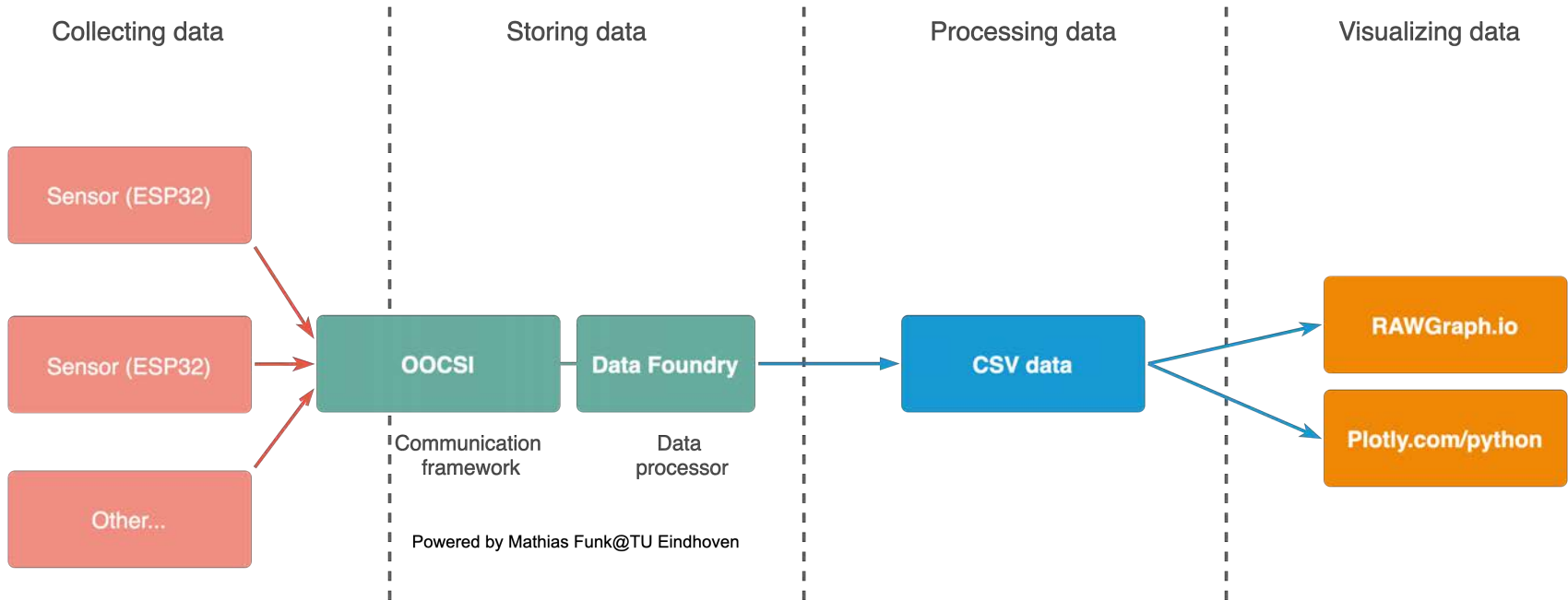


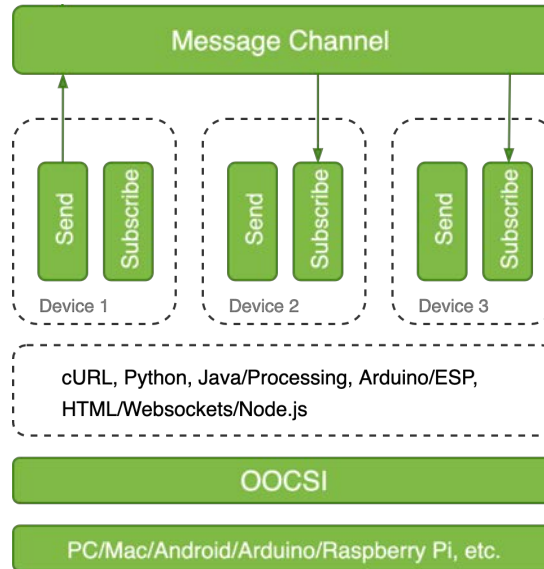
# Introduction to OOCSI and Data Foundry

A technical overview

Sark P. Xing, Stephen J. Wang, (Mathias Funk, Eden Chiang)




OOCSI is a message-based communication framework that connects clients across different platforms or programming languages. Go to <https://oocsi.id.tue.nl> for more details.





