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 | Spatial and Temporal Data Mining | Design of a Robotic Computer Vision System for Autonomous Navigation | Neural Networks
- **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 | Embedded Systems | Control Systems

TECHNICAL SKILLS

Programming Languages	:	Python, C, C++, Java, Shell scripting, SQL , R
Frameworks & Libraries	:	PyTorch, Tensorflow, Keras, STL (C++), OpenCV, Pandas, Numpy, Scipy, Scikit-learn
Softwares & OS	:	ROS, MATLAB, Visual Studio, Linux (Ubuntu), Windows, LabVIEW

RESEARCH & PROJECT EXPERIENCE

Activity Recognition from Video to Benchmark Hardware Accelerator *(Python, Keras)* May 2018 - Aug 2018

- Implemented activity recognition task using Convolutional and Recurrent Neural Net as a part of Independent Research at NC State University to benchmark a custom hardware accelerator
- Obtained an accuracy of **70%** by using Transfer Learning on VGG-16 network for 7 different activities on UCF-101 Dataset

Design of a SLAM System for Autonomous Robot (NC State University) *(ROS, C++, Python, OpenCV)* Jan 2018 - May 2018

- Localized aerial robot blimp using different algorithms like VINS-Mono and ORB SLAM2 and 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

PROJECTS

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 with a Root Mean Squared Error (RMSE) of **4.58**
- Reduced RMSE by **20%** by incorporating temporal dynamics using Hidden Markov Model (HMM)

Stock Trading using Machine Learning *(Python, Keras, Pandas)* Sept 2016 - May 2017

- Developed a complete portfolio management system using techniques like Reinforcement Learning and Neural Networks to learn stock trading strategies
- Employed fundamental and technical analysis techniques commonly used by investors to select optimal stocks to invest in

Face Classification using Expectation-Maximization Algorithm *(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 and fine-tuned the parameters using Expectation-Maximization algorithm

Image Segmentation using Markov Random Field (MRF) *(Python, OpenCV)* Dec 2017

- Segmented 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

3D Object Reconstruction using 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

CO-CURRICULAR ACTIVITIES

- Senate member of Society of Robotics and Automation (S.R.A.), VJTI 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)