İzmir Ekonomi Üniversitesi

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Tag Reader

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Introduction

An affordable ESP32 with an MFRC522 reader scans 13.56 MHz RFID-tagged garments in real time. A Python backend using SQLite and RabbitMQ manages data flow, instantly pushing stock updates to fitting-room displays.

Benefits

Instant product and size lookup eases customer uncertainty and social anxiety, cuts return rates, and lets staff focus on personalized service saving time and boosting satisfaction and efficiency.

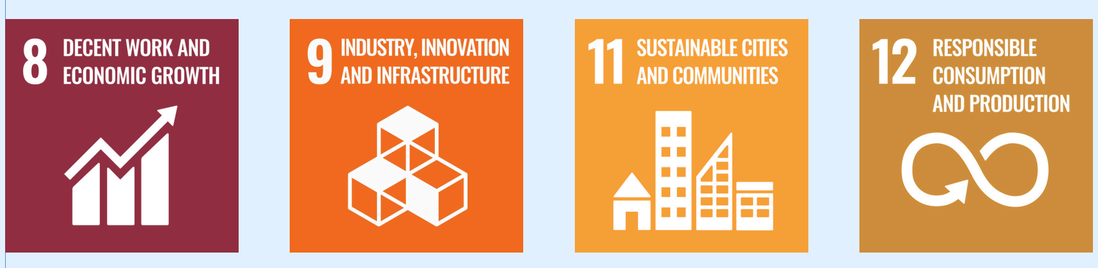
Scalability & AI-Ready

Modular APIs allow integration of AI-driven analytics for predictive restocking.

Technical Specs

MCU: ESP32 (240 MHz, 520 KB RAM)
RFID: MFRC522 @ 13.56 MHz (ISO 14443A)
Backend: Python 3 + SQLite + RabbitMQ (AMQP)
Bridge: MQTT plugin for RabbitMQ
Display: 320×240 TFT (TFT_eSPI)

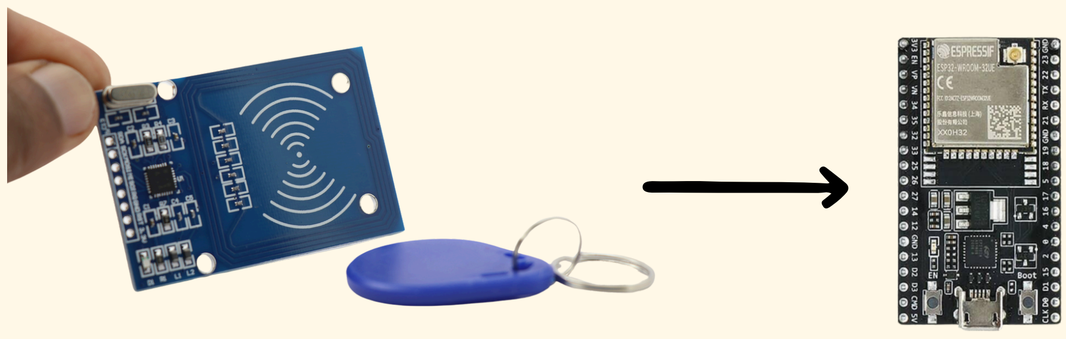
UN SDG Alignment



Workflow Overview

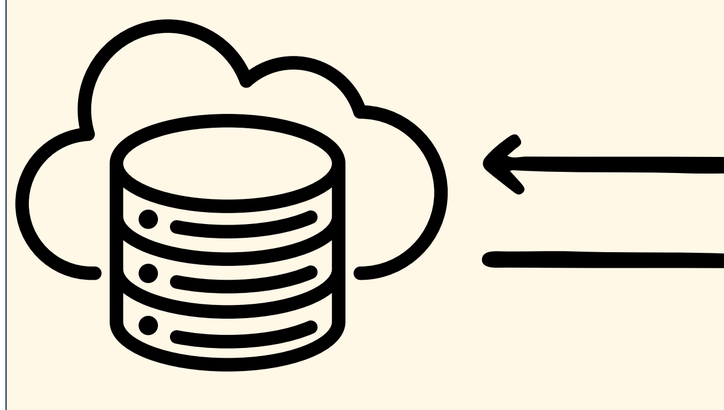
1.Customer scans garment on MFRC522

2.ESP32 sends RFID key to RabbitMQ



3.Python server queries SQLite for item information

RabbitMQ



4.Server publishes the information to RabbitMQ

RabbitMQ

5.ESP32 subscribes to RabbitMQ

6.ESP32 parses payload and updates the TFT screen