

RASPBERRY PI- BASED FACE- TRACEABLE FEVER DETECTION SYSTEM

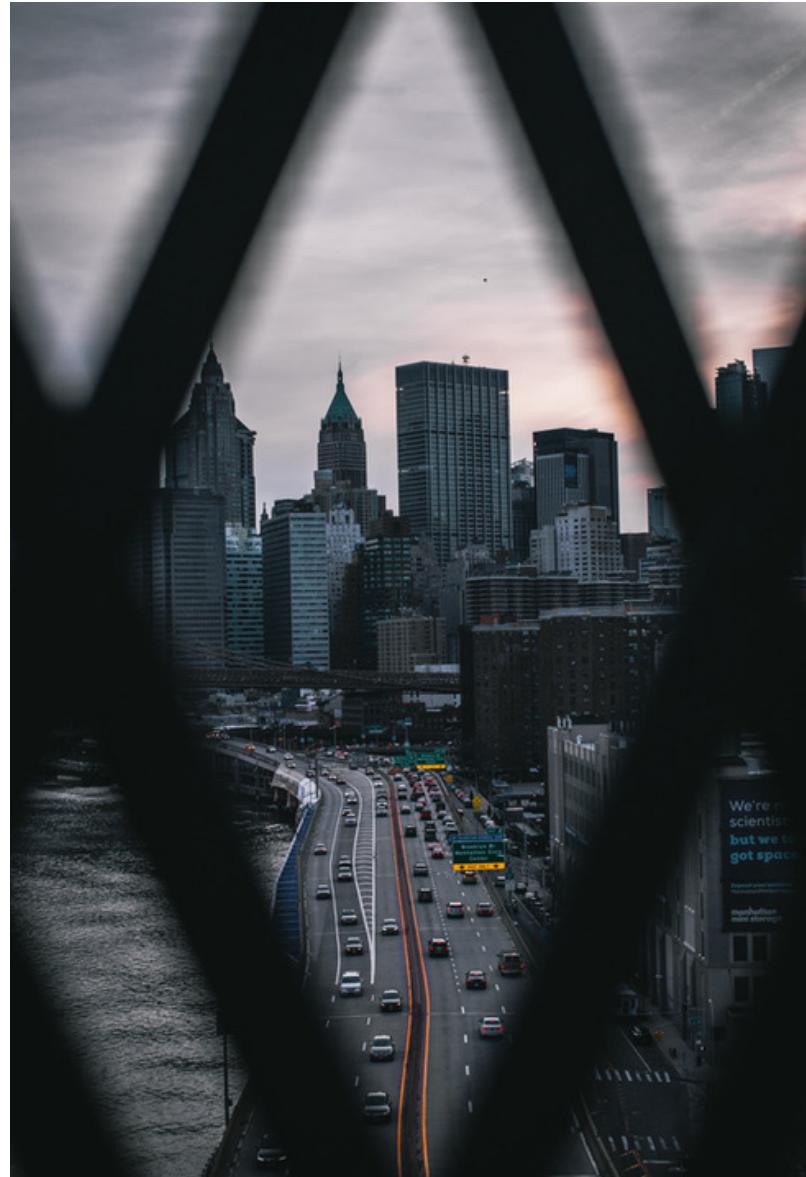
Presenters:

