# ARNAV IYER

iyerarnav@utexas.edu • (469) 340-7690 • github.com/ArnavIyer

## EDUCATION

**University of Texas at Austin** Austin, TX **August 2020 – June 2023**
B.S. Computer Science, GPA: 3.96; Courses: Data Structures and Algorithms, Architecture, Natural Language Proc.
**Graduate Courses**: Deep Learning, Autonomous Robots

## TECHNICAL SKILLS

Languages: C++1x, Python 3, C, Java 8, JavaScript, Kotlin
Tools: ROS, GTSAM, PyTorch, TensorFlow, matplotlib, OpenCV, Google Cloud

## EXPERIENCE & RESEARCH

**Apple, Inc.** Cupertino, CA **May 2021 – August 2021**
*Motion Sensing Intern (Software), Infrastructure Group*

- Built onto a web server to pull, analyze, store, and report motion sensor factory build data to engineers.
- Used Python 3, MongoDB, and Flask to build the server, and JavaScript for report generation.
- Created dynamic data visualizations and analysis tools with various libraries (bokeh, plotly, matplotlib).

**Autonomous Mobile Robotics Lab** University of Texas at Austin, Austin, TX **January 2021 - Present**
*Research Assistant*

- Engineered an anytime algorithm in **C++1x** to solve the Multi-Agent-Path-Finding (MAPF) problem using a windowing approach and information reuse that achieves first solution times strictly faster than standard algorithms (Conflict-Based Search) on a 100x100 four-connected grid with varying obstacle density.
- Optimized performance by leveraging code profiling with kcachegrind and efficient memory management.
- Created intuitive 2D and 3D visualizations of info reuse and path plans in matplotlib to understand and debug.

**Computational Epidemiology Lab** University of North Texas, Denton, TX **January 2019 – August 2020**
*Research Assistant*

- Implemented a heuristic algorithm in **Python 3** to create makespan-optimal routes for medicine delivery from multiple warehouses to designated points of distribution in the event of an epidemic.
- Contributed my implementation to emergency response software used for vaccine distribution in Texas.

**FTC #7172 Robotics Team** Plano, TX **June 2017** – **April 2020**
*Programmer*

- Created an autonomous navigation system in **Java 8** using odometry localization and motion profiling for a wheeled robot. Robot trajectories generated to any point on the playing field utilizing tracking wheels that measure the position and orientation of the robot at any instant.
- Leveraged distance sensors, motor encoders, and limit swi3tches to automate the stacking of blocks.
  *Distinctions: FTC Worlds Division Finalist 2019, 6th Place in the World 2020*

## PROJECTS

**Vehicle Obstacle Avoidance** <demo>

- Programmed a LIDAR-equipped robot car using C++1x and ROS to autonomously navigate through any course of obstacles and perform J-Turns on reaching a dead end.
- Built a one-dimensional time optimal controller for motion profiling and a greedy path-planning algorithm to generate and evaluate robot trajectories based on path length and clearance.
- Implemented Pose Graph SLAM using a correlative scan-matching front end and a factor-graph-based back-end optimized with GTSAM.

**Going Places** <code> <demo>

- Created a unique closed-loop route generator highlighting local attractions using Google Cloud APIs, Node.js, WebSocket. Applied Jarvis's algorithm and Google's Places and Directions API to create a route from a convex hull of a set of locations. Routes of interest stored using Cockroach DB.
  *Distinctions: HackTX Hackathon Winner*

**D* Lite Algorithm Visualizer** <code>

- Implemented the D* Lite path planning algorithm in C++ with an interactive OpenCV visualization.

## LEADERSHIP

**FIRST Global STEM Corps** Conakry, Guinea; Tangier, Morocco **Summer 2018/2019**

- Taught Java and mechanical design in French to the Guinean and Moroccan FIRST Global robotics teams.