*"The living room is now (timestamp), 120°F and 40°C."*

```


#include <oocsi.h>

OOC SI oocsi = OOC SI();

oocsi.connect("CLIENT_HANDLE", "oocsi.id.tue.nl", wifi_ssid, wifi_password, processOOC SI);

oocsi.newMessage("PolyU_SD_TT");
oocsi.addFloat("temp1", "120");
oocsi.addString("unit", "Fahrenheit");
oocsi.addFloat("temp2", "40");
oocsi.addString("unit", "Celsius");

oocsi.sendMessage();
```



*"The living room is now (timestamp), 120°F and 40°C."*

```

● ● ●

#include <oocsi.h>

OOC SI oocsi = OOC SI();

oocsi.connect("CLIENT_HANDLE", "oocsi.id.tue.nl", wifi_ssid, wifi_password, processOOC SI);

oocsi.subscribe("PolyU_SD_TT");

float tempvalue1 = oocsi.getFloat("temp1",0);
string tempunit1 = oocsi.getString("unit", "Fahrenheit");
float tempvalue2 = oocsi.getFloat("temp2",0);
string tempunit2 = oocsi.getString("unit", "Celsius");
```

# Quick Demo

- OOCSImote: [link](#)
- OOCSI Web Viewer: [link](#)



*"The living room is now (timestamp), 120°F and 40°C."*

```
#include <WiFi.h>
#include <FirebaseESP32.h>
#include <NTPClient.h>
#include <WiFiUdp.h>

FirebaseData fbdo;

FirebaseAuth auth;

FirebaseConfig config;

config.host = FIREBASE_HOST;
config.api_key = API_KEY;
Firebase.begin(&config, &auth);
Firebase.reconnectWiFi(true);

WiFiUDP ntpUDP;
NTPClient timeClient(ntpUDP;
```

```
    FirebaseJson json;
    String formattedDate;
    String dayStamp;
    String timeStamp;

    json.add("name", "Living Room");

    json.add("temp1", 120).add("temp2", 40);

    json.set("unit/temp1", "Farenheit");
    json.set("unit/temp2", "Celsius");
    json.set("timestamps",
timeClient.getFormattedDate());

    json.toString(Serial, true);
    Serial.println();
    Serial.println();
```

```
{
  "name": "Living Room",
  "temp1": 120,
  "temp2": 40,
  "unit": {
    "temp1": "Farenheit",
    "temp2": "Celcius"
  }
}
```

