Environmental control

IOT CLASS PROJECT 2024-2025,
PROF. GIANCARLO FORTINO

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DIPARTIMENTO DI INGEGNERIA INFORMATICA, MODELLISTICA, ELETTRONICA E SISTEMISTICA
DIMES

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- Work Flow
- Contex-aware
- Challenges
- Features
- Used Technologies

Goals

Main Goal:

Museum's environment dashboard

Side Goal:

Museum's environment data analysis

Work Flow

- First semester
- Second semester

Sensor Nodes
TelosB

Radio

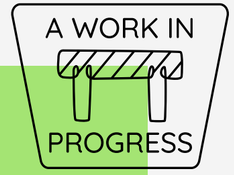
Base Station
TelosB

Serial port

Edge Device
PC, Python Interface

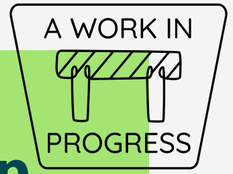
MQTT
Node-Red

Cloud Service
FireBase or AWS



Web Dashboard
Grafana

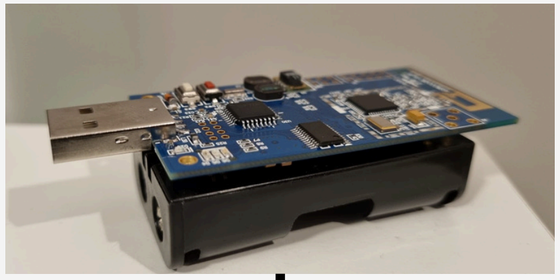
Mobile App
Android

