Our goal is to build an autonomous F1 car at 1/10th the scale. By restricting our model to the limitations of the F1Tenth platform, we successfully built a self-driving racing car that relies on the control of our algorithm. Using a LiDAR sensor and on-board computation, we implement a navigation algorithm and speed controller designed to run at a top speed of 6m/s in complex racetracks. We also organized a race to test our algorithm against other autonomous cars.

### Navigation Algorithm

- **Reactive based algorithm** that uses real-time LiDAR data
- **Uses the closest and farthest average set of distances** from the car to determine the car's turning angle

**SLAM Speed Controller**

- **Utilizes Simultaneous Localization and Mapping (SLAM)** and to determine track curvature
- **Faster speeds at shallow turns**
- **Slower speeds at sharp turns**
- **Reduces lap time by 16.7% compared to lidar-based speed controller**

### Racing Event

- **Organized a time trial event with Triton AI at UCSD**
- **First ever UCSB representation for f1tenth autonomous racing**
- **Stress tested vehicle and optimized lap time on full sized track**
- **Got involved with the f1tenth racing community and was exposed to a wide range of algorithms**

### Acknowledgements:

We would like to thank Tyler Hattori, Chris Cheney, Prof. Ilan Ben-Yaacov, Sean Anderson, and Prof. Joao Hespanha. Special thanks to the UCSD Trident AI Team for being a great competitor.