*“What if you want to collect, store, manage, and visualize data?”*

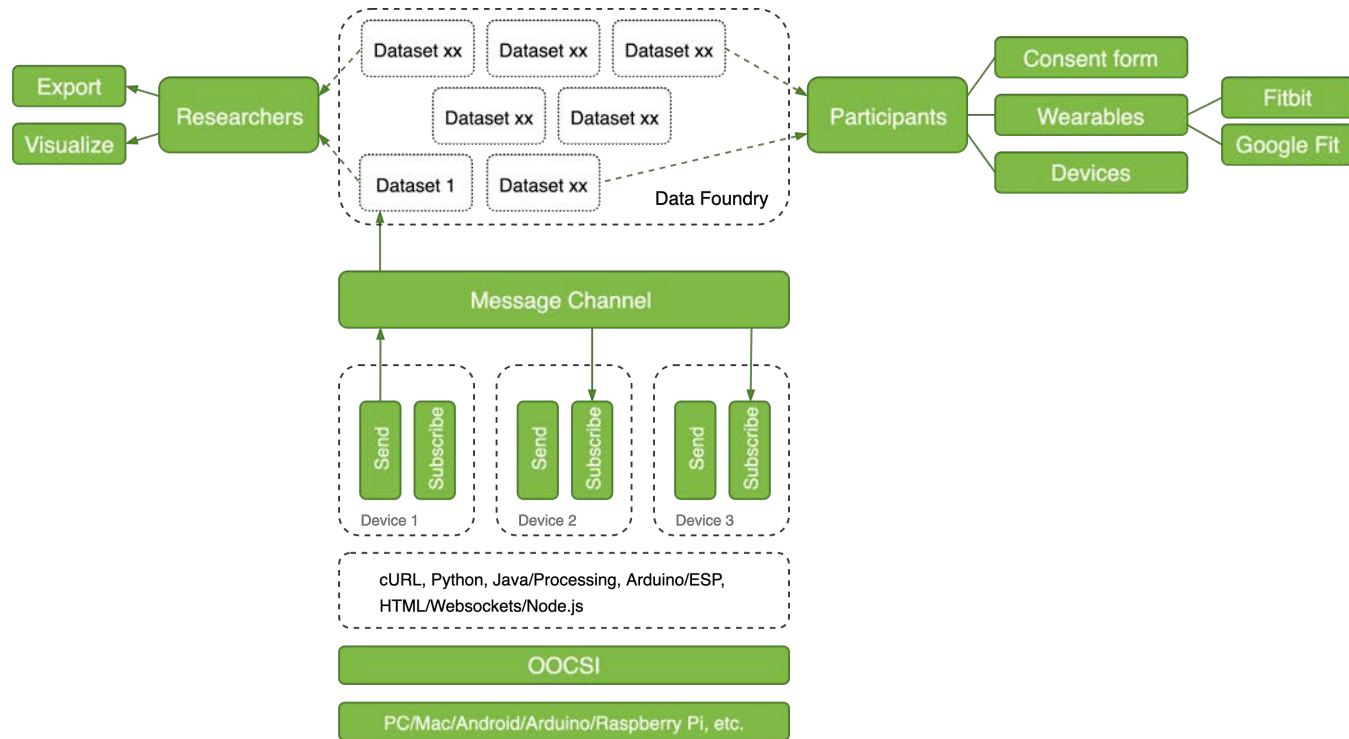




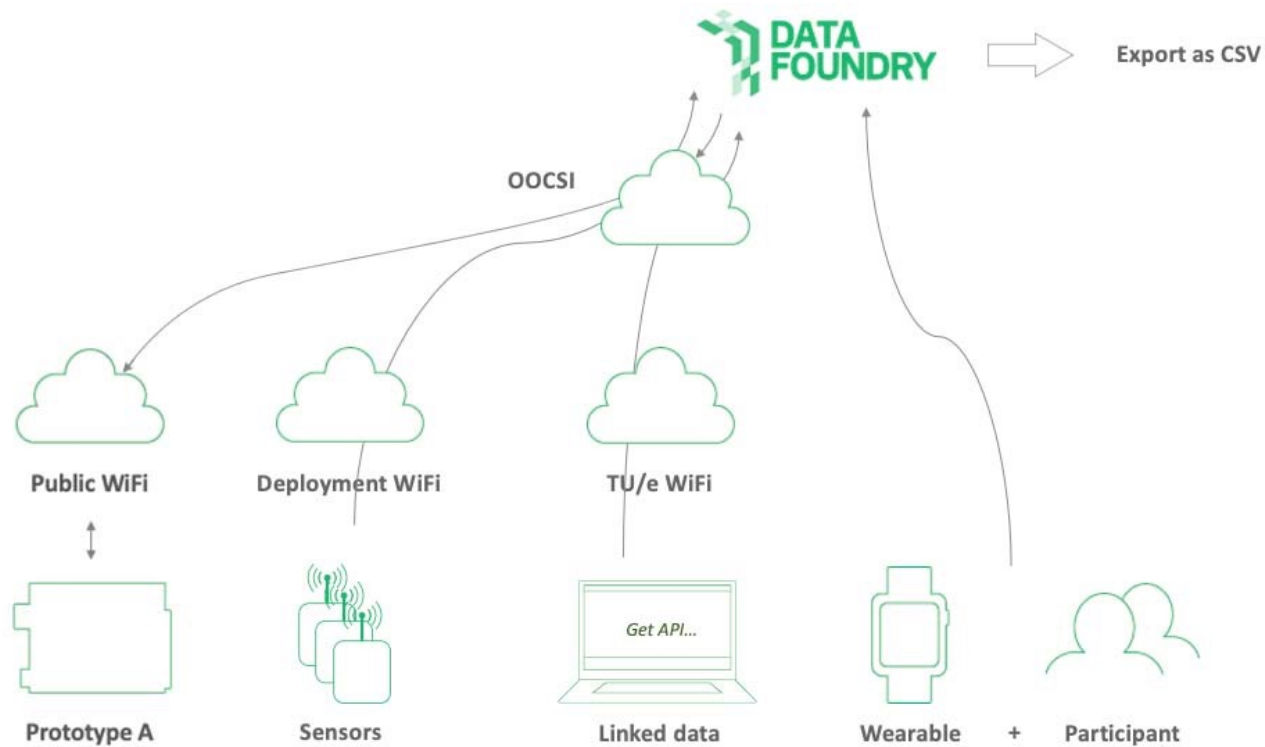
*Data Foundry is an all-in-one data collecting and storing infrastructure for design research projects. Go to <https://data.id.tue.nl> for more details.*

- **Collect, store** and **process** quantitative and qualitative data from a variety of sources, in an easy and structured way
