WASTE MONITORING AND MANAGEMENT

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Abstract

The system described in the paper comprises of wireless nodes which use ultrasonic sensors to evaluate empty room in the bins, a sensor gateway based on the Long-Range Wide Area Network (LoRaWAN) protocol and cloud-based back / front end for information collection, evaluation, and simulation.

Key words: Waste management, wireless nodes, ultrasonic sensors.

Introduction

This paper provides a way to provide a waste surveillance[1] and government waste bins management. Smart city[2] systems are an evolving subject and norms, methodologies and best practices are still lacking.

The paper aims at the following described points:

- First is to know stakeholder requirements and define requirements.
- Second is to design internet-of-things based system for monitoring and evaluating the use of government trash bins.

Methodology

The system includes sensor nodes, gateways, a cloud-based information collection backend and a front end for analytics visualization.

1. Sensor Nodes

   The nodes are easy instruments that can use ultrasonic sensors to evaluate the empty room in the trash bins and communicate the information to the backend later. Wireless communication is one of the main elements of sensor node design and general system

topology[3]. In this respect, our sensor nodes are using a new technology based on large-area long-range networks (LoRaWAN).

2. Gateway

   The LoRaWan networks are hub-based star topologies and the gateway is the physical unit that gets data packets from the nodes and transfers them to the backend system. The Things Network open source are used to transmit data packets to the backend.

3. Backend

   The backend is a cloud-based device that uses the MQTT (Message Queueue Telemetry Transport) protocol to obtain information from the nodes.

4. Frontend

   The front end is intended to provide both mobile devices and computer screens with an affordable interface.

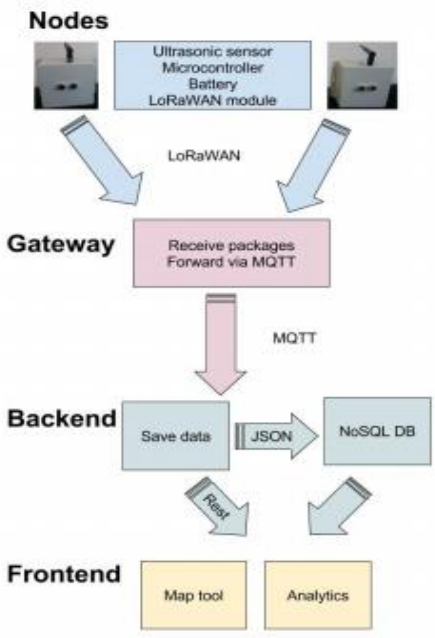

FIG.1 System Architecture

Conclusion

The embedded board can be intended to reduce production expenses and reduce the physical footprint considerably. Finally, adding a volatile organic compound or gas sensor can significantly

benefit the system; which can provide an assessment of the odors concentrated in the trash bin and provide a dimension in analytics.

References

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