

Demo: Raspberry Pi-Based Guitar Environmental Monitor

Sama Squad (Grant Alphenaar)

CIS 641 – GVSU

December 14, 2022

Roadmap

Recap &c.

What's Changed?

Action Shots

What's Next?

Demo Screenshots

Recap &c.

Project Overview

Build a system that can...

- ▶ ... be run off a Raspberry Pi to...
- ▶ ... measure temperature and humidity for guitars and...
- ▶ ... allow user monitoring and (some) control...
- ▶ ... through a basic web dashboard.

What's Changed?

Old Mockups

Sensor View

Sensor 1

Stand

Percent
Humidity

51

Temperature

67

Sensor 2

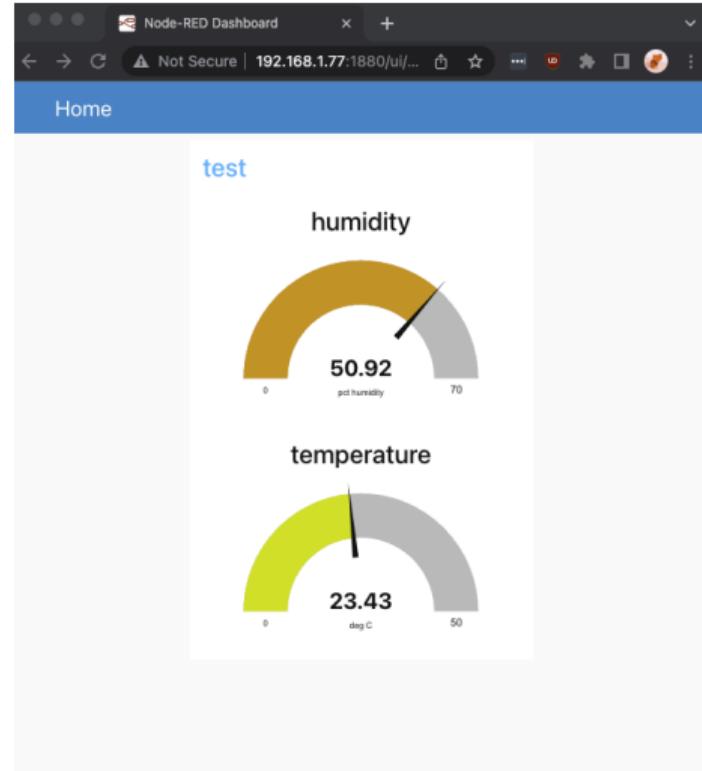
Case

Percent
Humidity

42

Temperature

72

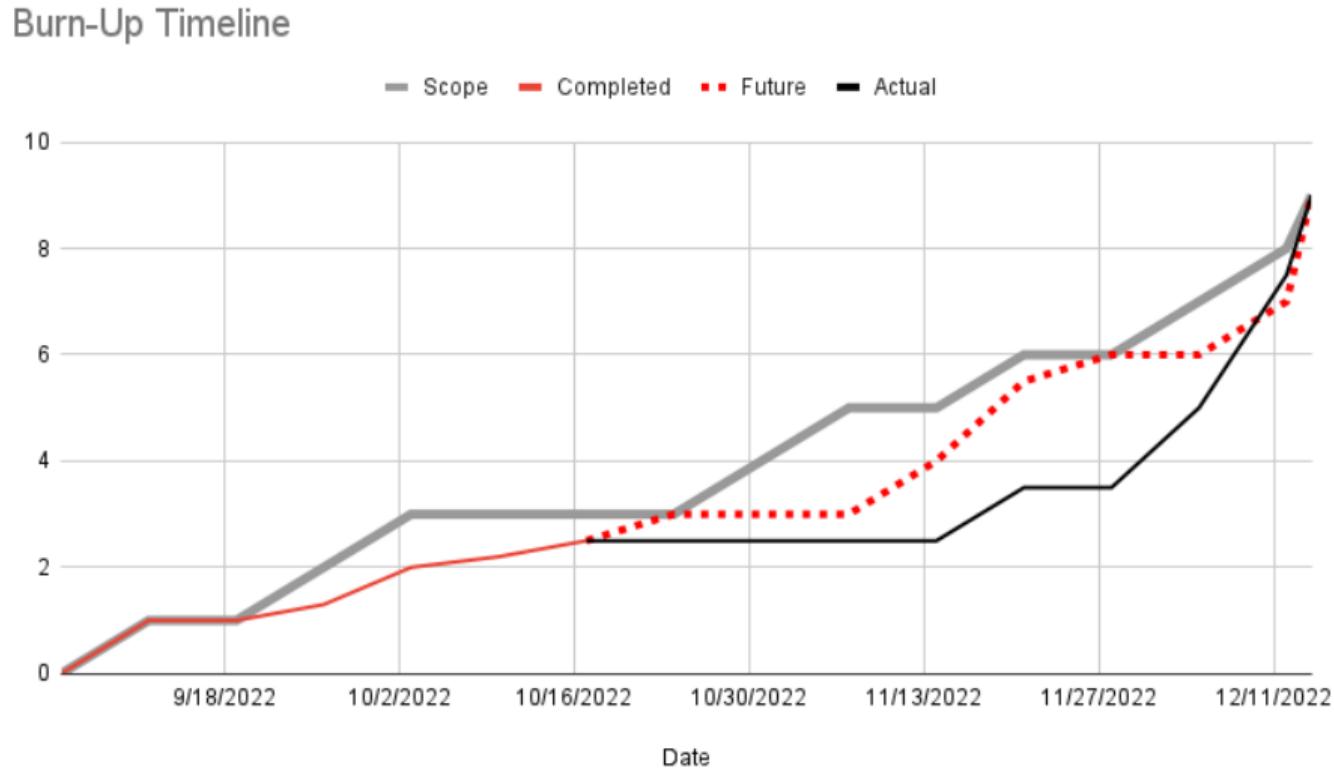


What's Changed?