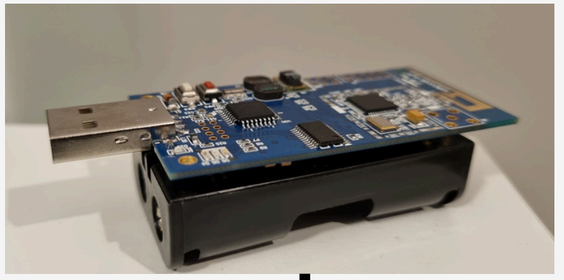


Sensor Nodes
TelosB

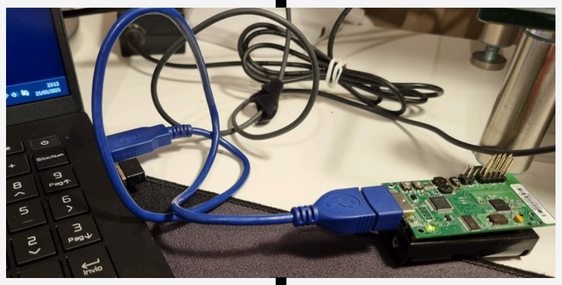
Base Station
TelosB

Edge Device
PC, Python Interface

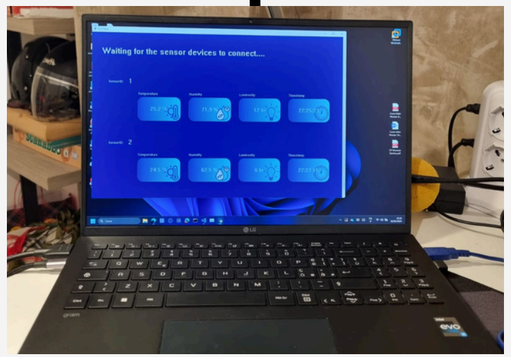


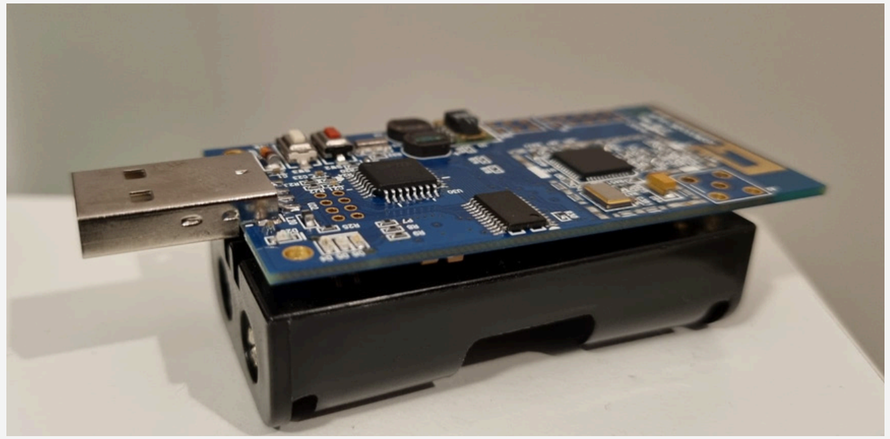


radio



Serial Port





2 TelosB

MAKEFILE

SensingAppC.nc

SensingC.nc

SensorMsg.h

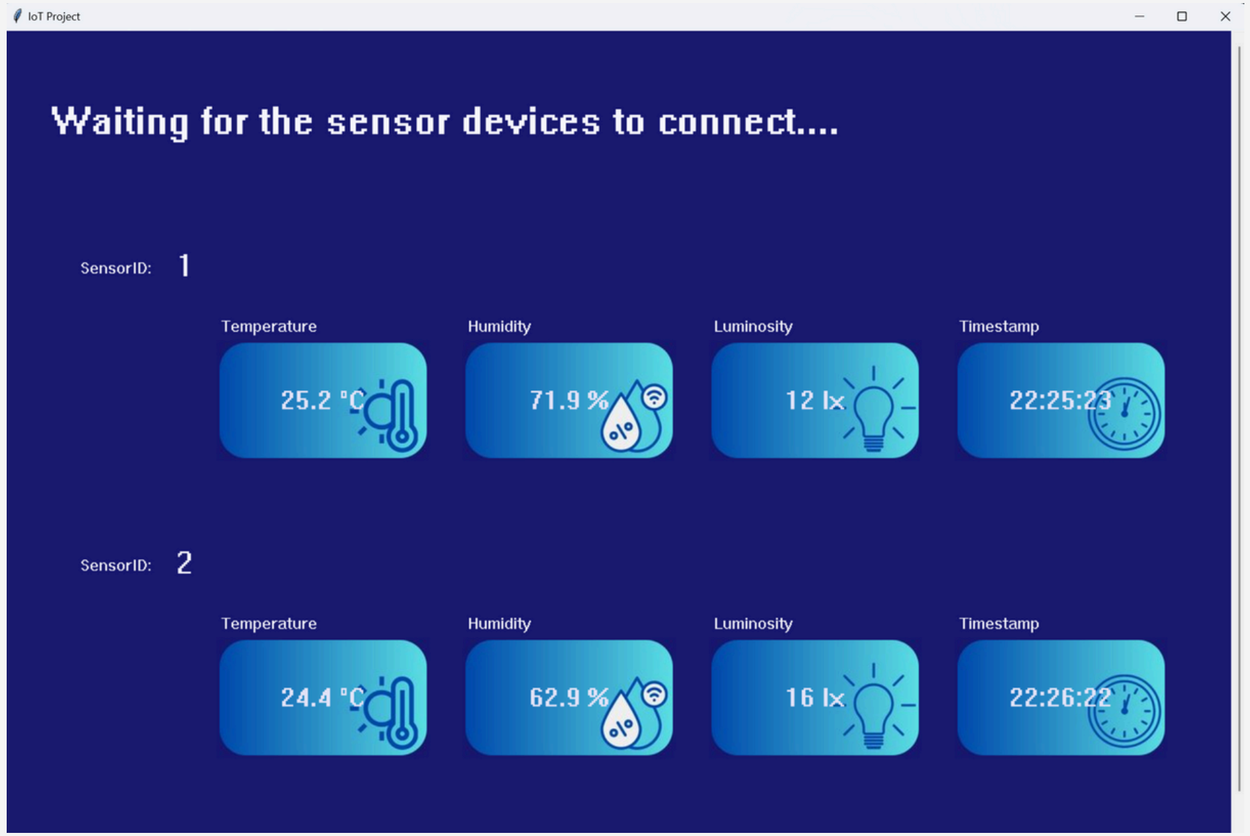
1 TelosB

MAKEFILE

SimpleReceiver AppC.nc

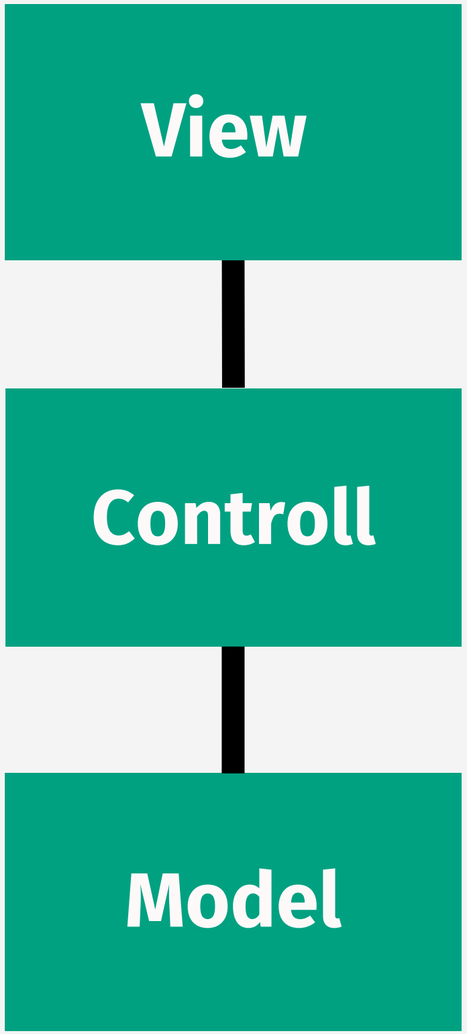
SimpleReceiverC.nc

SensorMsg.h



Python Interface

Pattern MVC

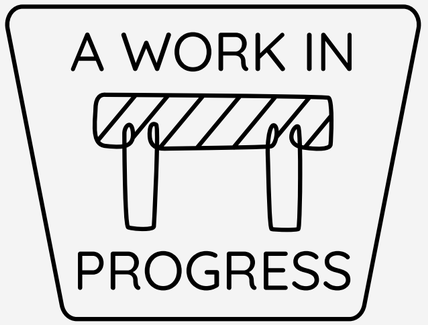


Contex-aware

2 ~ TelosB sensors to monitor temperature, humidity and luminosity

1 ~ TelosB base station

1 ~ Arduino to change the temperature



Challenges

- Measurement Frequency
- Radio communication fails between TelosB
- Sensors Placement
- Uncertainty

