

# Suriya Narayanan Lakshmanan

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## EDUCATION

### CMU, ROBOTICS INSTITUTE

#### MASTER'S IN COMPUTER VISION

Advised by Prof. Srinivasa  
Narasimhan

Dec 2018 | Pittsburgh, PA

Cum. GPA: 3.83/4.0

### NIT, TIRUCHIRAPPALLI

#### BACHELOR OF TECHNOLOGY IN ELECTRICAL AND ELECTRONICS ENGINEERING

May 2014 | Tiruchirappalli, India

Cum. GPA: 8.8 / 10.0

## COURSEWORK

Intro to Machine Learning  
Intro to Computer Vision  
Math fundamentals for Robotics  
Visual Learning and Recognition  
Deep Reinforcement Learning  
Geometry based maths in Vision  
Computational Photography

Algorithms and Data Structures  
Operating Systems  
Object Oriented Programming  
Digital Signal Processing

## SKILLS

### PROGRAMMING

C • C++ • Python • Matlab  
• OpenCL •  $\LaTeX$

### LIBRARIES

TensorFlow (Python and C++) •  
PyTorch • OpenCV • ROS • Numpy •  
PCL • OpenAI gym • scikit-learn

### OPERATING SYSTEMS

Linux • Windows • Android

### OTHER SOFTWARE

Git • Microsoft Office • GIMP

## EXPERIENCE

### CYNGN INC (SELF-DRIVING VEHICLE COMPANY) | PERCEPTION ENGINEER

Feb 2019 - Present | Menlo Park, USA

- Brought up traffic light detection system from scratch consisting of components such as traffic light detection, traffic light recognition, tracking and temporal smoothing with TensorRT optimizations
- Working on a 2D object detector
- Worked on single image based 3D bounding box detector for vehicles
- Analyzed the depth error of stereo and proposed stixels based obstacle detection/free space segmentation with appropriate stereo settings
- Worked on choosing camera format and lens focal length for required detection range and Field of View
- Contributed to the design of a software based Lidar-Camera synchronization system

### SAMSUNG RESEARCH AMERICA | COMPUTER VISION RESEARCH INTERN Think Tank Team

May 2018 - August 2018 | Mountain View, USA

- Developed human pose datasets for proprietary imaging sensors using unsupervised domain adaptation
- Developed a deep learning based human pose estimation network that can predict human poses on frames obtained from the proprietary imaging sensor
- Worked on deploying the above developed network by creating a C++ application using TensorFlow APIs for building and executing the deep learning graph

### TEXAS INSTRUMENTS | SOFTWARE ENGINEER

July 2014 - June 2017 | Bangalore, India

- Improved accuracy of TI CNN model for driver drowsiness detection by 2x
- Improved Adaboost classifier for object detection yielding 10% more true detections. [*Efficient object detection and classification on low power embedded systems, ICCE 2017*]
- Accelerated a set of OpenCV functions using OpenCL and DSP which was released as part of TI Vision SDK. [*Understanding the Performance Benefit of Asynchronous Data Transfers in OpenCL Programs Executing on Media Processors, HiPC 2015*]

### TEXAS INSTRUMENTS | COMPUTER VISION INTERN

May 2013 - July 2013 | Bangalore, India

- Improved an existing homography based Ground Plane Detection by 10%. [*Ground plane detection, Patent 2017*]. [*Improved ground plane detection in real time systems using homography, ICCE 2014*]

## ACADEMIC PROJECTS

### UNSUPERVISED SEGMENTATION DATA GENERATION

October 2018 - December 2018 | CMU, Pittsburgh

Interpolated semantic segmentation labels between key frames in a video using dense depth as supervision

### RGB SUPER SLOMO USING HIGH FPS DYNAMIC VISION SENSOR

October 2018 - December 2018 | CMU, Pittsburgh

Developed a deep learning network to produce high frame rate RGB video from a low frame rate RGB video using optical flow derived from high frame rate dynamic vision sensor video as supervision

### SMART RECONSTRUCTION

January 2018 - May 2018 | ILIM Lab, CMU, Pittsburgh

Reconstructed traffic from a single stationary camera using keypoint detection, tracking and geometric constraints while stabilizing the camera

### WEAKLY SUPERVISED OBJECT DETECTION

March 2018 - March 2018 | CMU, Pittsburgh

Implemented weakly supervised object detection algorithm: WSDDN

### SCENE CLASSIFICATION

September 2017 | CMU, Pittsburgh

Performed scene classification using Spatial Pyramid Matching from scratch

### DIGITAL ART USING SFM

October 2017 - November 2017 | CMU, Pittsburgh

Developed an application to create portrait effect from single camera using SFM and 3D segmentation

### INTELLIGENT INPAINTING

October 2017 - November 2017 | CMU, Pittsburgh

Developed an application that removes a person from an image from a single click using pedestrian detection, semantic segmentation and exemplar inpainting

## PUBLICATIONS

- Improved ground plane detection in real-time using homography, ICCE
- Understanding performance benefit of asynchronous data transfers in OpenCL programs executing on media processors, HiPC