

FPGA Contest 2020

Shared House

Live Sensors

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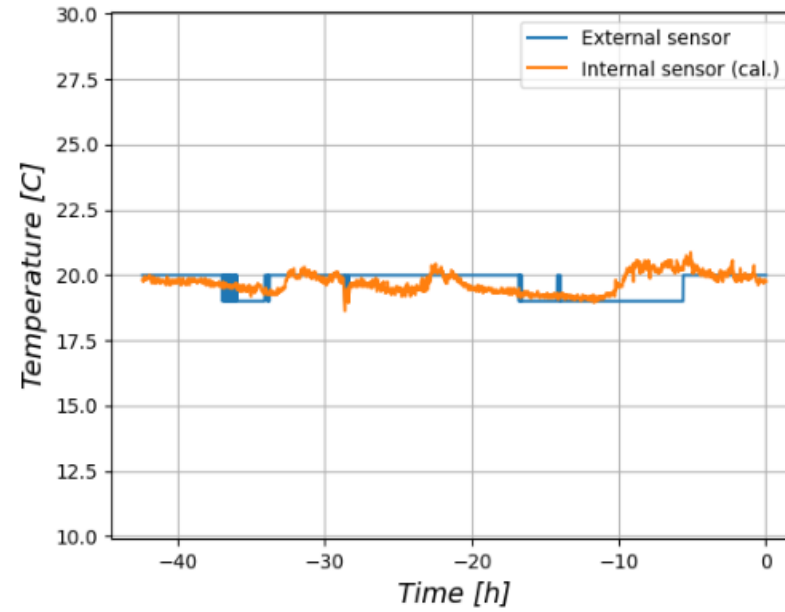
Agenda

PROJECT NAME

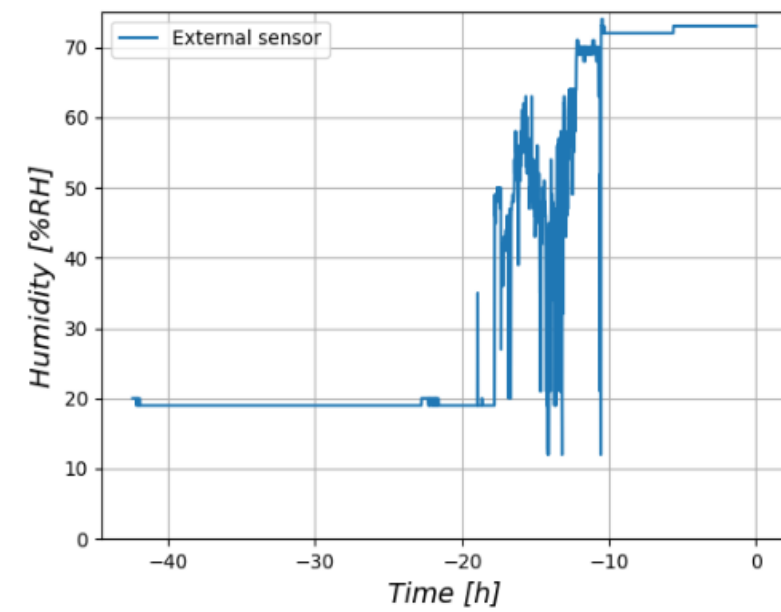
- Abstract
- Idea
- Concept
- Realization
- Status
- Project outlook



