Research Project: Navigation Integrity of Lidar-based localization

Navigation Lab - Illinois Institute of Technology

Sep 2021 - Dec 2021
Chicago, Illinois

Chicago, Illinois

Lidar-based localization of autonomous vehicles in an area with low **GNSS** availability, with a Velodyne's Puck sensor to compensate for **IMU** drift to ensure landmark identification against the misassociation problem. I established an error model to quantify precise 3σ probabilities of tree misdetection, considering multiple noise sources. I also researched the implementation of the Error Correction Codes domain **(Hamming and BCH codes)** for navigation safety.

Master's Thesis: Isogeometric Representation of Turbojet Blades

Structure Mechanics Laboratory - INSA

Sep 2020 - Dec 2020 Lyon, France

Building an algorithmic solution to merge CAD and FEA methods through Non-Uniform Rational Basis Spline (NURBS) manipulations. I designed an adaptive fillet to join the blade and its root volumes by implementing a fillet patch mesh on Python: NumPy - geomdl.

Other personal projects:

- Path Finding app using C++ and Qt: real-time visualization of algorithms (Dijkstra, A*, Maze Generation) through multithreading.
- VGG16 and ResNet50 blood cells classification, using TensorFlow and data augmentation with image data generators.
- Graph SLAM implementation from scratch, using Lidar measurements from the Victoria Park Dataset.
- Kinematics and dynamics modeling of a Scara Robot with PID and linearized command control.
- Drive cycle designed for autonomous vehicles: testing Wh and SOC consumption by simulating the pursuit of a standard car.
- Consciousness and Neuroscience research project: Statistical and Bayesian Brain.