

Smart City IoT Project

Indoor/Outdoor air quality: the case of vehicles

Background

Improving Indoor Air Quality (IAQ) in shared spaces is an area of intense interest, especially since the covid-19 outbreak. One particular use case of IAQ, but with limited, so far, progress is that of vehicles and in particular, mass transport vehicles, such as buses. Given the complex interactions of the vehicle with the outdoor environment (and in particular the discontinuities presented on embarkation/disembarkation of passengers) we focus on the interplay of perceived IAQ by passengers.

Aim and purpose

The project aims at the students gaining familiarity with a network of sensors deployed on, and around the ELIN bus, and use it to characterize the perception of bus users in the sensory input context.

Organization

Project supervisor: Vangelis Angelakis {vangelis.angelakis@liu.se}

Project Group

The project should be conducted by a group of 1-2 students: since the number of group members is variable, there may be need to propose a clear and fair separation of responsibilities to the supervisor from the project specification.

Project Description

The project covers the following steps:

- Observation of installation of sensors in and around the ELIN bus platform, discussions with sensor experts and literature review on the relevant IAQ topics.
- Acquisition of sensory data, user perceptive information (qualitative) and correlation of bus motion and local meteo conditions with air quality on, in, and around the vehicle.

Project Grading

Each project can be graded, Fail, 3, 4 or 5 for the corresponding ECTS grades. Each step below will be evaluated regarding aspects such as complexity, realization, reasonability, systematic treatment etc.

For the grade 3, at least the following steps must be carried out:

- A detailed project specification and project plan, written in professional English
- A concise literature review of (i) common pollutants and their potential impact (ii) relevant sensor types
- Deep demonstrated familiarization with the sensors available at the lab.

For the grade 4, at least the following additional step must be carried out:

- Correlation of outcomes of sensory inputs from inside the ELIN bus, with external sources of data (position on route, day/time, number of passengers etc)

For the grade 5, (a) the grade 3 and 4 steps have to be carried out with outstanding results, (b) exemplary presentation, and (c) the following step should also be carried out.

- Correlation of outcomes of qualitative survey carried out with the data of the step above.