python, OpenCV)* Dec 2017
- Used MRF based approach called Graph-Cut to segment chambers of a foraminifera (marine species) from its edge probability map
- Obtained an accuracy of **71.40%** using morphological refining and watershed transformation

Single View Metrology *(Python)* Oct 2017
- Reconstructed 3D model of an object from its single 2D image using 3 point perspective
- Computed Homography matrices and projection matrix using vanishing points from the image
- Obtained texture maps for 3D model after applying affine transformation on the image using the obtained matrices

Task Learning Robot *(LabVIEW)* Aug 2015 - Nov 2015
National Instruments, India
- Implemented a Computer-Vision based approach for *'Robot Learning from Demonstration'* using industrial robotic arm Scorbot ER-VII
- Shortlisted in the **top 20 teams** for the **National Level Contest**, **NIYANTRA**, organized by National Instruments, India

Stock Trading using Machine Learning *(Python, Keras)* Sept 2016 - May 2017
- Implemented a recommendation system to provide real time trading advice to investor
- Optimized the investor's portfolio and implemented technical analysis using Neural Networks and Reinforcement Learning separately to suggest best actions (buy, sell or hold) to the investor

Respiratory Rate Estimation *(Python, Keras)* Nov 2017
- Estimated respiratory rate of a human based on accelerometer data, heart rate and body temperature using Ridge Regression and Neural Networks separately with a Root Mean Squared Error (RMSE) of **4.58**
- Reduced the RMSE to **3.68** by incorporating temporal dynamics using Hidden Markov Model (HMM)

CO-CURRICULAR ACTIVITIES

- Senate member of **Society of Robotics and Automation (S.R.A.), V.J.T.I.** which deals with robotics, machine vision and automation
- Managed and conducted workshops with a team of 10, to teach students about line-following robots, embedded systems, Bluetooth technology and Internet of Things (IoT)