

SURAJ MANIYAR

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EDUCATION

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

WORK EXPERIENCE

Kitware Inc., Carrboro, North Carolina Feb 2019 - May 2019

Research and Development Intern

- Developing deep learning methods in conjunction with *persistent homology* for digital pathology image analysis
- Improving methods for *nuclei detection*, *image segmentation* and *whole slide classification* of the images using *multiple-instance learning* of deep ConvNets

TECHNICAL SKILLS

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

ACADEMIC PROJECTS

Activity Recognition from Video (Python, Keras) May 2018 - Aug 2018

- Implemented activity recognition task using Convolutional and Recurrent Neural Net as a part of Independent Research Study to benchmark a custom hardware accelerator at NC State University
- Improved accuracy from **40%** to **70%** using *Transfer Learning* on *VGG-16* network for 7 activities on UCF-101 dataset

Design of a SLAM System for Autonomous Robot (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

Deep Visual Attention Prediction using skip-layer network (Python, Tensorflow, OpenCV) Apr 2018

- Replicated results of the paper: '*Deep Visual Attention Prediction*' to predict human eye fixation on view-free scenes
- Improved accuracy to **74%** by incorporating multi-level saliency predictions from skip layers

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

- Segmented chambers of foraminifera (marine species) from its edge probability map using *Graph-Cut (MRF)* approach
- Improved accuracy to **71.40%** by using morphological refining before applying watershed transformation

Respiratory Rate Estimation using Hidden Markov Model and Neural Network (Python, Tensorflow) Dec 2017

- Predicted respiratory rate of an individual based on accelerometer data, heart rate and body temperature using *Ridge Regression* and *Neural Networks* with a Root Mean Squared Error (RMSE) of **3.38**
- Reduced the error by **20%** by incorporating temporal dynamics using *Hidden Markov Model* (HMM)

Stock Trading using Machine Learning (Python, Keras, Pandas) May 2017

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

Task Learning Robot (LabVIEW) Nov 2015

- Shortlisted in **top 20 out of 800** teams at *national level* contest, NIYANTRA, organized by National Instruments, India.
- Implemented a vision-based approach for '*Robot Learning from Demonstration*' on industrial robotic arm Scorbot ER-VII

CO-CURRICULAR ACTIVITIES

- Served as senate member of *Society of Robotics and Automation* at VJTI dealing with *robotics*, *machine vision*, *automation* and *student-mentorship programmes* in robotics from 2014-2017
- Managed and conducted workshops with a team of 10, to teach freshmen and sophomores about *line-following robots*, *embedded systems*, *Bluetooth technology* and *Internet of Things (IoT)*