Proposal 5

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Title: Implementation of a motion detector alarm system: feasibility of transmitting images on Lora

Description:

The need for effective and reliable intrusion detection with an alarm system has become a vital necessity due to the frequent instances of burglary. Attacks on homes, offices, factories, banks, etc. are on the rise. With advances in technology, motion can be detected by measuring the change in velocity or vector of an object in the field of view.

This can be achieved either by mechanical devices that physically interact with the field, or by an electronic device that quantifies and measures changes in the given environment. The goal of this project is to implement a motion detector alarm system. Indeed, this project will be built using two Arduino devices each connected to a motion sensor (PIR sensor). Their role will be to inform the application (which students must create on a server) when a movement is detected, this application can be used to access all the information collected by the final devices.

The application will then have to send an e-mail notifying the destination, the ID of the sensor that receives this information. The final devices must be programmed to receive two different downlink commands, by receiving the first command, they must create a sound using a buzzer and by receiving the second command, the final devices will flash their LED. Finally, an IP camera must start transmitting an image (or a luminous video with a given light encoding) to be transmitted over the network.

Required hardware and software:

Final device: two Arduino's each connected to a motion sensor, a buzzer (or speaker), an LED and a camera.

Gateway: Build a gateway using a Raspberry pi and LoRa concentrator board.

Server: TTN, LoraServer or any other LoRa server.

In order to achieve this goal, the following tasks will need to be completed:

- Perform a theoretical study: LoRa and LoRaWAN (technical overview), motion sensor (operation) etc.

- Make a connection diagram between the two Arduino, the motion sensors and the buzzer.

- Build a gateway using Raspberry pi and a LoRa hub board.

- Study the different server technologies for LORAWAN and create an application on the chosen server.