Ganesh Iyer

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Education

Thakur College of Engineering and Technology, Mumbai University *Aug. 2012 - Aug. 2016*

B.E. in Electronics and Telecommunication Engineering, Aggregate CGPA - 8.11

Experience

Robotics Research Center, IIIT Hyderabad *Hyderabad, India*

Research Assistant, under the guidance of Dr. K Madhava Krishna *July 2017 - PRESENT*

- *Recurrent Self Supervision for Deep Monocular and RGBD Visual Odometry* [Link]: Experimenting with Conv-LSTM architectures and geometric constraints enforced in $se(3)$ tangent space, to facilitate training by photometric error reduction for Monocular and RGBD inputs.
- *Markerless Extrinsic LIDAR-camera calibration* [Link] for self-driving vehicles using a Deep Convolutional Network based initialization, unsupervised training methodology, and non-linear pose optimization.
- Working on a Road Sign Detection and Classification Pipeline using Deep Networks for the Mahindra RISE Driverless Car Challenge.

Swaayatt Robots *Bhopal, India*

Research Intern and Developer, Artificial Intelligence and Computer Vision *Aug. 2016 - June 2017*

- Developed a *Fast Stereo Disparity Map Computation Pipeline* [Link] and PointCloud Reconstruction technique using Siamese Convolutional Neural Network and Semi-Global Matching.
- Created a *Facial Pose Tracking System from RGBD Point Clouds* [Link] for Advanced Driver Assistance Systems. Tested on the Kinect-v2.
- Contributed to a *Tight Segmentation and Tracking Package for Annotation* [Link] using multi-scale template matching and particle filters.

Selected Projects

Telepresence Robot with Stereoscopic Vision

Final Year Project *July 2015-Apr. 2016*

- Developed an inexpensive Telepresence Robotic platform capable of streaming a 3D immersive live video feed using Raspberry Pi over a wireless network. Stabilized camera gimbal movement using complimentary filter for jitter-free stream against neck movements.

Grid Traversing Robots

Thakur College of Engineering and Technology, Mumbai *Dec. 2013-Mar. 2015*

- Minesweeper Robot: Demonstration of BFS and Dijkstras' Algorithms to detect and locate small obstacles on a grid and reach end point.
- Warehouse Management: Using Order Picking Methods to segregate objects by certain criteria (color) and deposit into respective zones.

Other Projects

Semester based or Self-Initiated

- Self-Initiated Research on Generative Adversarial Networks, focusing on generation of images with semantic segregation of objects.
- Monte-Carlo Tree Search: Tic-Tac-Toe using Monte-Carlo Tree Search and Upper Confidence Bounds.
- Replacement of Workstations with Distributed Raspberry Pi projection systems, proposed for schools in rural areas for low cost computing.

Background & Technical Skills

Courses

- **Undergraduate Courses:** Differential Calculus, Vector Algebra, Analytic Functions, Discrete Time Signal Processing, Image & Video Processing, Fuzzy Logic & Neural Networks, Operating Systems, Digital & Analog Electronics, Computer Networks, Mobile; Optical & Satellite Communication.
- **Online Lectures** Stanford CS229/CS231n, Multiple View Geometry (Daniel Cremers), SLAM (Cyril Stachniss), Reinforcement Learning (David Silver)

Research Interests

- **Machine Learning:** Neural Networks and Deep Learning, Reinforcement Learning, Generative Models, Optimization.
- **Perception and Computer Vision:** 3D Geometry and Reconstruction, Structure from Motion, Visual Odometry, Stereo and Monocular Depth Inference, Semantic Understanding, SLAM, Object Reconstruction

Achievements

- Recipient of IEDC(Innovation and Entrepreneurship Development Center) Grant, Dept. of Science & Tech., New Delhi for 2016-2020
- Recipient of Final Year Student Project Grant, Mumbai University
- National Level in the Warehouse Management Theme, eYantra Robotics Competition (eYRC-2014), IIT Bombay
- Research and Development Cell Co-ordinator, TCET

Tools

- **Programming Languages:** Python, C/C++, Java (familiar)
- **Softwares/Libraries/Frameworks:** Numpy, OpenCV, Tensorflow, Theano, Keras, MATLAB, ROS (Robot Operating Systems), Point Cloud Library, Python/C API, Caffe, LCM, ATMEL Studio, LaTeX, g2o: General Graph Optimization(familiar), Ceres Solver(familiar)