Challenges

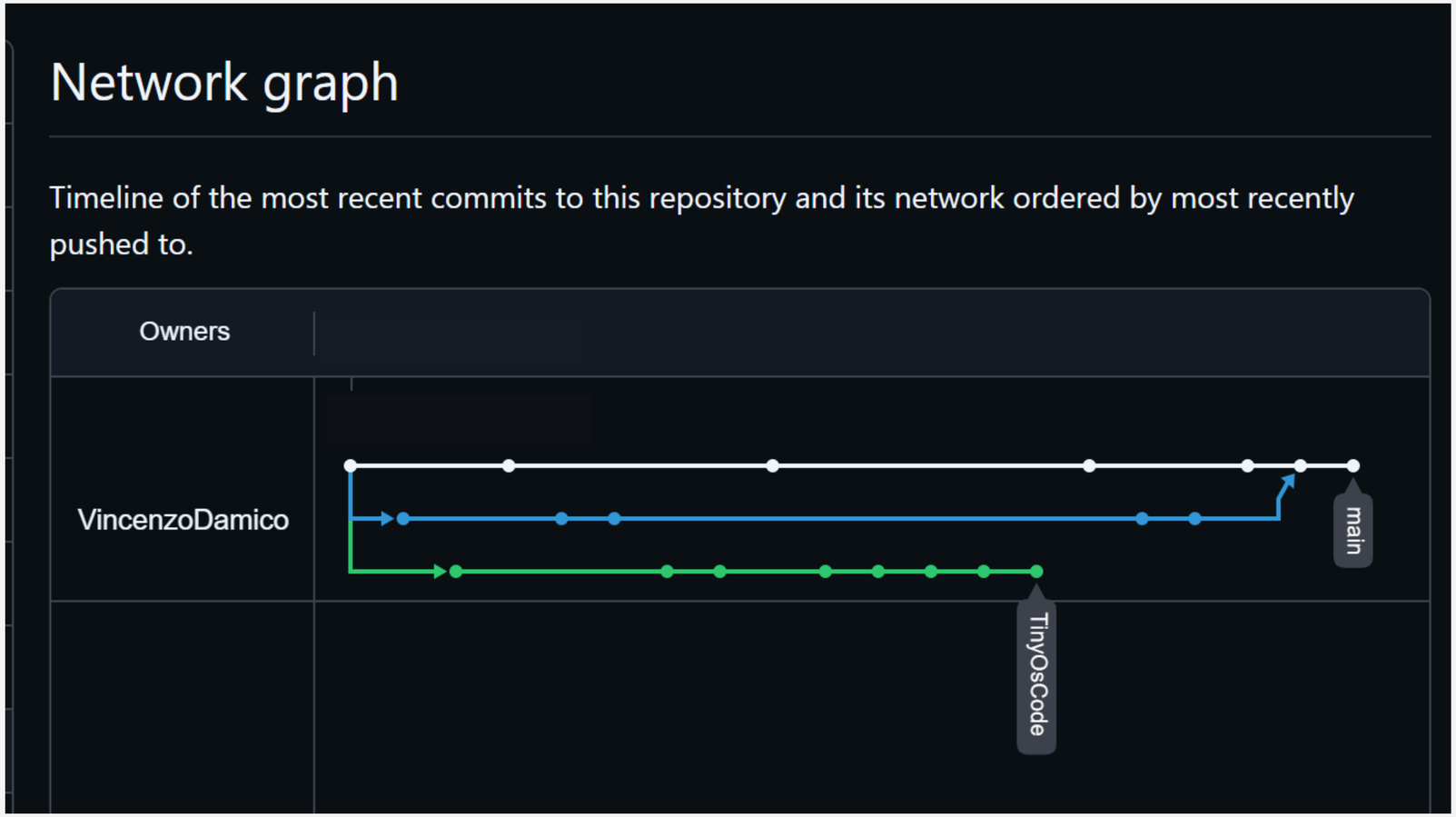
- MQTT with QoS=1 to balance RealTime constraints & Reliability
- Design a cheap cloud architecture

Features

Dashboard that provides real-time visualization	Data analysis, computation, and interpolation (air quality and data history).
Cloud system to store and share data	Auto-setting of the temperature with a reinforcement learning (if we have time 🙂)

What did | will we use?

TinyOS (.nc)	Python
AWS	MQTT (Nodered+ Mosqitto)
Grafana	Android



https://github.com/VincenzoDamico/IOT_TinyOs

Thank you

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