Mixin Shi

Zeal Liang

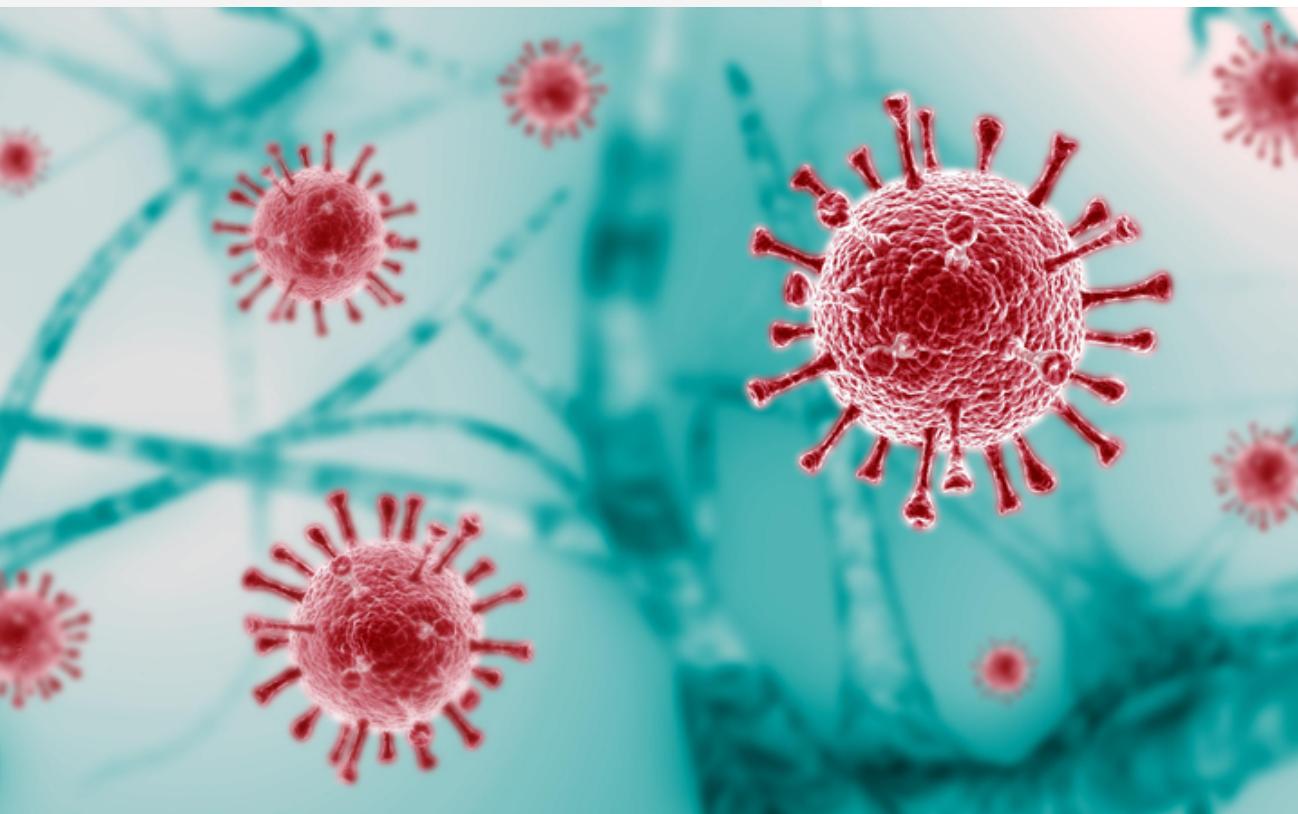
Wenqian Zhang

Jiacheng Wei



Group: kurukuru~

Initiative



Whenever there is season change, influenza often occurs. Check body temperature becomes very important.

Meanwhile, since the 2020 COVID-19, The temperature of people will be above 42 degrees of the disease.

COVID-19 in 2020 is one virus that can easily spread from person to person.

Medical care and isolation

Outline

Our basic objectives.

- Pedestrian temperature measurement. Fixed camera location and check the temperature of each walker and show it on the screen.
- Health monitoring. Continuous face tracking, camera rotation to continuously report of a single target for a long time, waning of high and low temperatures.





About This Project--statement of purpose

The basic purpose of our project is a device that can monitor the body temperature of the target.

Compared with traditional temperature measurement

contact and non-contact
Reduce workload and cross infection

Background Research

A thermal camera-based, automated continuous body temperature measurement system (Lin et al., 2019).

- using a low-cost and low-resolution LWIR camera for measurement

"mean absolute error (MAE) and root mean square error (RMSE) of 0.375°C and 0.439°C , respectively, with real-time continuous measurement capability" (Lin et al., 2019).