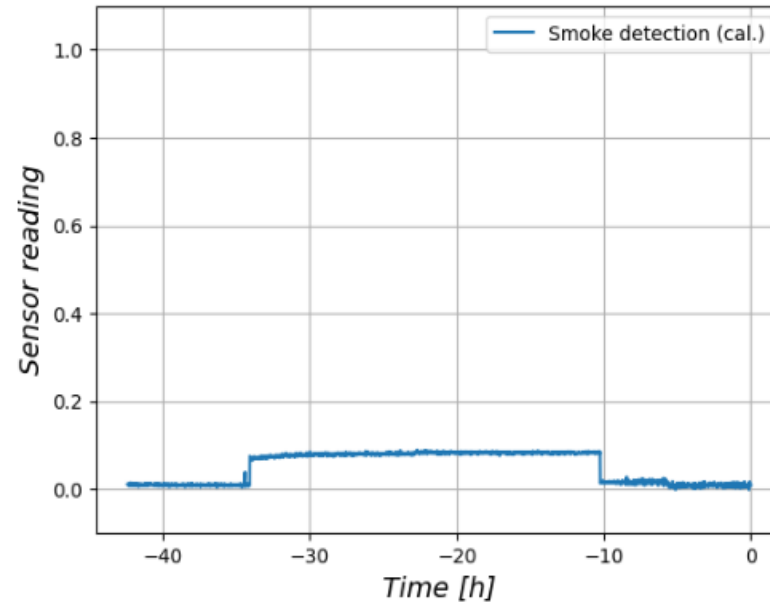
Temperature



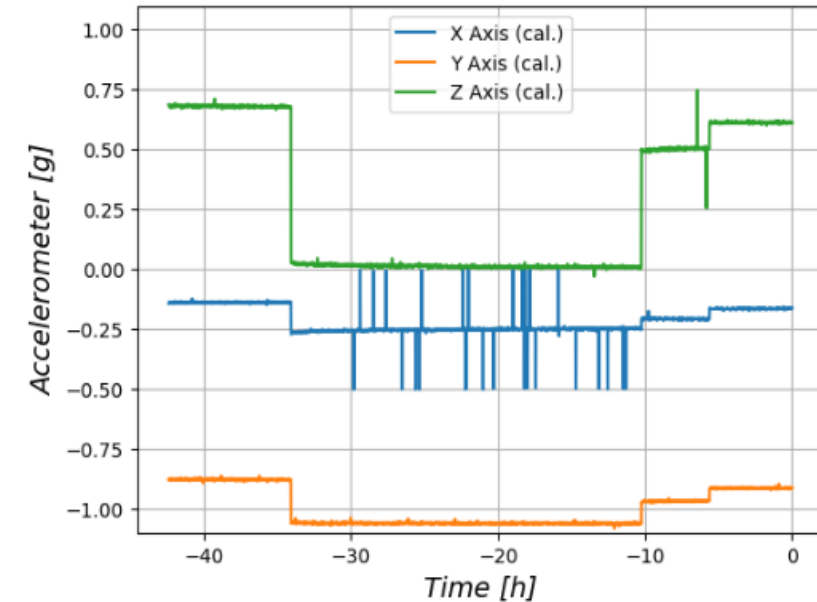
Humidity



Smoke sensor



Accelerometer



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SUMMARY

- The „Shared House Live Sensors“ project allows to share multiple sensors data live on a website
- It enables my roommates to see live data from our living room
- Features:
 - Updates every minute, data kept in a database for the last 7 days
 - Live data available on this website: <https://pi.cdamman.eu/livesensors>
 - 5 different sensors
 - Temperature with AnalogMax sensor
 - Temperature & Humidity with DHT11 sensor
 - Smoke sensor with AnalogMax sensor
 - Accelerometer with AnalogMax sensor

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IDEA

- My roommates complain all the time that
 - It is too cold in their room
 - It is too hot in the living room
 - There are toast burnt in the toaster
 - etc ...
- All these are very subjective feelings
- What if I could give them objective data to prove they're wrong?

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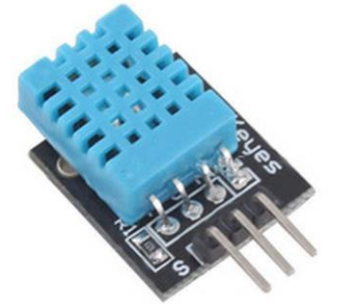
CONCEPT

- How to do that?
- What we need
 - A board with a lot of sensors, including (at least) temperature (“It’s too cold/too hot here” issue) and smoke detector (“burnt toast” issue)
 - An online website
 - A connection between the board and the website

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REALIZATION

- The AnalogMax board is the perfect fit for this!
 - Embeds a lot of sensors
 - Enables to add more sensors with GPIOs and ADCs
 - I already added one DHT11 sensor (1-Wire protocol implemented in VHDL)
 - An embedded NIOS processor is used to gather all data from sensors and communicate with the serial USB link
- For the website:
 - I used a Raspberry Pi to host the server
 - The AnalogMax board is connected using serial USB link
 - A Python script is called every minute to acquire data and update plots