- **Export** or **visualize data** for analysis or stream back in real-time into prototypes, products and systems
- **Compatibility** with a wide variety of sources, in order to automate and simplify the infrastructure of everyday data collecting and maintaining task

# System Overview (*Data Foundry*)



# System Overview

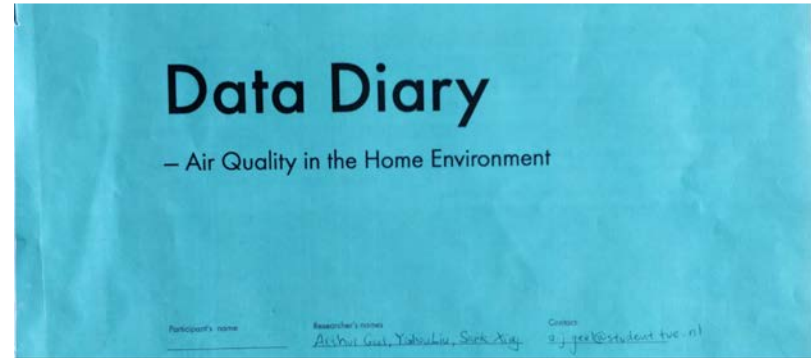
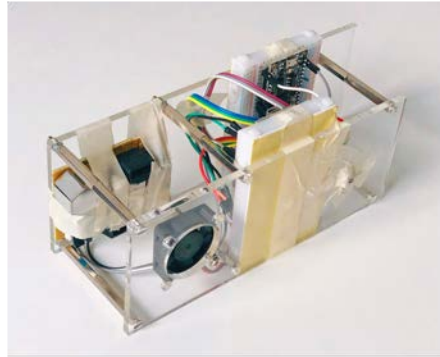
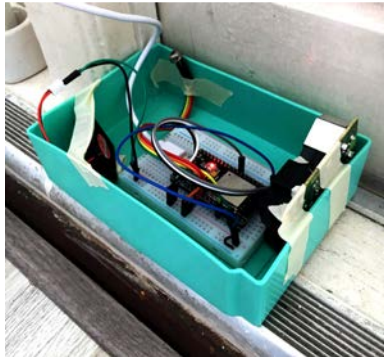