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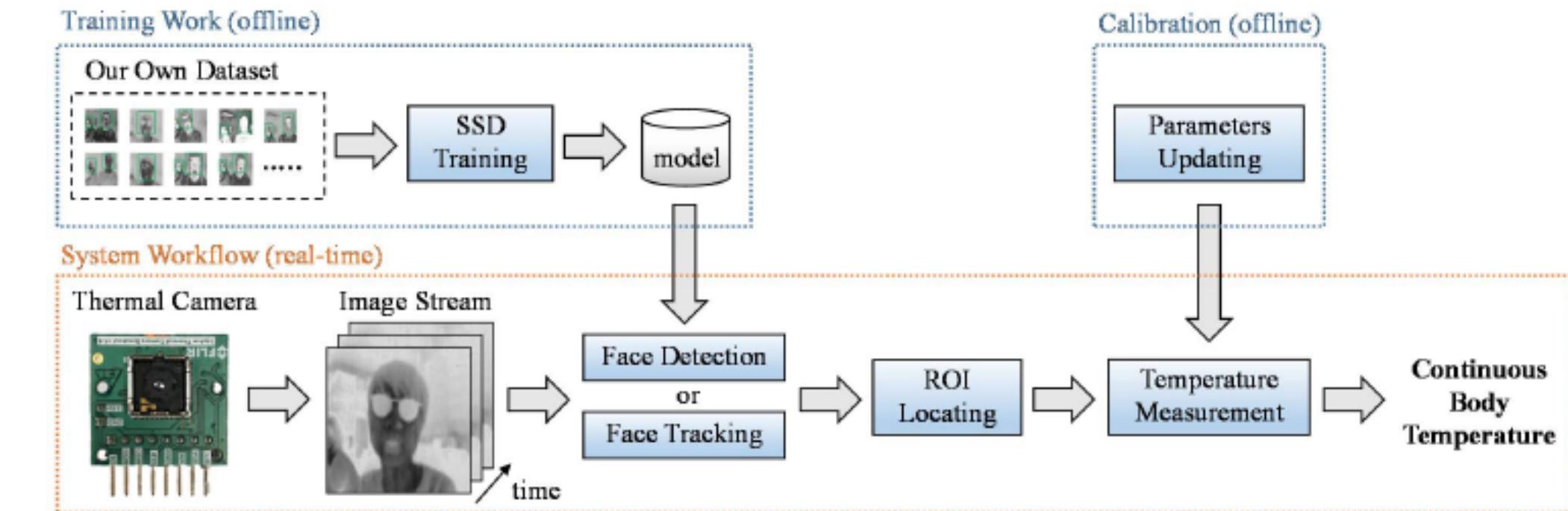


Figure 1. The proposed thermal camera-based continuous body temperature measurement framework.

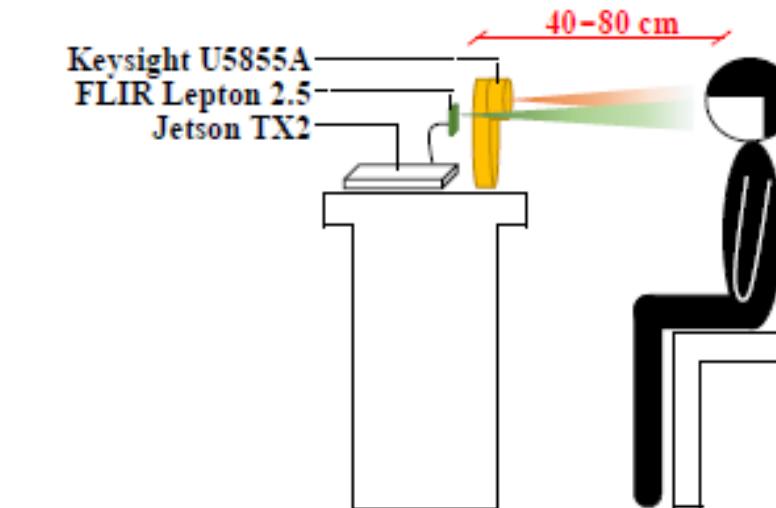
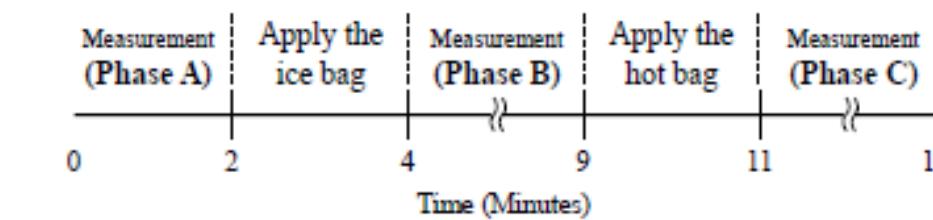


Figure 7. Illustration of the study setup.



