

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

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

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

- Ported a popular open source 2d detection PyTorch model to TorchScript and implemented 2D detection pipeline in C++
- Working on finetuning the same by
 - Incorporating architectural advances such as weighted BIFPN from 'EfficientDet' paper
 - Using Swish activation over ReLU activation
 - Tuning hyperparameters such as learning rate, weight decay, focal loss parameters, loss weightage parameters using Bayesion Optimization package called 'Ax'
 - Creating hierarchy of classes to better differentiate between classes and easily adopt with different annotation formats
- Designed and implemented traffic light detection system from scratch consisting of components such as traffic light detection, traffic light recognition and tracking
- Analyzed the depth error of stereo and came up with an optimal baseline width taking into account target working range, camera FOV and permissible blindspot
- Worked on prototyping multilayer stixels world work on the in-house stereo camera setup which involved camera calibration, stereo rectification, tuning SGBM parameters and understanding stixels computation
- Worked on choosing camera format and lens focal length for required detection range and Field of View
- Designed and implemented software based Lidar-Camera synchronization system that is capable of operating at 10Hz under certain configurations

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 | 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 NYU depth dataset v2 videos using dense depth as supervision for intermediate frames improving mIoU by 2% over FCN baseline finetuned on NYU v2 dataset

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 and achieving comparable performance as that of using high FPS RGB video supervision

SMART RECONSTRUCTION

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

Reconstructed traffic from a single stationary camera using keypoint detection and ground plane assumption (similar to the work done by Beyond Pixels paper), 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 as part of course project

SCENE CLASSIFICATION

September 2017 | CMU, Pittsburgh

Performed scene classification using Spatial Pyramid Matching from scratch as part of course project

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 as part of course project

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