

LoRa-Enabled Post Detection System



The Talking Mailbox

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Problem

- Professors/Instructors have a lot to do, and don't always have the time to see the mailbox
- Checking for mailbox and finding nothing can be annoying and waste of time
- Unchecked post for long time if professor busy
- No way of knowing if post received if away



Solution: The Talking Mailbox



Check post

Your mailbox knows when something arrives

- Pressure sensor to detect post in box
- Same sensor can detect when post is removed



Notify

The mailbox talks to you

- Update a website to see if post is in the box
- Optional: mail the respective person



Alert

Stay alert

- Monitors battery and alerts user in case of low battery
- Detects opening, and alerts user: avoid tampering

Approach to Solution

Check for post

Use a pressure sensor to detect if a post comes in

Notify personnel

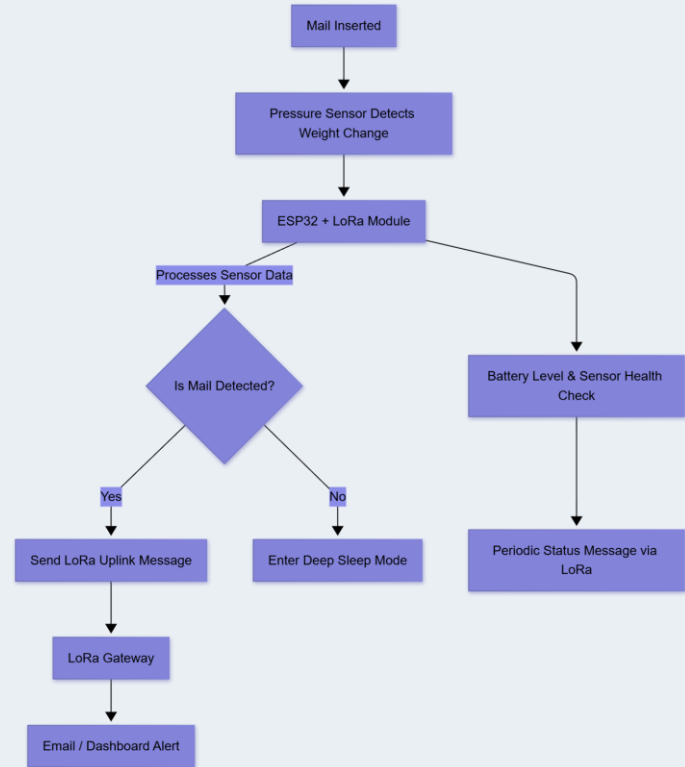
Detecting post triggers LoRaWAN gateway notification (website/mail)

