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TL;DR

I'm interested in leveraging large-scale data and system design to solve challenging problems. I have worked both on the research and on production software-engineering aspects of city-scale visual SLAM for augmented reality, large-scale visual perception pipelines and on data-driven prediction and planning for autonomous driving. I currently work on leveraging graph learning for decoding complex biology - both on the machine learning and engineering aspects.

Education

- **Georgia Institute of Technology** — Atlanta, United States
  Master of Science in Computer Science (Specialization: Machine Learning); GPA: 3.8/4.0 — *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*

Experience

- **Relation Therapeutics** — London, UK
  Senior ML Engineer — *Sep 2021 - Present*
  Research Engineer — *Nov 2020 - Aug 2021*
  - **Tech team**: I work on a mix of software engineering, ML model development and data science pipelines to decode complex biology for drug discovery and therapeutic development.
- **Lyft Level 5** — London, UK
  Research Engineer — *Nov 2018 - Apr 2020*
  - **AV Research**: I led the research and development of a deep learning based prediction and planning module for autonomous driving in open-road scenarios. I designed the experiments, analyzed and iterated on the models, and collaborated with the Autonomy team to set up the pipeline to plumb it through to the AV Simulator.
    Open-sourced results
    Toolset: Pytorch, NumPy/SciPy stack
  - **Visual Trajectories**: I worked on building a cloud based offline pipeline for extracting accurate large-scale 3D trajectories of vehicles and pedestrians from dash-cam mounted on a large number of Lyft vehicles. I was one of a team of 6 responsible for building this. In effect, this productionized my previous research paper at Blue Vision Labs.
    Toolset: Golang, Python, Flyte + AWS
- **Blue Vision Labs** — London, UK
  Research Engineer — *Aug 2018 - Nov 2018*
  - **Blue Vision Labs was acquired by Lyft Level 5**: I worked on leveraging large-scale visual data for visual SLAM, semantic map annotation, perception and prediction systems.
- **Blue Vision Labs** — London, UK
  Research Engineering Intern - CV/ML — *May 2017 - Mar 2018*
  - **Improving pose graph optimization for faster city-scale map building**: I 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.
    Toolset: Python, C++, Ceres-solver
  - **Visual vehicle tracking through noise and occlusions using crowd-sourced maps**: I 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.
    Toolset: Python, Caffe
  - **Motion prediction from large-scale motion priors using mobile phone-equipped vehicles**: I designed 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**: I 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.
- **Google Summer of Code** Remote, IN
  Intern *Apr 2014 - Jul 2014*
  - **VisPy**: I 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.

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.

Patents

- P Ondruska, L Platinsky, **SM Surendran** *Enhanced vehicle tracking*. U.S. Patent No. 10,668,921. 2 Jun. 2020.