- ▶ Sensor/server relationship → sensors now publish on a fixed schedule, while the server just listens (via Mosquitto MQTT)
- ▶ Handling sensor “wonkiness” → take 20 super-fast averaged readings every 30 seconds to moderate weird readings
- ▶ More heavily websocket-based (JavaScript & socket.io) rather than db-based

Timeline

Burn-Up: Estimated vs Actual



Timeline

Retrospective

Did we meet timeline goals?
yes and no...

"Confounding factors":

- ▶ Changing core system → from "Pi controls all" to "sensors control themselves"
- ▶ General sensor / embedded coding (C++)
- ▶ Websockets / socket.io

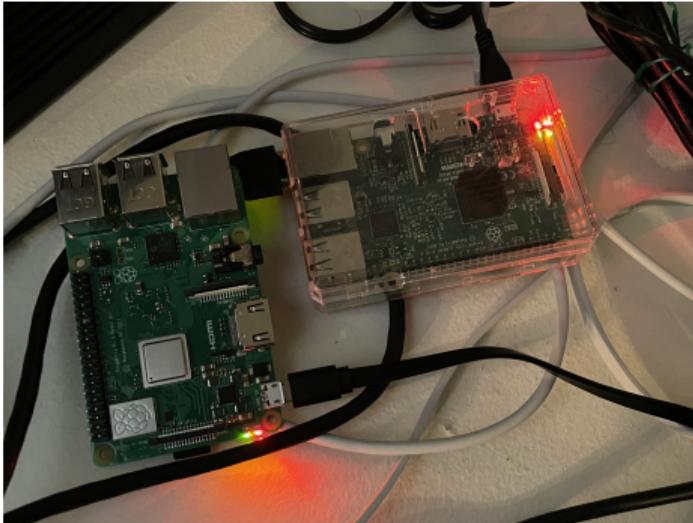
Professor: What inspired you to write this essay?

Me: The due date

Also me:



Action Shots



Bonus
technology



What's Next?