Detect opening

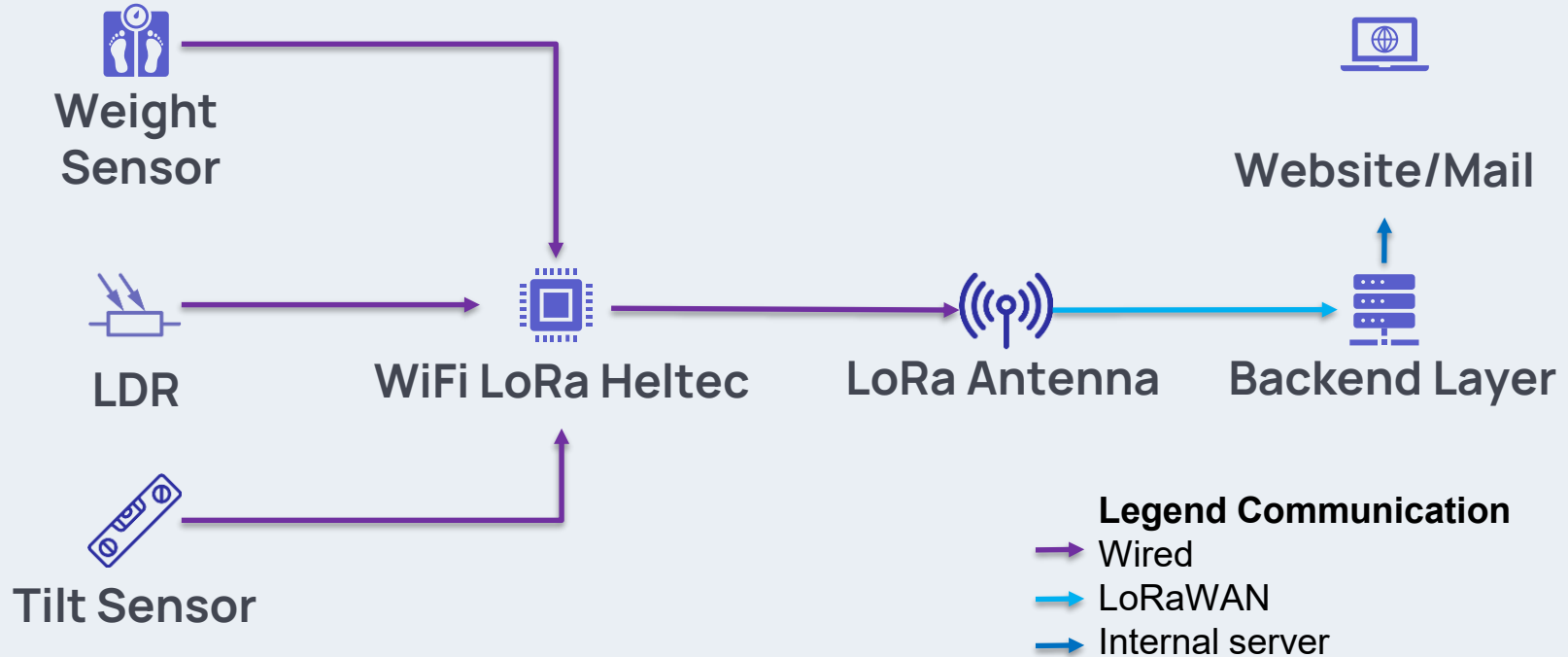
A combination of Light Dependent Resistor and Tilt Sensor on the lid to detect opening

Monitor battery

Check voltage levels, in case it drops below a threshold, alert the user



Product technologies and interaction



A thin vertical line and a wider blue-to-purple gradient bar are positioned on the left side of the slide.

Thank You

Any questions?

Functional Requirements

For the The Talking Door to be a satisfiable product, the following functional requirements must be implemented:

- It can detect if a mail is in the mailbox
 - It can detect if the mailbox is opened
 - It can check the battery status
 - It can communicate if a mail is in the box to a website (based on LoRaWAN)
 - It can detect light as a redundancy for confirming the opening status of the mailbox
 - It alerts the responsible person via email or dashboard upon mail detection
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Technical Requirements

For the The Talking Door to operate and perform its functions, the following technical requirements must be implemented:

- The pressure sensor can detect when a piece of mail has been placed within the box
 - The tilt sensor can detect the rotation of the post box lid hence detecting if it opened
 - The LDR can detect the change in light intensity when the lid is opened
 - The transmitter can reliably connect and communicate via the LoRaWAN
 - The server the LoRaWAN communicates too can notify the personnel about the mail
 - The power supply is a battery with a working voltage of 3.3V to 5.5V
 - The enclosure can protect the system within a typical indoor environment (IP 31)
 - Should function at temperatures ranging 0-40°C and humidity 10-90%
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Attribution Links

Some icons were used from flaticons, here are the attribution links:

- <https://www.flaticon.com/free-icons/light-dependent-resistor> : Light dependent resistor icons created by verluk – Flaticon
 - <https://www.flaticon.com/free-icons/antenna> : Antenna icons created by Freepik – Flaticon
 - <https://www.flaticon.com/free-icons/spirit-level> : Spirit level icons created by juicy_fish - Flaticon
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Price Estimates

Estimates

- Weight Sensor : 20.00 euros
 - RBS311104: Digital Tilt Sensor : 3.00 euros
 - ESP 32 Heltec : 32 euros
 - PDV-P9203 : LDR : 0.88 euros
 - Housing estimate : 20 euros (extreme case)
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