Background Research

Thermal imaging cameras integrated with an attendance management system

- camera accuracy
- infected individuals do not necessarily exhibit higher body temperatures
- uninfected individuals may show higher body temperatures.

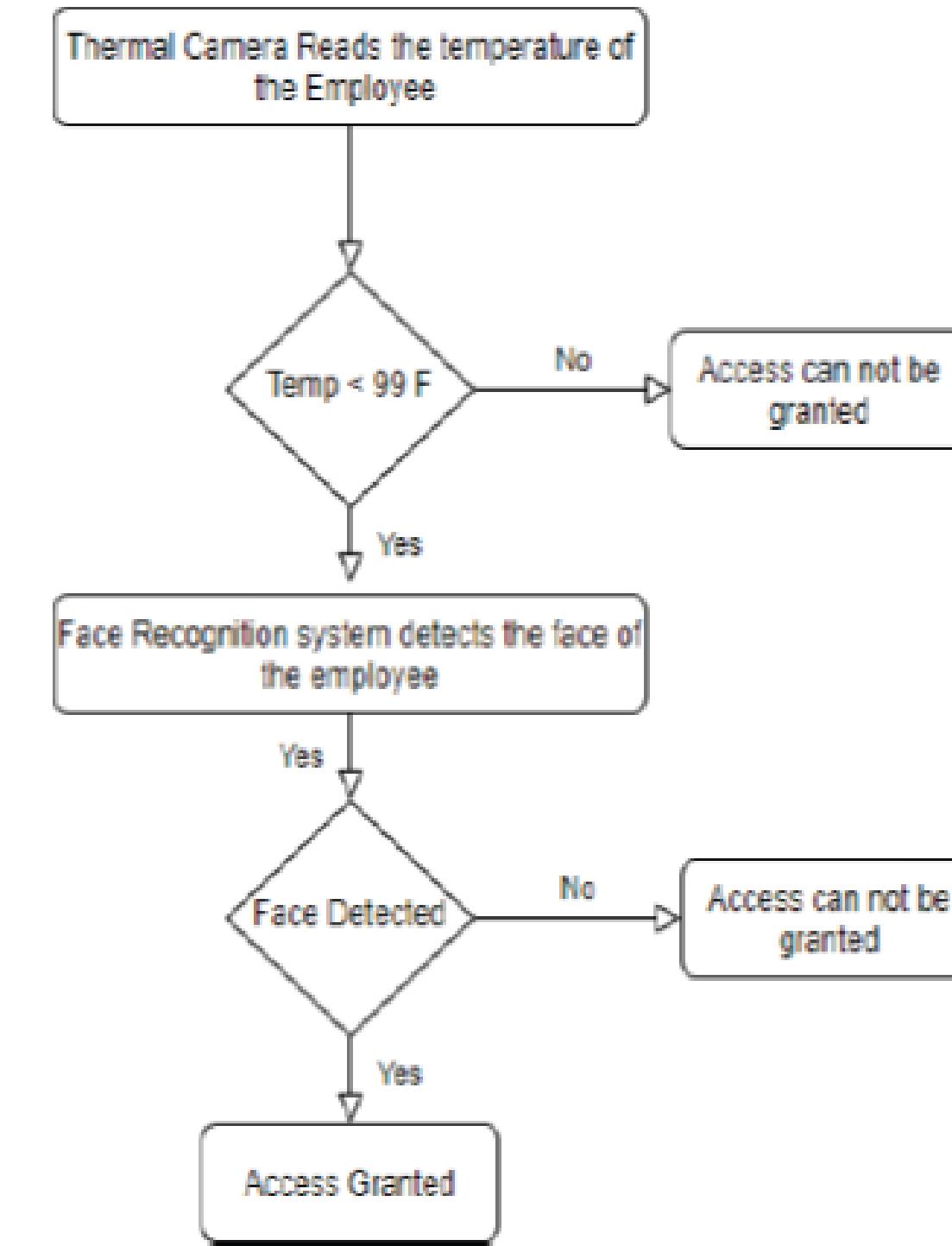


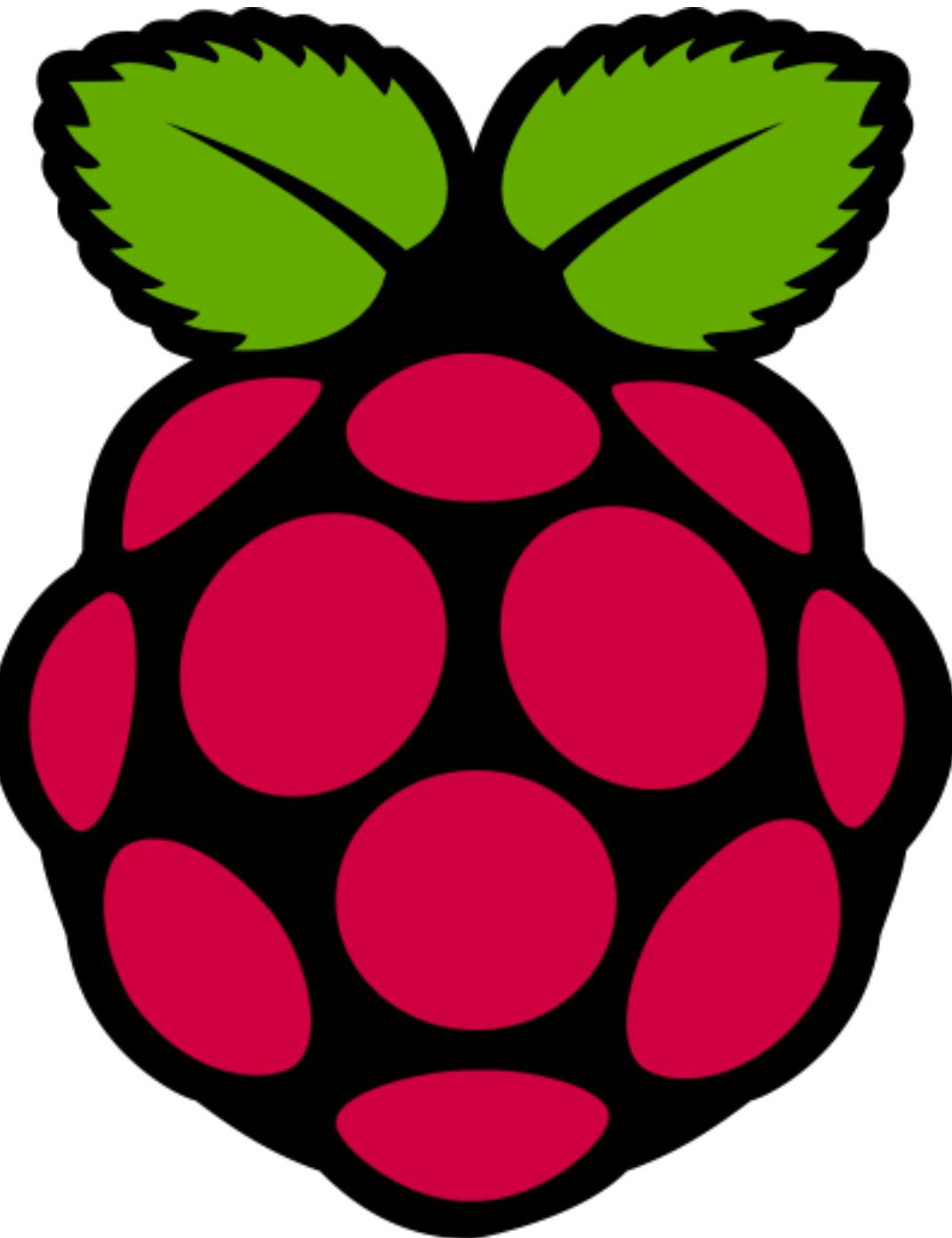
Figure 4: Flow chart

(Gupta et al. 2021)