*“The living room is now (timestamp), 120°F and 40°C.”*

device_id	ts	activity	temp1	unit	temp2	unit
dc7e66082f4ae48cb	2021-10-02T14:35:26	The_living_room_temp	120	Fahrenheit	40	Celsius

*“Designing a solution that helps in creating a healthier living environment, by either changing the environment and/or the behaviour and experience of the user.”*

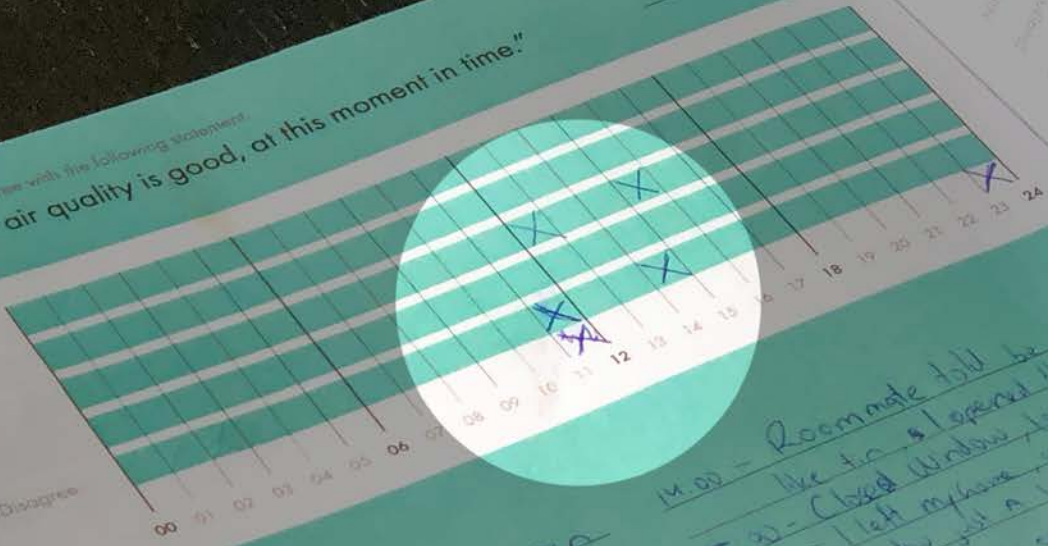


*Exploring the design context through quantitative- and qualitative- data.*

Please share how much you agree with the following statement:  
"I think the indoor air quality is good, at this moment in time."