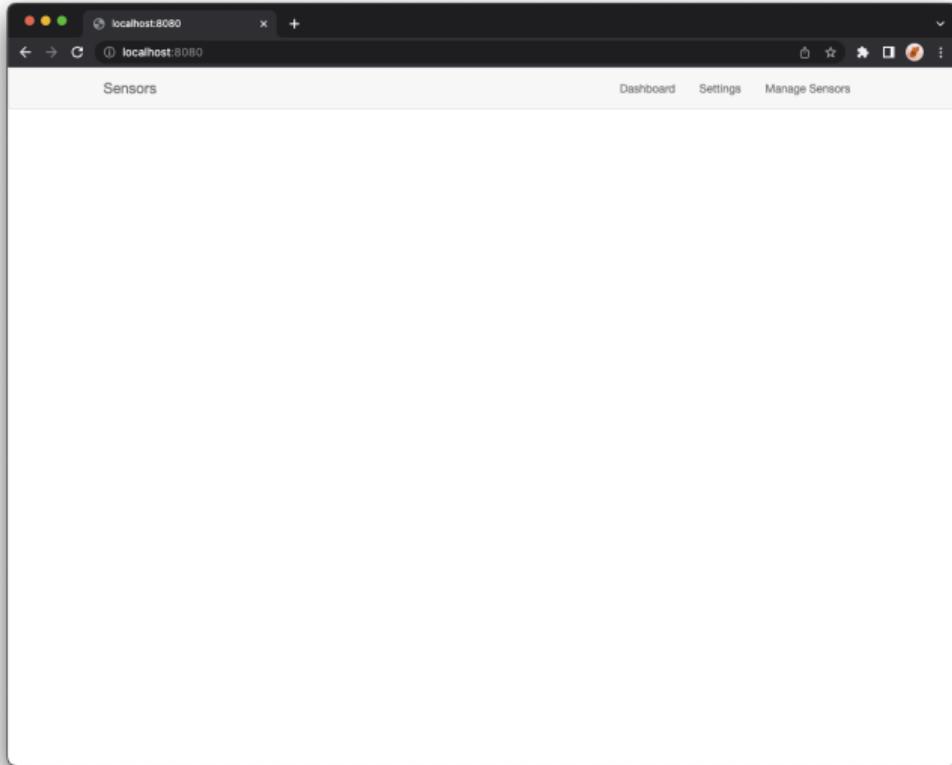
- ▶ Battery power → investigate sleep/wake & power draw
- ▶ Increased database connectivity → trends & logging capabilities
- ▶ DNS → have a custom URL rather than something like
192.168.1.83:8080
- ▶ Security → currently nothing securing Mosquitto & allows anonymous publishing
- ▶ Soft Access Point → allow users to change sensor settings after flashing

Demo Screenshots

Just in case anything blows up...

