BIDONCINI

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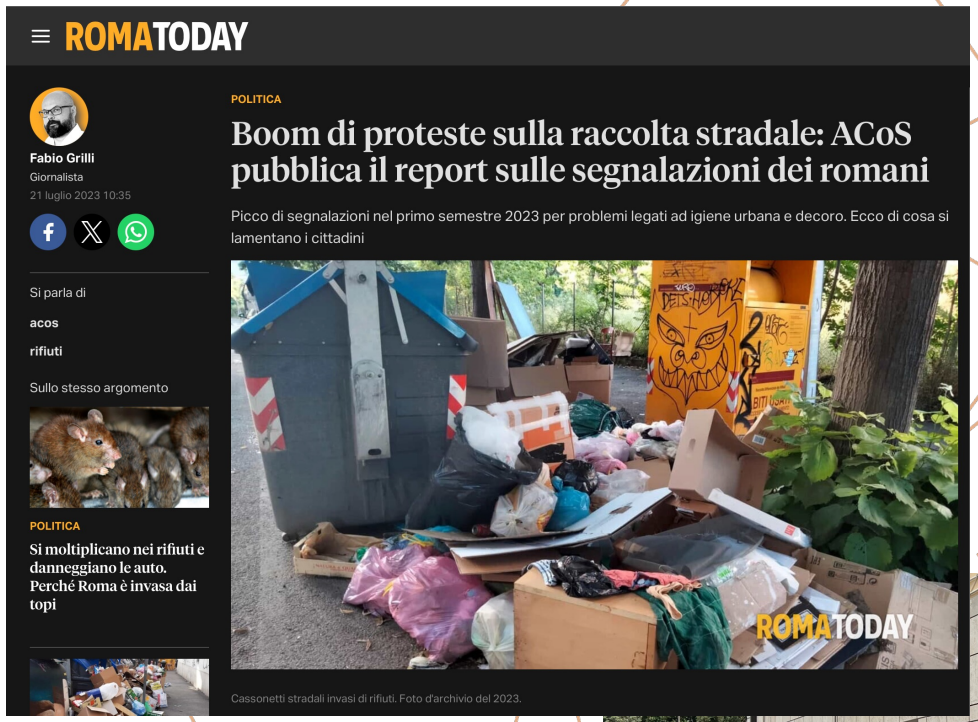
THE PROBLEM

Rome is a city home to 2.8 million residents, hosting 7-10 million tourists each year (source: Wikipedia). Litter is a big problem, especially during hot seasons.

Our project aims to tackle this phenomenon, by bringing smart IoT devices to record and analyze trash production.