Our Project

Hardware

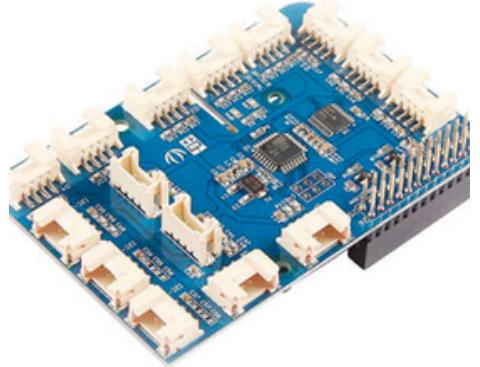
Software



H A R D W A R E



Raspberry Pi 4
Model B 4GB



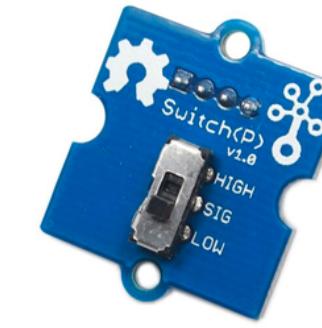
GrovePi+



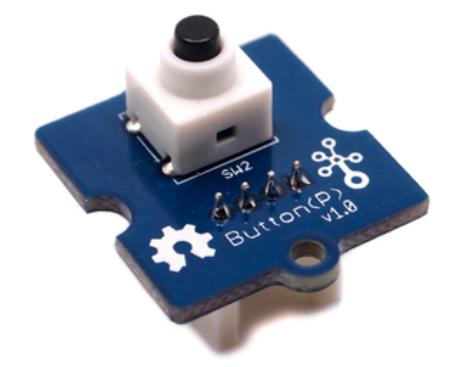
RealSens Depth
Camera D435



Grove - Rotary
Angle Sensor



Grove -
Switch(P)



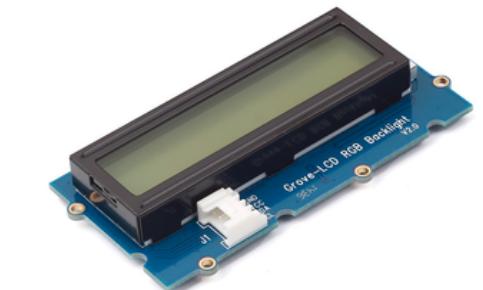
Grove -
Button(P)



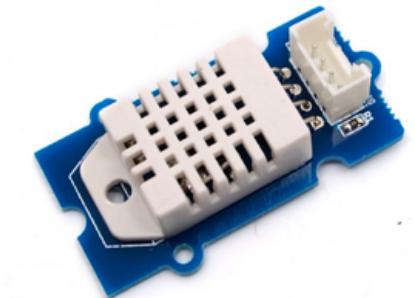
Grove - PIR
Motion Sensor



SM-S2309S ;
Micro Analog
Servo Motor



Grove - LCD
RGB Backlight



Grove -
Temperature &
Humidity
Sensor



PureThermal 2



FLIR Lepton 2.5

S O F T W A R E

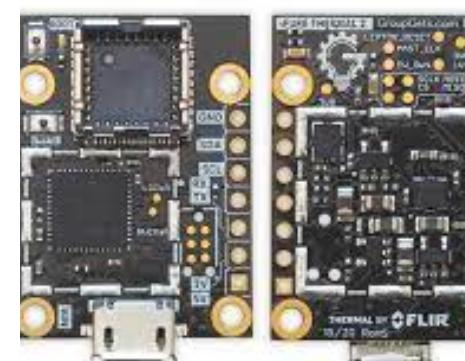
- 1. How to take body temperature make sure is accurate**
- 2. Human-computer interaction**
- 3. Energy Saving and Performance optimization**

How to take body temperature make sure is accurate

- 1. Face Detection**
- 2. Multiple detections**
- 3. Consider the ambient temperature**



