Co.2 MECHANICAL PLANT AVATAR

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PROJECT GOALS

The aim of this project was to create a customisable wireless interface to monitor current conditions via environmental sensors and subsequently control a mechanical flower based on these values.

As such, several KPIs were developed to clearly define the project's success:

Sensor Measurements

- Can it measure CO_2 levels? Temperature? Sound?
- Are these quantities accurate? Stable? Reliable?

Measurement Display

- Does the PC GUI receive sensor data? Are they displayed on screen with corresponding units?
- Are they accurate? Do they update in a reasonable timeframe?

Flower Control

- Can the flower petals be adjusted? Open? Shut? Is the LED brightness controllable?
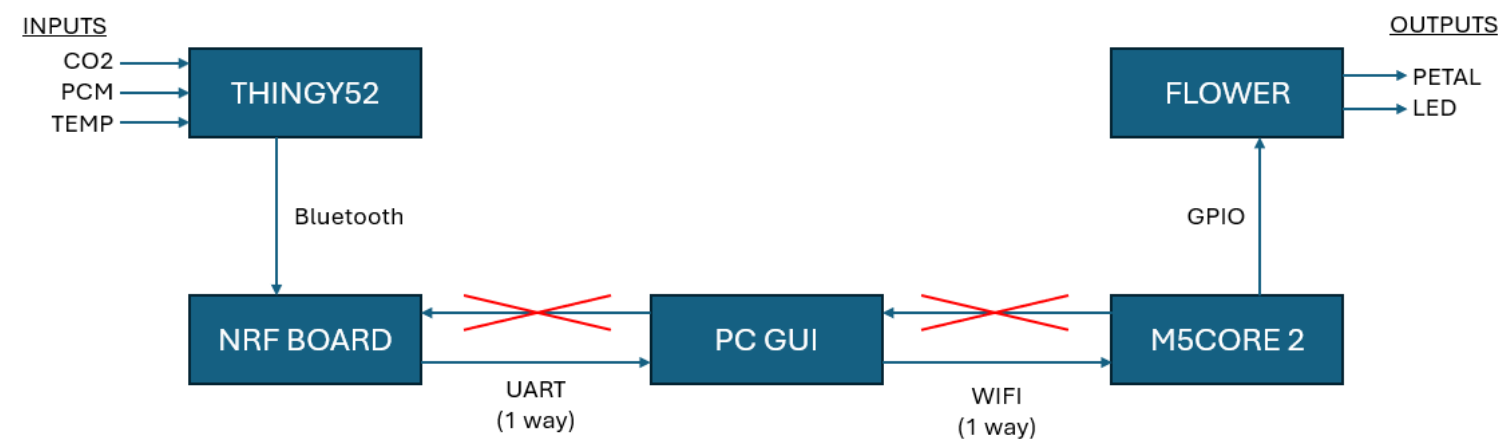- Can these outputs be driven by the M5Core2 GPIO pins?

Communication

- Do the required forms of communication work? Bluetooth? UART? MQTT wifi?
- Are these connections reliable?

Flower Sensitivity

- Do the sensor values directly influence the flower status?
- Can this be demonstrated? Are the thresholds customisable?

SYSTEM OVERVIEW

RESULTS

The PC GUI is depicted below; it clearly has all the required functionality with measurement displays and customisable thresholds. Likewise, flower control is shown being driven by the M5Core2, with fully open and maximum brightness and fully shut and minimum brightness.
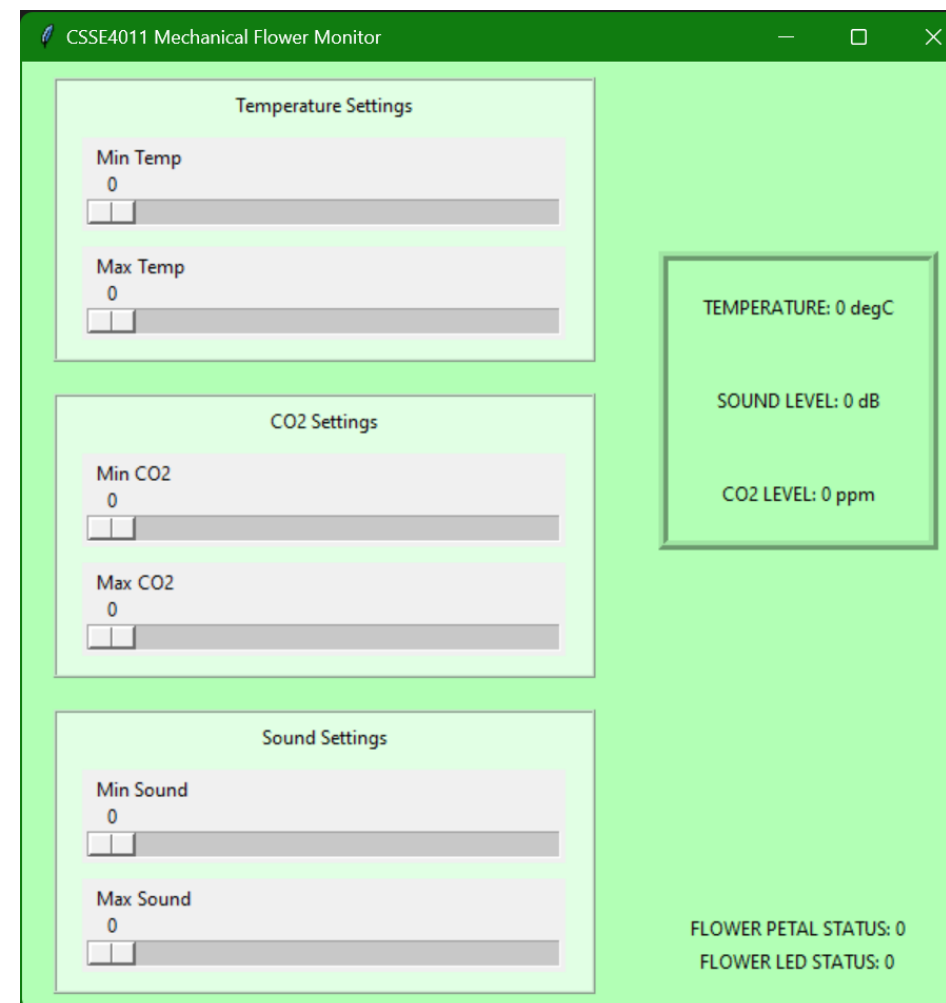
CONCLUSIONS

This project achieves all of its goals as set out by its proposal and the associated KPIs. The system overview diagram is fully accurate, summarising the end-to-end process for the flower control.

Sensor Measurements

- Fully accurate and reliable
- Kalman filter stabilises

Measurement Display

- Sensor data and flower status is clearly displayed on screen
- Updates within 1s

Flower Control

- Petals open and shut
- LEDs have adjustable brightness
- M5Core2 is capable of controlling

Communication

- Bluetooth works
- UART works
- Wifi works
- Mostly reliable and reconnects as needed

Flower Sensitivity

- Flower is controlled by sensor values
- Demonstrable by changing threshold ranges