Localizing minicar withing Delta 3rd floor hallways (MSc)

The Autonomous Driving lab owns a dozen DonkeyCar S1 minicars. These vehicles come equipped with a camera and inertial measurement unit, as well as Raspberry Pi. Your task is to localize the vehicle with best possible accuracy within the third floor of Delta building (starting with only one wing or hallway, for example) using the available sensors. This means the high level localization (which hallway I'm in) can be based on the proximity of wifi access points, while more precise localization inside a certain hallway can be based on lines detected in the camera image.

The supervisors see particle filters as a possible approach to the task, as it allows combining multiple sources of information (north direction from IMU, hallway-precision from wifi, location within hallway by camera). However, the student should complete a thorough literature review on camera-based localization and another method may prove applicable.

If the vehicle is capable of localizing itself within the third floor of Delta with sufficient precision, it can follow paths and complete any routes given to it, opening possibilities for further applications, such as delivery of items, security patrols etc.