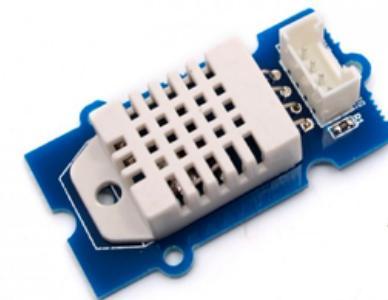
RealSens Depth
Camera D435



PureThermal 2



FLIR Lepton 2.5



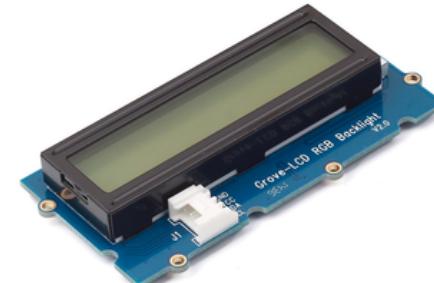
Grove - Temperature &
Humidity Sensor

Human-computer interaction

1. Screen to display information and remind
2. Automatically find faces
3. Automatically track faces



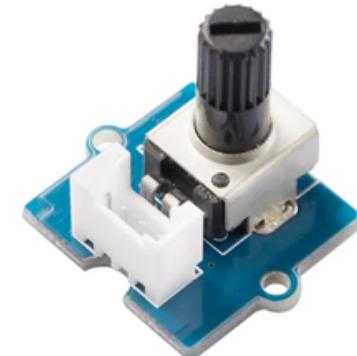
servo motor



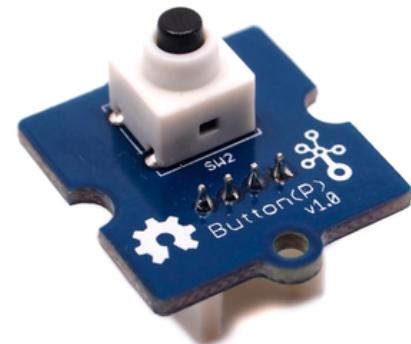
Grove - LCD
RGB Backlight



Grove - PIR
Motion Sensor



Grove -
Rotary
Angle Sensor



Grove -
Button(P)

Energy Saving and Performance optimization

1. Power Switch
2. Hibernation system
3. Compress frame size
4. Reduce the video frame rate



Grove -
Switch(P)



Grove - PIR
Motion Sensor

PROJECT PLAN

WEEK
5~7

Core

WEEK
6~7

Peripheral

WEEK
7~8

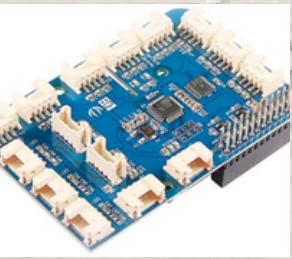
System Performance

R I S K A S S E S M E N T

Risk Type	Severity	Response
Schedule Postponed	★★★	Give up less important parts
File Lost/Corruption	★★★★★	Github Code Management & Version Control
Peripheral Compatibility/ Algorithm Unrealizability	★★★★★	Already Verified in Early Stage
Environmental Influences	★★★★★	Video Record Ambient Offset

B U G E T

Raspberry Pi 4 Model B 4GB, \$55
SD card \$5



Grove -
Rotary Angle Sensor, \$3.2

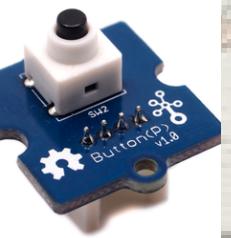


Grove - Button(P), \$1.5



RealSens Depth Camera
D435 , \$314

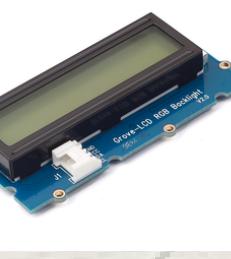
Grove - Switch(P), \$3.2



servo motor, \$8.84



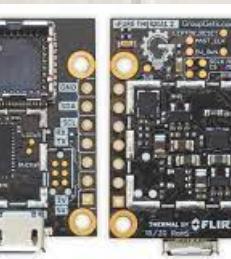
Grove -
LCD RGB Backlight, \$15



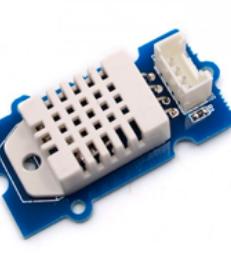
Grove -
PIR Motion Sensor \$8.7



PureThermal 2, \$109.99



Grove - Temperature &
Humidity Sensor, \$6.95



FLIR Lepton 2.5
\$109.00



Total = USD \$674.88 ≈ AUD \$1019.51

Bibliography

J. -W. Lin, M. -H. Lu and Y. -H. Lin, "A Thermal Camera Based Continuous Body Temperature Measurement System," *2019 IEEE/CVF International Conference on Computer Vision Workshop (ICCVW)*, Seoul, Korea (South), 2019, pp. 1681-1687, doi: 10.1109/ICCVW.2019.00208.

Gupta, A., Sudhanshu Maurya, Mehra, N., & Kapil, D. (2021). *COVID-19: Employee Fever detection with Thermal Camera Integrated with Attendance Management System*.
<https://doi.org/10.1109/confluence51648.2021.9377079>

Q&A