IoT and Waste Management for Food Efficiency

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Efficient waste management can reduce environmental problems and cost issues.

In a Smart Garbage System (SGS), Smart Garbage Bins (SGB), exchange information using wireless mesh networks.

Router and servers collect and analyze data for service provisioning.

Residents have cards called RFID cards for using the waste bins.

The idea is to make residents pay for their food waste by measuring the weight of the waste.

There is a card reader for authenticating the residents and keeping track of their waste management and payments history.

This project was operated in Gangnam, Seoul, South Korea for one year.

The average food waste was reduced by 33%.
Smart Garbage System

Figure 1: Overview of smart garbage system.
Administrative Domain and Service Domain

Administrative Domain:

- Data stored and processed.
  - Data:
    - Resident's information and previous payments
    - Battery and memory status and malfunctions
    - Amount of waste
  - Servers:
    - Smart Garbage Management Server
    - User Management Server
    - Payment Management Server

Service Domain:

- Where users throw away their food waste.
  - The RFID card touches the RFID reader
  - User enter code
  - SGB authenticates the user and opens the lid
  - User throws away his food and SGB measures it’s weight
  - The data is sent and processed in administrative domain
  - Payment info is displayed on LCD
Wireless Mesh Network for Garbage Bins Information Exchange

Figure 2: Network topology of smart garbage bins.
Smart Garbage Bins (SGB)
Implementation

Figure 10: Implementation of a smart garbage system.
Application

Figure 7: Mobile application for the collectors.
Statistical Analysis

- The number of households: 7009 households
- The number of SGBs: 136 SGBs

- Amount of food waste (kg)
- Food waste disposal cost (Korean won)

33% reduction
Resources

► Further Readings:
