

Ineltek GmbH is an independent electronic components distributor founded in 1987 in Heidenheim (Baden-Württemberg, Germany), while Ineltek Italy started operations in 2015 in Castelfranco Veneto (TV) supporting customers from all over the country. The company does not only provide components, but also follows the customers from the beginning of the project to full production, offering both technical and commercial support. Ineltek designs a variety of development boards in order help customers speed up and simplify the creation of new products.

Candidate

The company is looking for a graduate student in electronic/automatic/telecommunication engineering, who wants to develop an embedded AI experimental thesis.

Overview

The development of low cost microcontroller modules, which integrate both WiFi and Bluetooth stacks, makes it possible to connect to a global network of increasing numbers of electronic devices. The internet of things (IoT) movement is experiencing a tremendous growth and new applications are emerging at a fast pace. This increasing computational power enables AI applications on edge devices with new opportunities in the field of smart sensors.

Project details

The project is a camera based people detector that should ideally be cost effective enough to replace PIR (Passive Infrared Sensor) modules. It should work with still subjects and be able to distinguish people from other objects or animals, achieving better performance and hence smarter management of power consumption. To replace PIR modules in all applications, a high privacy standard must be ensured by using (physical and visible) non-reversible lens filters. The communication with the module is managed through WiFi (e.g. MQTT protocol). Fig. 1 shows a block diagram of the smart detector. The WiFi module identified for this project is the ESP32-S2 by Espressif. This thesis activity consists in three main steps.

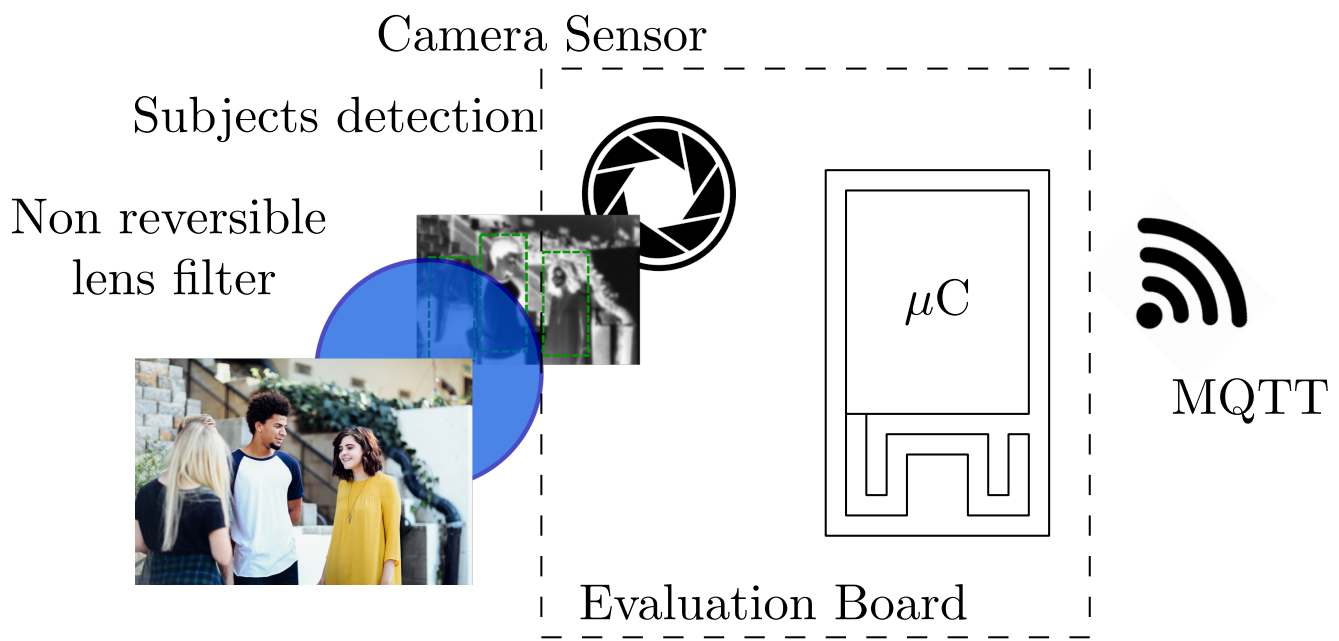


Figure 1: Smart people detector with hardware enforced privacy

Thesis Proposal

1. The student will select and study a suitable non-reversible filter.
2. An image database will be selected and processed to simulate the previously selected filter.
3. After the NN training, the neural network will be implemented on the microcontroller.

The expected thesis duration is between 6 and 9 months and will be developed with the support of a company tutor, which will follow the student remotely and with regular meetings.

For further information

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