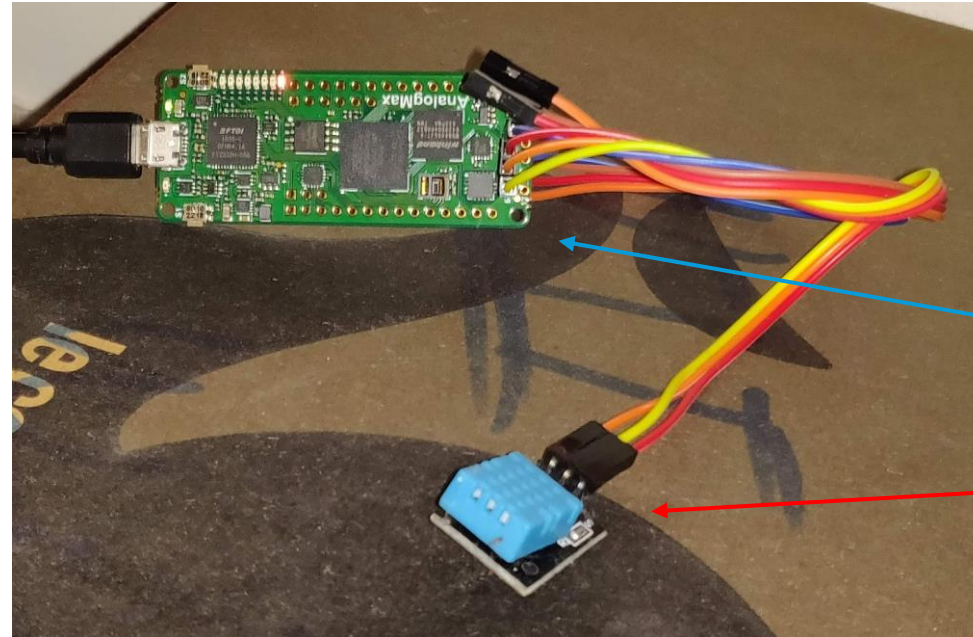
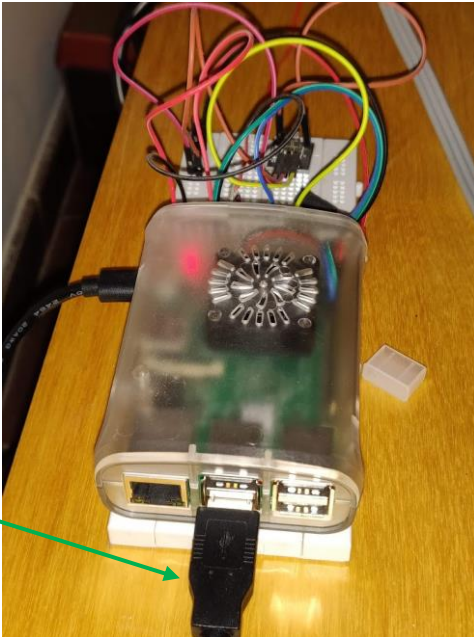


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STATUS

- Live sensors are now available online for my roommates...
- ... but also the rest of the world!
 - Website link: <https://pi.cdamman.eu/livesensors>
 - Github repository: <https://github.com/cdamman/SharedHouseLiveSensors>