Date 04/05

Strongly Agree  
Agree  
Neutral  
Disagree  
Strongly Disagree



Notes

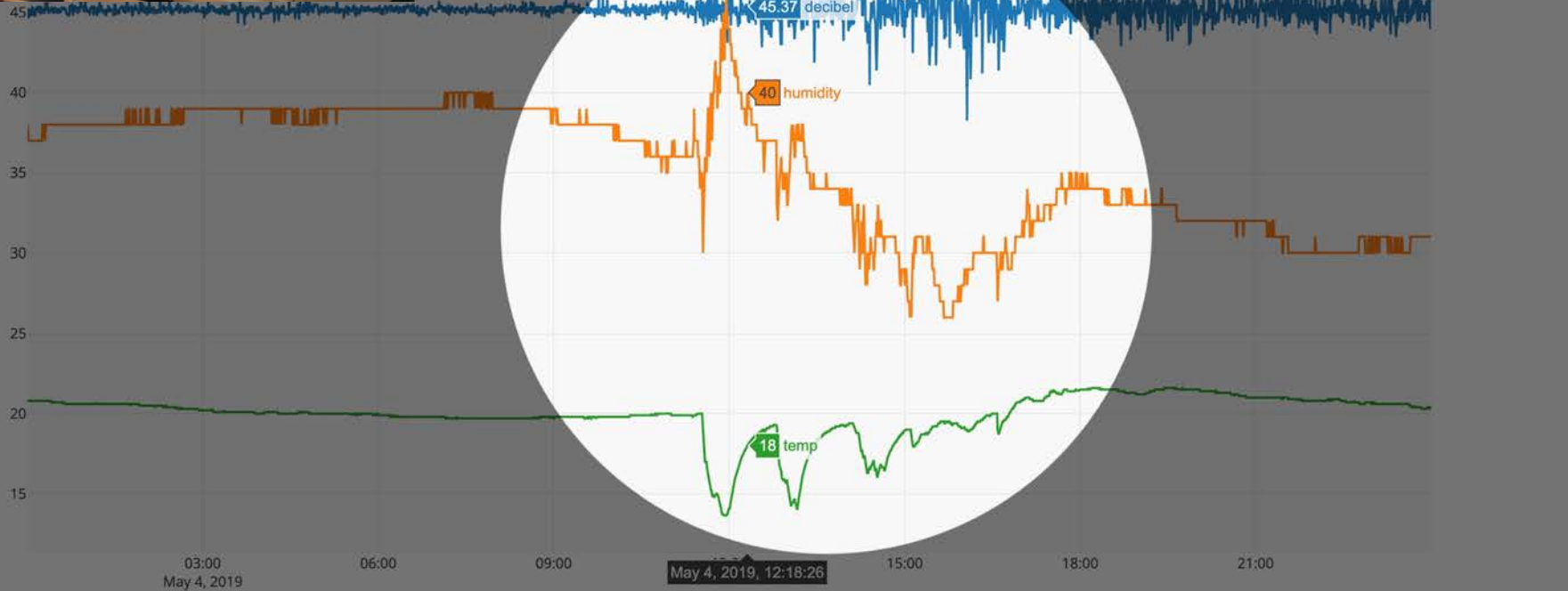
11:00 - It still smells, so I open up the window  
"I closed a bit and started smelling"  
12:00 - It's getting cold, closed window

14:00 - Roommate told be it smell like to open the window  
15:30 - Closed window, but still  
18:00 - I left my house, so opened the window just a little bit  
20:00 - Smell, so opened window for a moment

Notes

13:30 - I left home, so I left window

High variance signifies areas of interest.



Repeating patterns: human behaviour, or a flawed system?



# Round-Up of Insights

## **Correlation**

Cleanliness impacts the perception of air quality among the participants.

## **An Implicit Language**

The participants formulated implicit rules of taking care of the environment.

## **Treading Carefully**

Frustration occurs when the unspoken rules are broken.



# Design Implication

We hypothesized that making the dynamics in the shared kitchen **socially translucent** would encourage participants to take care of the environment.

$$AQS = \frac{UR}{w_1} + \left( \frac{\Delta H}{w_2} + \frac{\Delta CO_2}{w_3} + \frac{\Delta TVOC}{w_4} + \frac{\Delta T}{w_5} \right)$$

Air Quality Score ..... AQS

User Ratings ..... UR

Absolute deviation in Humidity  
compared to optimum value .....  $\Delta H$

Absolute deviation in Carbon Dioxide  
compared to optimum value .....  $\Delta CO_2$

Absolute Deviation in Total Volatile Organic  
Compounds compared to optimum value .....  $\Delta TVOC$

Absolute Deviation in Temperature  
compared to optimum value .....  $\Delta T$

Weights used to scale impacts of factors ..... w[1-5]