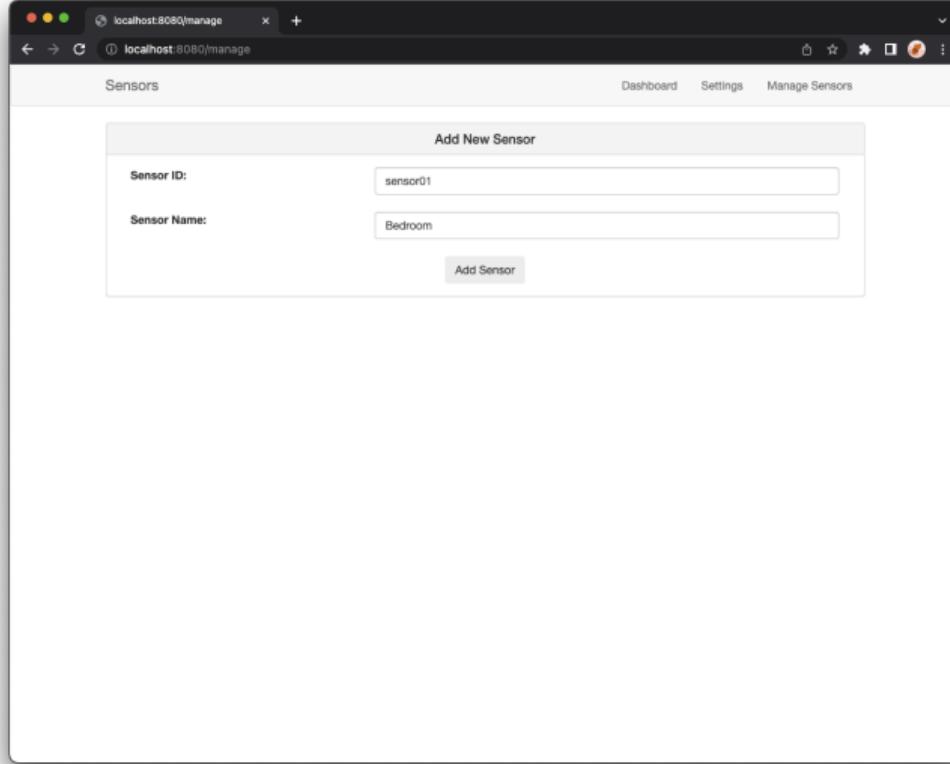
Demo Screenshots

Empty Home Screen



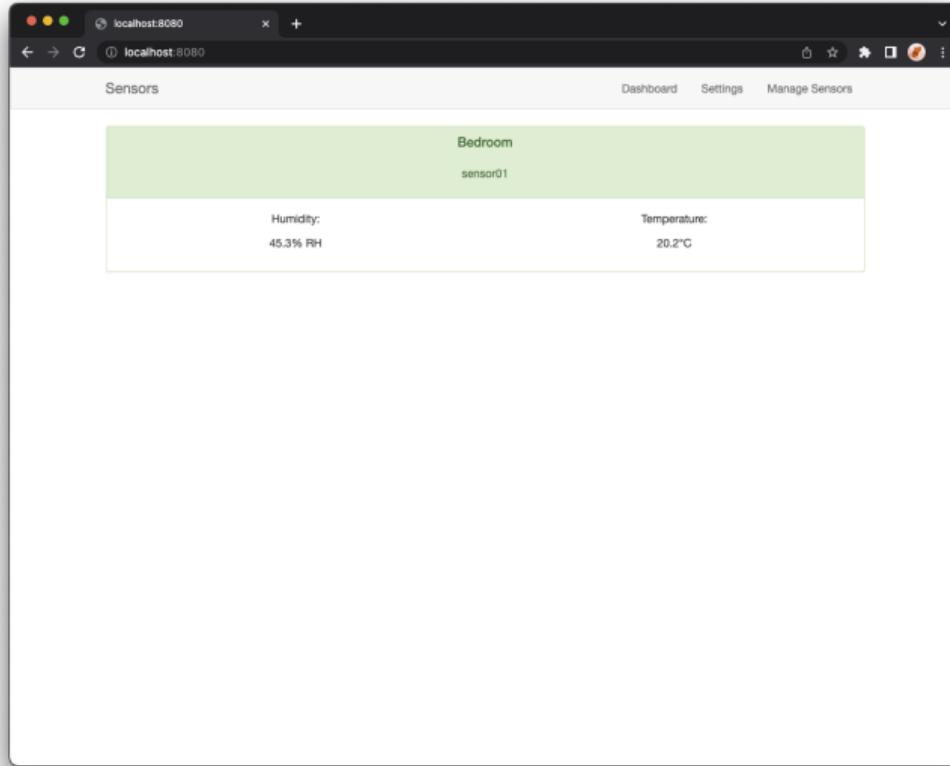
Demo Screenshots

Adding a Sensor



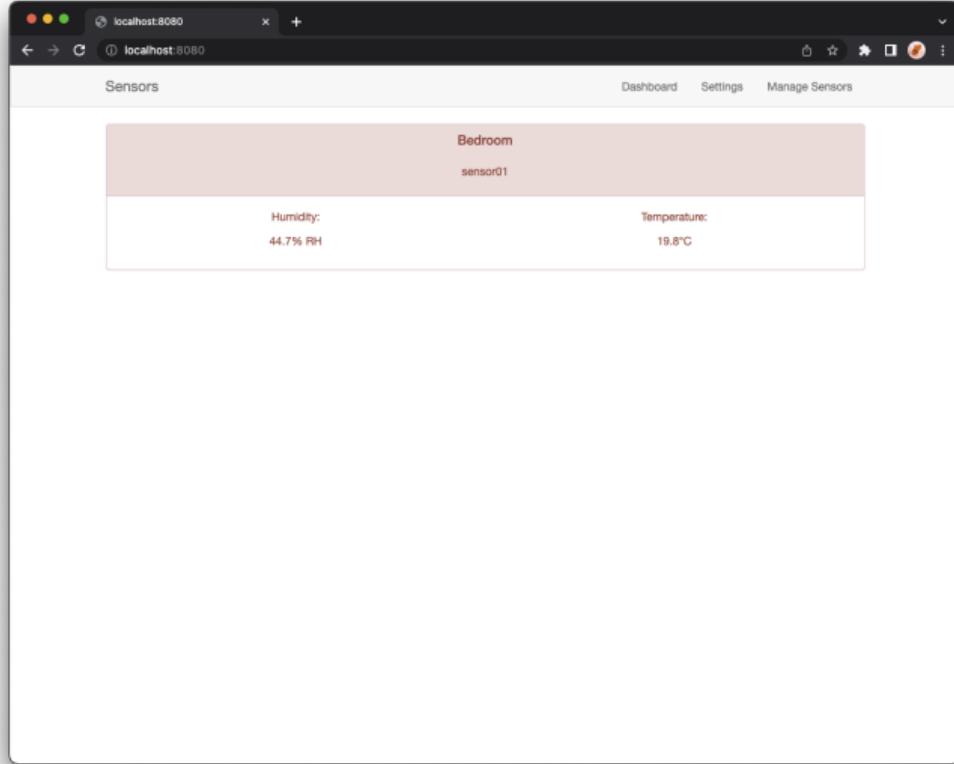
Demo Screenshots

Populated Home Screen



Demo Screenshots

Out-of-Range Alert



Demo Screenshots

Settings Menu

The screenshot shows a web-based application interface for managing sensor settings. The top navigation bar includes links for Dashboard, Settings, and Manage Sensors. The main content area is titled "Sensors".

Set Humidity Range Limits

Lower: Upper:

Change Humidity Range

Set Temperature Range Limits

Lower: Upper:

Change Temperature Range

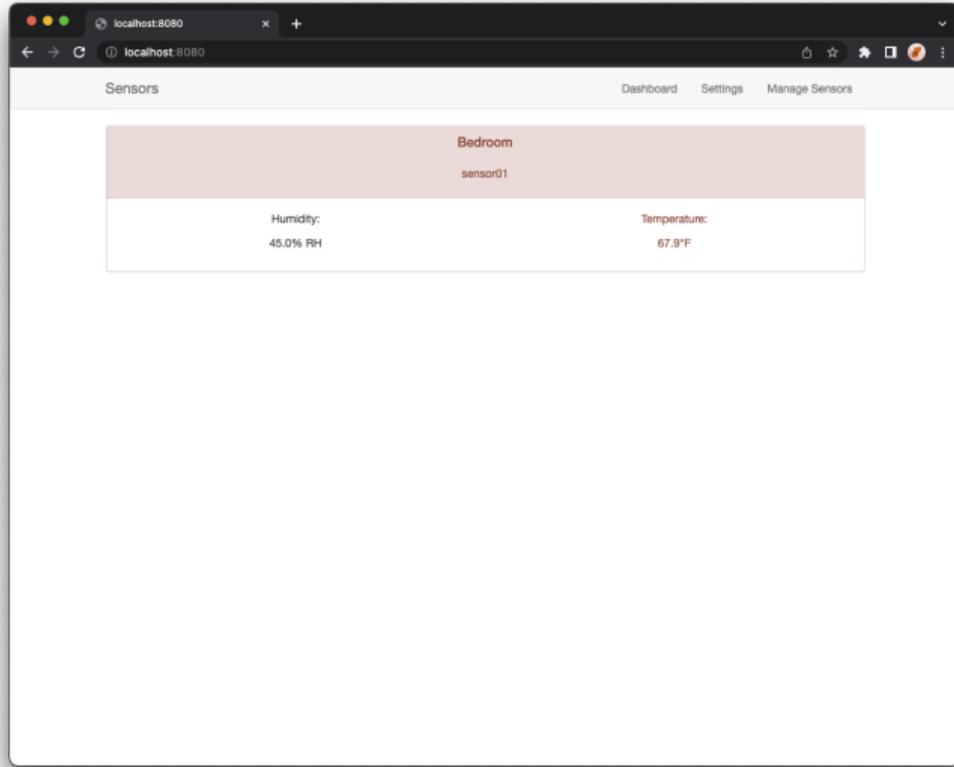
Change Temperature Units

Note: due to rounding, upper and lower temperature ranges may change slightly. Please adjust above if necessary.

Celsius (C)

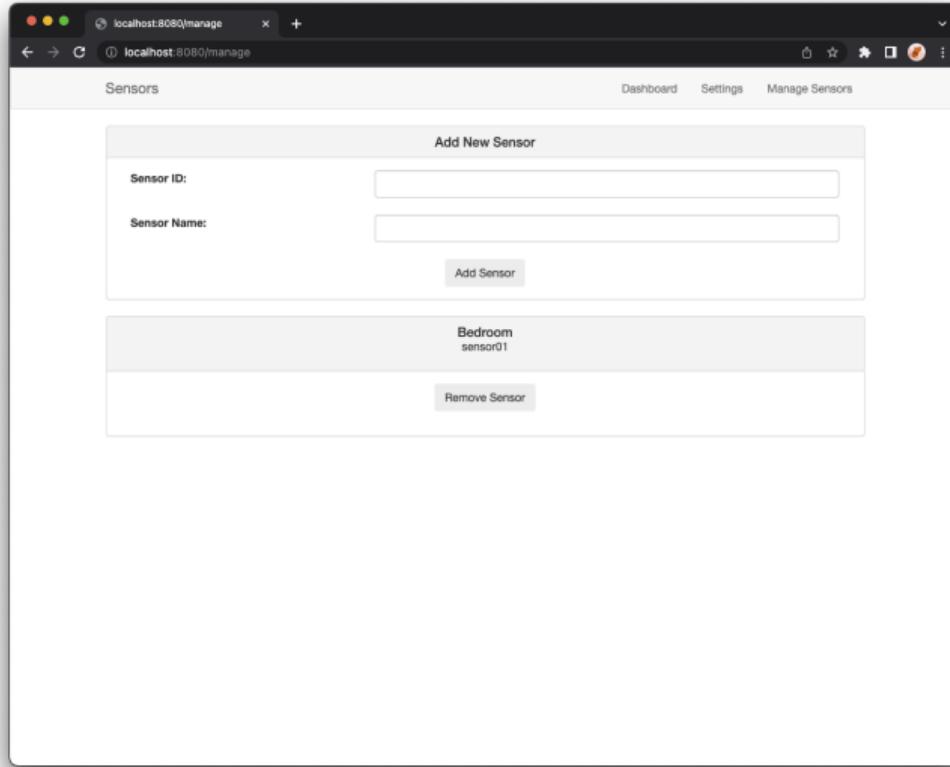
Demo Screenshots

Dashboard in Fahrenheit



Demo Screenshots

Removing a Sensor



Demo Screenshots

Multiple Sensors