RaspBerry Pi
with serial USB

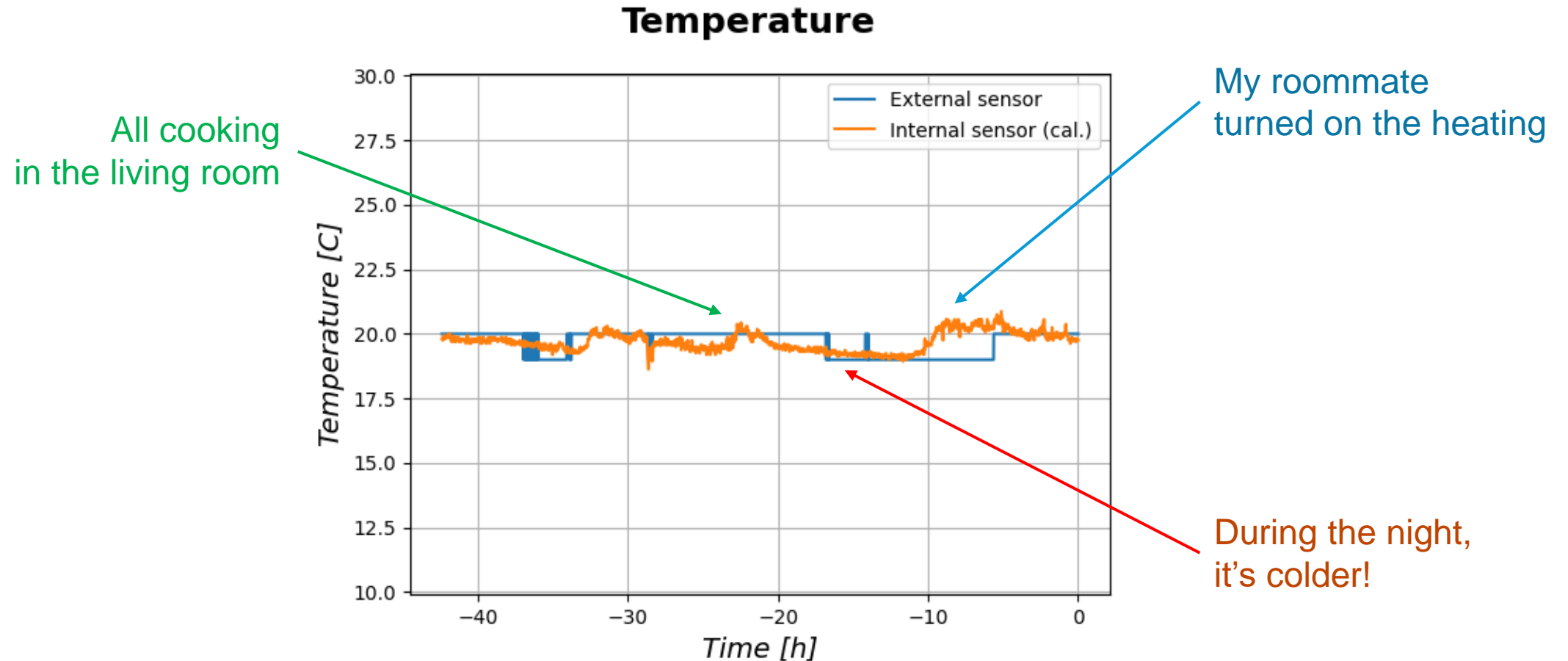


AnalogMax board

DHT11 sensor

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STATUS: TEMPERATURE SENSORS

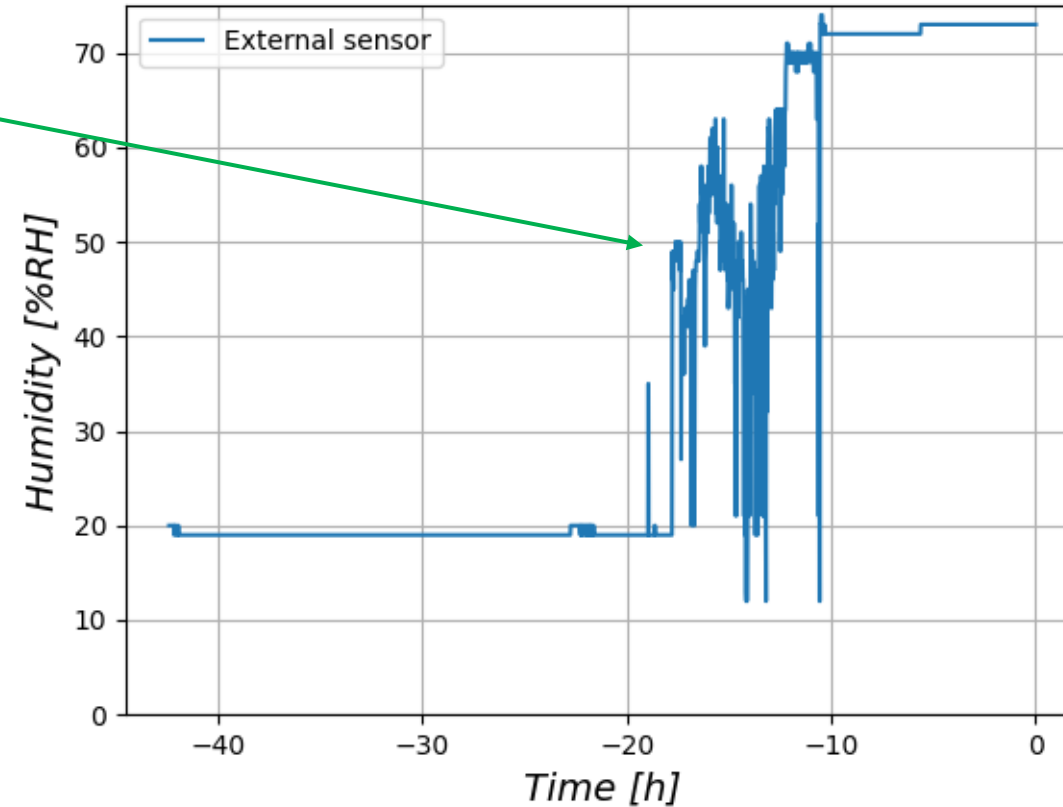


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STATUS: TEMPERATURE SENSORS

Humidity