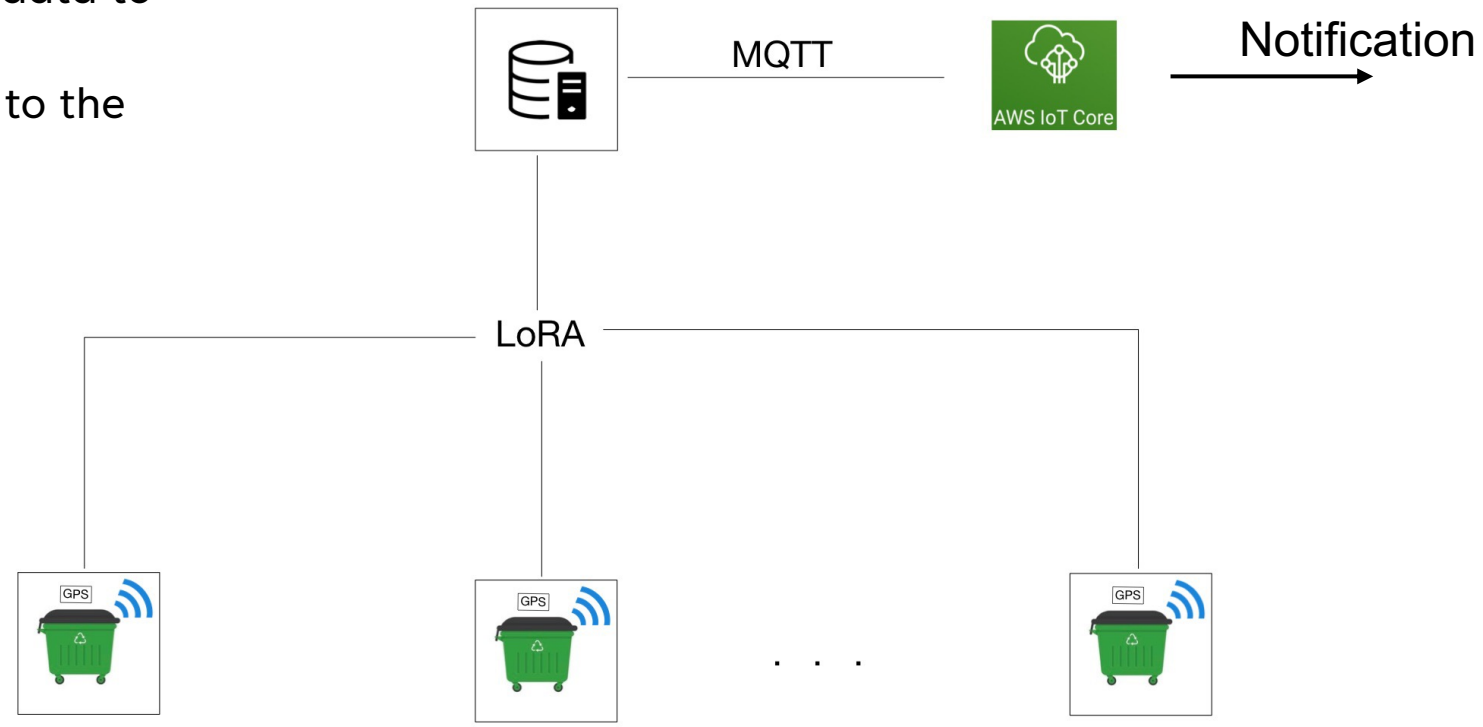
THE SOLUTION

An IOT device would provide us with a cheap but extensive solution. A distance sensor would tell us when a dumpster is full.

Frequency analysis would tell us the optimal trash collection frequency. Statistical analysis on the whole network would instead indicate us more active areas, useful to consider dumpster reallocation.

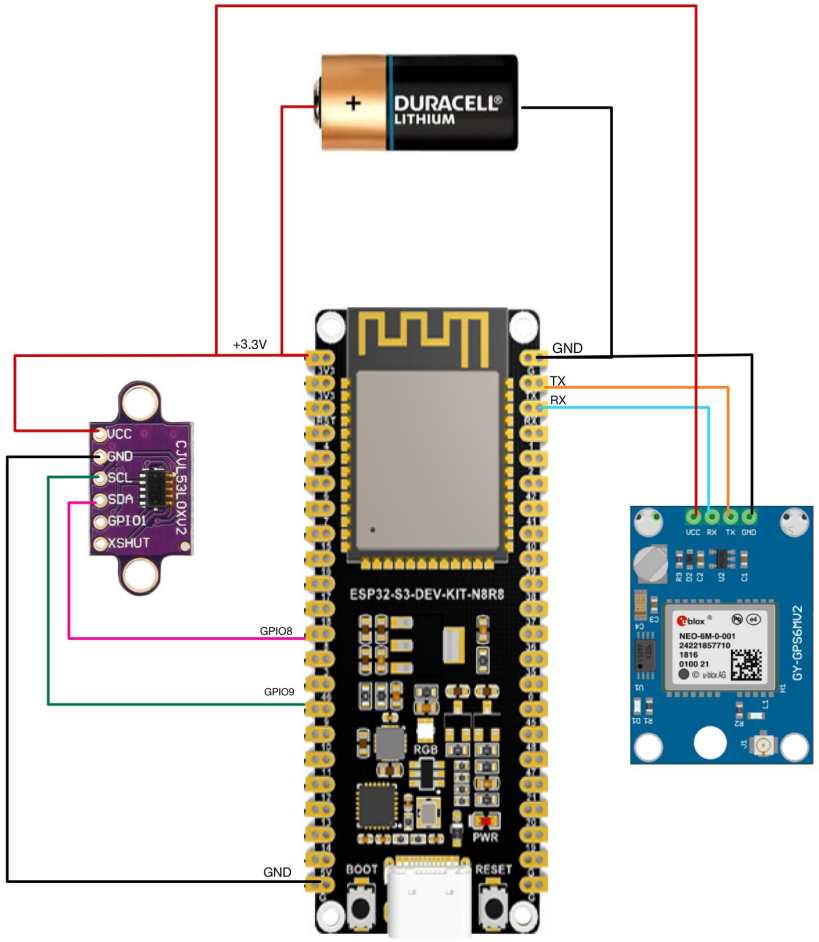
IOT ARCHITECTURE

- LoRA to transmit data to the gateway.
- MQTT to forward to the cloud.



DEVICE COMPONENTS

- ESP32 board
- Distance sensor
- GPS module
- Battery



Data collected

Trash production, most active areas.

Actuators

Notification of trash collection, collection performed by operators.

Impact on the environment

Optimization of trash collection routes, reduction of overflowing dumpsters.

CONSTRAINTS

- Bandwidth: relevant, but addressable with gateway replication. Also packet size minimal.
- Latency: not relevant.
- Energy: expected low power consumption.
- Duty cycle: measurement and value forwarding. Periodical frequency analysis.
- Frequency: adjusted to frequency analysis.

PERFORMANCE EVALUATION

- Bandwidth: 4 byte packet size.
- Latency: to be measured.
- Energy: distance sensor: 6 uA on sleep, 19 mA on duty.

  gps sensor: 47 mA on duty.
- Duty cycle: to be measured.

MEASURE EFFECTIVENESS

- STEP 1: Install the devices and collect data (no action).
- STEP 2: Activate notification system.
- STEP 3: Compare data.

THANK YOU

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