

## Internship proposition (Ms. Student)

### Development and implementation of perception and observation algorithm on a electric vehicle

**Keywords:** Autonomous vehicles, data fusion, obstacle detection, Vehicle dynamic in it environment, Observer design.

#### 1. Context

The laboratory and the faculty are equipped with an electric vehicle (Renault Zoé type). The vehicle has undergone many transformations that have made it possible to equip it with several sensors of the dynamics and the environment (IMU, GPS, Stereo cameras, LIDAR...). This vehicle has all the equipment that allows the vehicle to locate itself in its traffic environment and estimate its dynamic state. At the same time, the researchers have developed several observation algorithms that must be supplemented by advanced measurements of perception of the environment including static and dynamic obstacles. It is therefore a double problem: methodological development of algorithms of perception and observation on one hand and algorithm implementation on the other hand.

#### 2. Objectives

The objectives of the work are as follows:

- Review the actual vehicle architecture and sensor equipment.
- Simulink integration of IMU, LIDAR and CAN
- Development and implementation of observer algorithms vehicle dynamics estimation, distance and speed to obstacles. Privileged theory is model based and neural network based methods

#### 3. Required profile

You are curious, creative, independent, and rigorous. Your interest in innovation, research in autonomous vehicle including dynamics and environment detection using advanced methods of observation and fusion. We aim to make theoretical results practically implemented and workin.

#### 4. Academic training sought

- Master / Engineer with skills perception, vehicle dynamics, system dynamics.
- Matlab and Simulink
- Languages: C, C++ • English: good level.

**5. Application procedures:** Applications (CV + cover letter) must be sent directly by email to the contact below. The transmission of transcripts will be appreciated.

**Training period:** 6 months

**Start date of internship:** February or March 2022

#### Supervision and contact:

- Said.mammar (full professor, IBISC), [said.mammar@ibisc.univ-evry.fr](mailto:said.mammar@ibisc.univ-evry.fr)
- Hocine Yakoubi (Engineer, IBISC), [hocine.yakoubi@ibisc.univ-evry.fr](mailto:hocine.yakoubi@ibisc.univ-evry.fr)