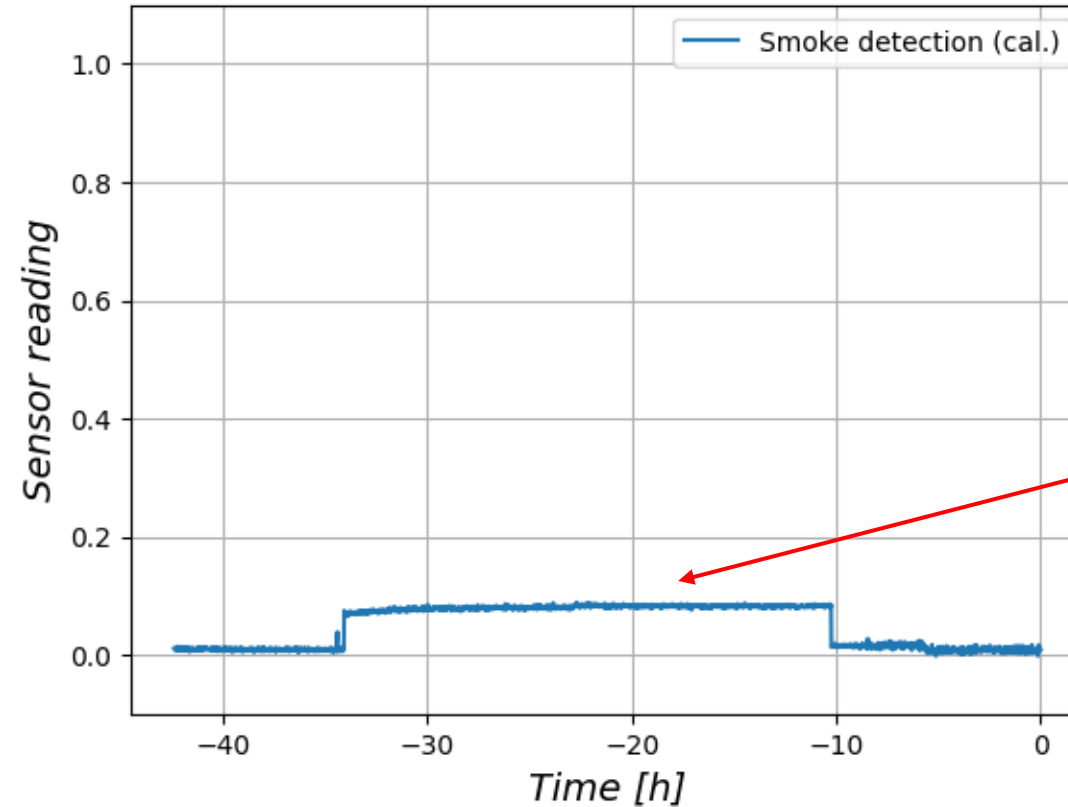
Cooking + window
opened during autumn



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STATUS: TEMPERATURE SENSORS

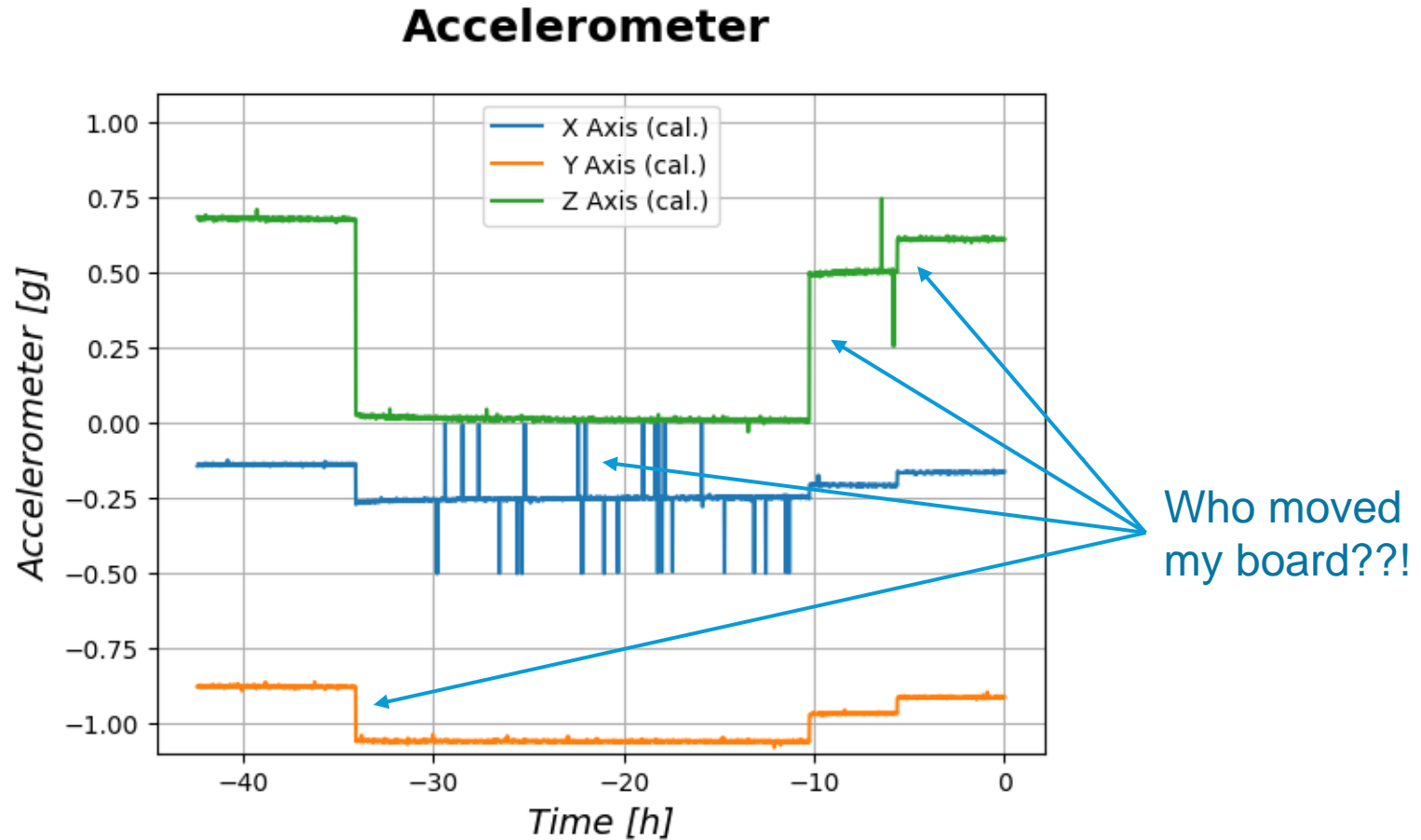
Smoke sensor



Who burnt a toast??!

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STATUS: TEMPERATURE SENSORS



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PROJECT OUTLOOK

- Next steps and future plans:
 - Add more sensors
 - Motion sensor: is there someone in the living room?
 - Add “is the heating on?” indicator on the website
 - If living temperature > temperature programmed in the thermostat -> the heating is on
 - ...