

Jim Aldon D'Souza

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Experience

Perception to Control In-Vehicle Autonomy Stack
Technical Lead Algolux / **Torc Robotics**
Nov '19 – Present Montreal, Canada

- Built a new team of 4 robotics engineers (MSc./PhDs) as a hiring manager. Defined and executed on a roadmap to extend in-house camera based perception software into a perception-to-control autonomous driving stack
 - Led team to implement localization, HD-mapping, state estimation/sensor fusion, prediction, planning, control modules that communicate via ROS-based middleware, with validation from simulator and in-vehicle testing
 - Achieved "key company milestone" by delivering on its first hands-free driving **demo** of a passenger vehicle on a test track at highway cruising speeds
 - Published a **CVPR 2023** paper on multimodal automotive scene understanding using sound to augment vision and an **ICLR 2022** spotlight paper (176 selected of 3391) on interaction-aware motion prediction of traffic. These were a result of collaborations with Princeton University and Mila Quebec respectively
- C++11/14 | Python3 | ROS 2 | PyTorch | Ceres | Unreal Engine

Monocular Camera based AV Perception
Senior Software Engineer Algolux / **Torc Robotics**
Sep '18 – Oct '19 Montreal, Canada

- Developed monocular visual odometry as part of a pilot project for a large German car manufacturer
 - Designed method for online calibration of multiple lidars and cameras that estimates small changes in extrinsic sensor calibration and declares failure if it increases beyond set bounds
 - Reverse engineered Tesla Autopilot inside a 2017 Model S car for **comparison** with internal vision based perception
- C++11/14 | Python3 | PyTorch | Eigen3 | TensorRT

Localization, HD-maps, Sensor Fusion for AD
Senior Software Engineer **TomTom**
Apr '17 – Aug '18 Eindhoven, Netherlands

- Delivered TomTom's first real-time ML-based multimodal (camera, IMU, GNSS, odometer) localization framework on an embedded platform (Nvidia Drive PX2) that leverages their extensive network of HD maps
 - Spearheaded collaboration between cross-functional teams in Amsterdam and Eindhoven to turn semantic segmentation models inference-ready on power-limited hardware, thus introducing ML into company's real-time localization framework
 - Built pipeline to match neural network11 output with HD-maps and fuse it with multi-rate geo-inertial data using particle filters to provide cm-level localization accuracy at speeds up to 130 km/h
- C++11/14 | Python3 | TensorFlow | ROS | TensorRT | RTMaps

Laser Scanning API for μm Precision Metrology
System Software Engineer **Nikon**
Sep '16 – Mar '17 Leuven, Belgium

Developed high-performance pipelines for industrial metrology laser scanners using latency-critical C++ code
C++11/14 | PCL | MSVC | microsoft/GSL

Rover Navigation in Featureless Environments
Robotics Researcher **DFKI**
Jan '16 – Aug '16 Bremen, Germany

- Published **thesis** on lidar navigation in feature and global positioning denied spaces by autonomous rovers in lunar and planetary exploration missions as part of a **project** funded by the German Aerospace Center DLR
 - Designed a SLAM algorithm with scan matching frontend and a graph optimization backend that's aided by arbitrarily deployed environment modifiers. In addition to reducing scene ambiguity, it improved data association, enabling loop closure and higher accuracy positioning.
- C++11 | Python3 | g2o | PCL | OpenCV | ROS | Rock RTOS

Monocular Visual Inertial Navigation System
Software Engineer **Rovsing**
Apr '15 – Apr '16 Skovlunde, Denmark

- Built camera+IMU state estimation that ran on Nvidia Tegra X1 for navigation in GNSS-denied environments using visual features and extended kalman filter (EKF) SLAM
 - Deployed the software for use by two different customers: Daimler in underground parking garages and the Danish military in urban warfare
- C++11 | Python3 | CUDA | Magma | Eigen3 | Qt

Perception and Localization for Mobile Robots
Student Researcher **DTU**
Jan '15 – May '15 Lyngby, Denmark

Developed SLAM algorithms in a competitive setting where teams rushed to have robots navigate a maze using cameras, 2D lidar, and a kinect sensor. Used particle filter for estimation and occupancy grid SLAM for rapid scene understanding
C++03 | Python3 | OpenCV

Education

MSc Electrical Engineering
Technical University of Denmark, Denmark

MSc Robotics Innovation Center
Thesis DFKI Bremen, Germany

MSc Computer Control & Automation
Exchange Nanyang Technological University, Singapore

BTech Electrical & Electronics Engineering
NITK Surathkal, India