

SURAJ MANIYAR

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EDUCATION

- **North Carolina State University, Raleigh, North Carolina** Aug 2017 – May 2019
Master of Science in Electrical Engineering (Specialization: Computational Intelligence) 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, C++, Java, Linux Shell scripting, SQL (Beginner), R (Beginner)
Frameworks & Libraries	PyTorch, Tensorflow, Keras, OpenCV, Pandas, Git, Numpy, Scipy, Scikit-learn, STL (C++)
Softwares & OS	ROS, MATLAB, Linux (Ubuntu), Windows, LabVIEW
Miscellaneous	Deep Learning, Neural Networks (CNN/RNN), Logistic Regression, Linear Regression, K-means, SVM, Reinforcement Learning

PROJECTS

- **Stock Trading using Machine Learning** (*Python, Keras, Pandas*) 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 using Hidden Markov Model and Neural Network** (*Python, Keras*) Dec 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 RMSE to **3.68** by incorporating temporal dynamics using Hidden Markov Model (HMM)
- **Expectation-Maximization Algorithm: Comparative Study** (*Python*) Mar 2018
 - Performed a comparative study of Gaussian, Mixture of Gaussian, t-distribution, mixture of t-distribution and Factor Analysis models for face image classification
 - Fine-tuned the parameters (mean and variance) for each of the models using Expectation-Maximization algorithm
- **Activity Recognition from Video 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%** by using Transfer Learning on VGG-16 network for 7 different activities on UCF-101 Dataset
- **Image Segmentation using Markov Random Field (MRF)** (*Python, OpenCV*) Dec 2017
 - Segmented the chambers of a foraminifera (marine species) from its edge probability map using Graph-Cut (MRF based) approach
 - Obtained an accuracy of **71.40%** using morphological refining and watershed transformation
- **Deep Visual Attention Prediction using Skip-Layer Network structure** (*Python, Keras, Tensorflow, OpenCV*) Apr 2018
 - Replicated results of the paper: 'Deep Visual Attention Prediction' to predict human eye fixation on view-free scenes
 - Obtained accuracy of **64%** by incorporating multi-level saliency predictions from skip layers
- **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
- **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
 - Obtained 3D point cloud of the environment by incorporating Visual and Odometric data
 - Technology used: NVIDIA Jetson TX1, Raspberry Pi, BNO055 IMU, Raspberry PiCam, Point Cloud Library (PCL), ROS

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)