Suraj M S
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Research Interests

I'm interested in computer vision and machine learning methods for perception and prediction in autonomous robots. I have experience on large-scale optimization, visual object detection, tracking and SLAM.

Education

- **Georgia Institute of Technology** — Atlanta, United States
  Master of Science in Computer Science; GPA: 3.8 — *Aug. 2016 – Jun. 2018*
- **Birla Institute of Technology and Science, Pilani** — Goa, India
  Bachelor of Engineering in Electrical and Electronics; GPA: 7.85/10.0 — *Aug. 2011 – July. 2015*

Publications

- **Suraj, M. S.**, Grimmett, H., Platinský, L., & Ondrúška, P. (2018, October). *Visual vehicle tracking through noise and occlusions using crowd-sourced maps.* In 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (pp. 4531-4538). IEEE.
- **Suraj, M. S.**, Grimmett, H., Platinský, L., & Ondrúška, P. (2018, June). *Predicting trajectories of vehicles using large-scale motion priors.* In 2018 IEEE Intelligent Vehicles Symposium (IV) (pp. 1639-1644). IEEE.

Experience

- **Lyft Level 5** — London, UK
  Research Engineer — *Nov 2018 - Present*
  - **AV Research**: I currently work on using deep learning based approaches for prediction and planning in autonomous navigation and leverage the large-scale driving data collected at Level5
  - **Visual Trajectories**: I worked on building cloud based offline pipeline for extracting accurate large-scale 3D trajectories of vehicles and pedestrians from dash-cam mounted on Lyft vehicles. This was then used to build HD semantic maps and to inform prediction and planning systems.
  - **Blue Vision Labs was acquired by Lyft Level 5**: I work on leveraging large-scale visual data for visual SLAM, semantic map annotation, perception and prediction systems.
- **Blue Vision Labs** — London, UK
  Research Engineer — *Aug 2018 - Nov 2018*
- **Blue Vision Labs** — London, UK
  Research Engineering Intern - CV/ML — *May 2017 - Mar 2018*
  - **Improving pose graph optimization for faster city-scale map building**: Worked on the pose graph optimization step of the map building pipeline and was able to make it faster by an order of magnitude enabling it to scale to city-size maps easily.
  - **Visual vehicle tracking through noise and occlusions using crowd-sourced maps**: Built a 3D vehicle tracking pipeline from scratch on top of city-scale localization system. Given a stream of images taken from a monocular camera mounted on a moving car and accurate localization, the system detects and generates 3D position and pose estimates of moving cars around it.
  - **Motion prediction from large-scale motion priors using mobile phone-equipped vehicles**: Proposed and implemented a non-parametric method predicting future poses of vehicles in urban environments leveraging motion data which were collected efficiently through crowd-sourcing at city-scale. This approach does not need any manual annotation or semantic labeling and implicitly encodes traffic and environment-specific rules into the prior.
- **Georgia Institute of Technology** — Atlanta, US
  Backend developer — *Jan 2017 - May 2017*
  - **MINED Group**: Wrote and deployed a complete Django+PostgreSQL system for Equipment and Lab Automation project supporting various Material Informatics specific research and data management tools. The system was integrated with Raspberry-Pi based scanner that automatically authenticates users and processes samples into the cloud database.

- **Charles University** Prague, CZ
  Research Intern *Nov 2015 - Jul 2016*
  - **Computer Graphics Group**: Worked on improving stratified metropolis light transport algorithm.
- **Google Summer of Code** Remote, IN
  Intern *Apr 2014 - Jul 2014*
  - **VisPy**: Implemented fast triangulation algorithms in numpy and expanded the visuals engine to allow users to draw with rich set of primitives without any knowledge of OpenGL.

Programming Toolset

Golang, Python, C++ | PyTorch, Tensorflow