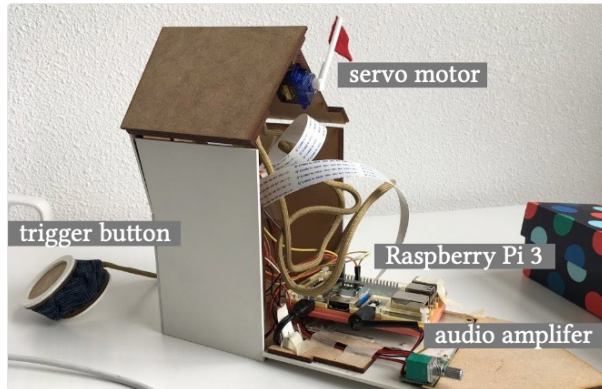




## Use-case 2: Peekaboo Cam [1]



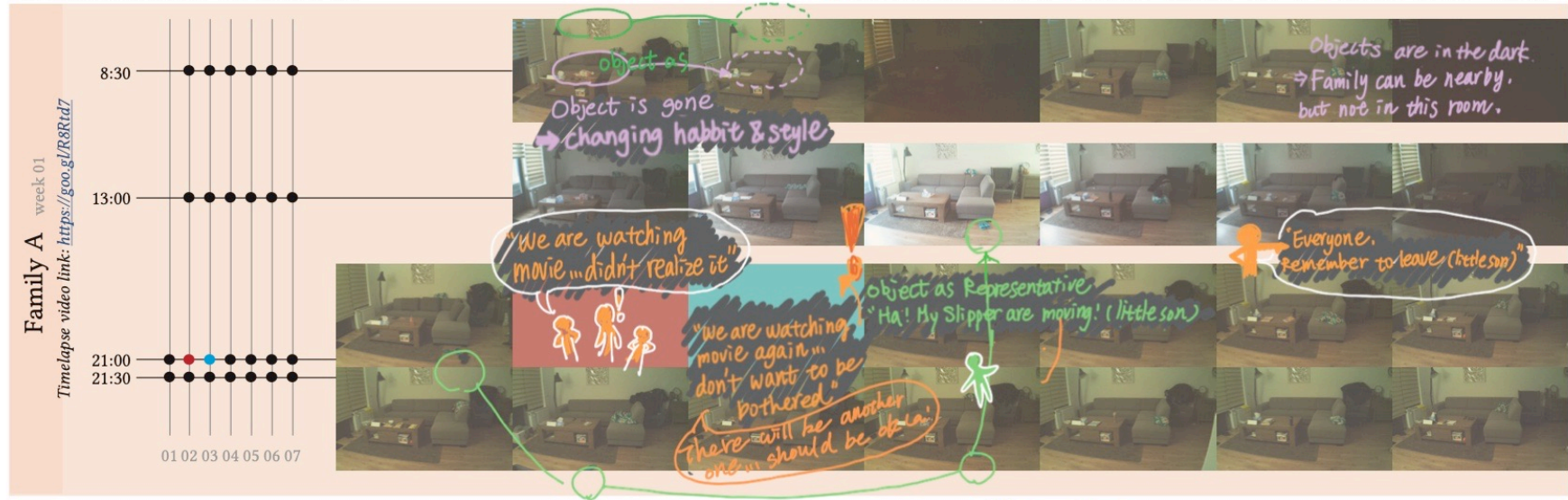
*“Designing an observational artifact that can not only capture rich information about the ecology of daily objects, but also protect the privacy of inhabitants.”*



# Use-case 2: Peekaboo Cam [1]



## DATASET: ACTIVE PEEKABOO



- Collect and log sensor data
- Annotate and correlate IoT and Media dataset

# Q & A



- Data Foundry: a data processor, <https://data.id.tue.nl>
- OOCSI: a network middleware, <https://oocsi.id.tue.nl>
- Arduino Language References, [link](#)
- Getting started with esp32, [link](#)
- [1] Cheng, Y-T., Funk, M., Tsai, W-C., & Chen, L-L. (2019). Peekaboo cam: designing an observational camera for home ecologies concerning privacy. In DIS 2019 - Proceedings of the 2019 ACM Designing Interactive Systems Conference (pp. 823-836). New York: Association for Computing Machinery, Inc. <https://doi.org/10.1145/3322276.3323699>

