

# IndoorAirBox

## Members

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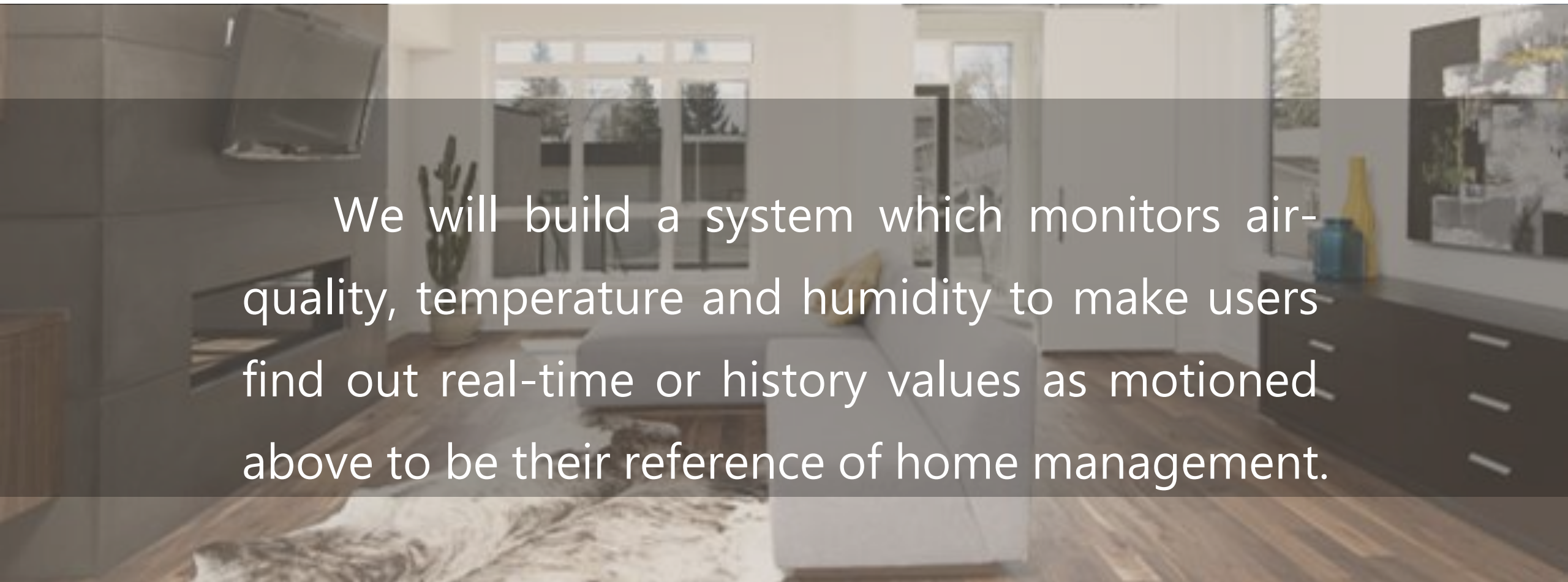


# Introduction

■ Motivation

■ Propose

# Introduction

A modern living room with a grey sofa, a large window, and a dark wood cabinet. The room is well-lit and features a mix of contemporary and natural elements.

We will build a system which monitors air-quality, temperature and humidity to make users find out real-time or history values as motioned above to be their reference of home management.

# Motivation

An aerial photograph of Taipei, Taiwan, featuring the Taipei 101 skyscraper on the left. The city is densely packed with buildings, and the surrounding mountains are visible in the background. Overlaid on the image are four semi-transparent dark gray circles, each containing a text label for a type of air pollution.

PM 2.5


Nitrogen  
Oxides

Sulfide

Moisture



# Purpose

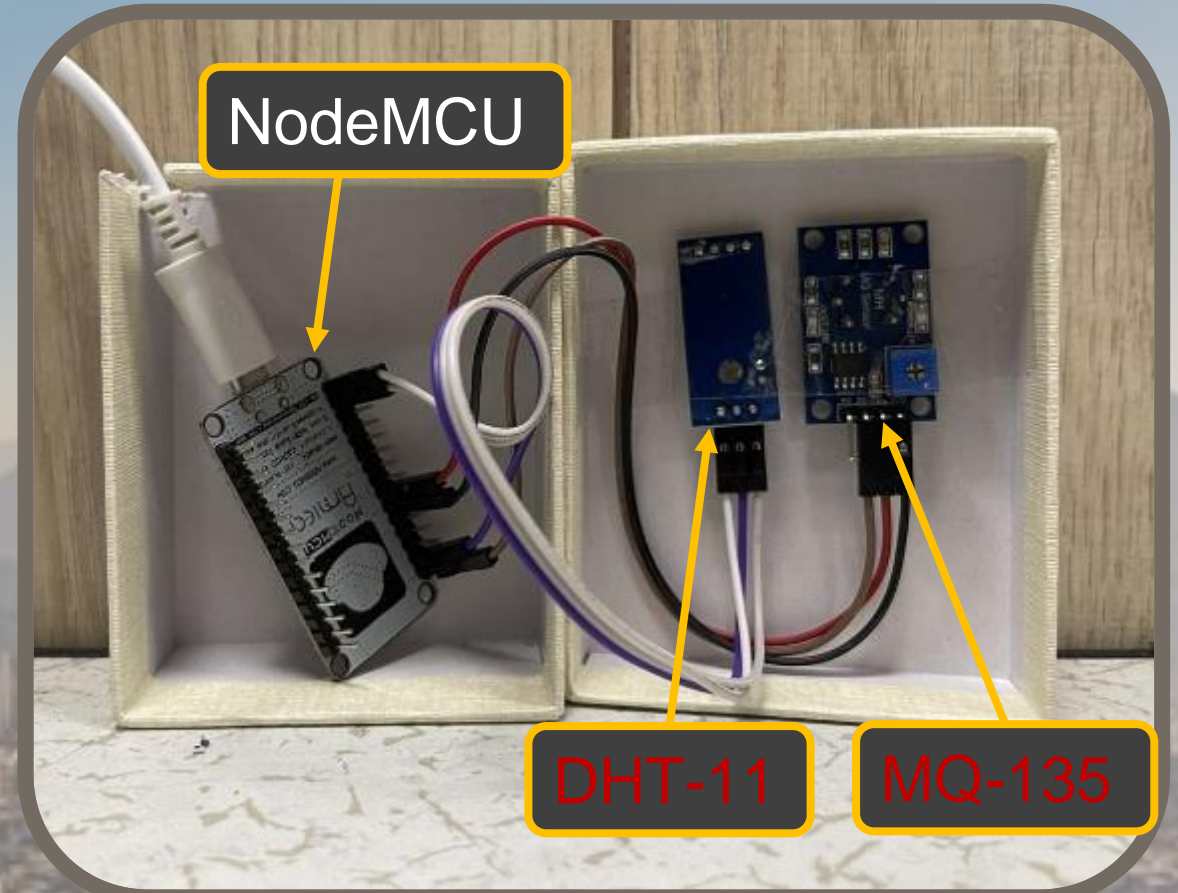
- 
- Uploading measured values of temperature, humidity and air-quality to back-end database.
  - Displaying real-time, history, average values in front-end WEB.
  - Making Data Visualization(e.g. SVG) to show data in WEB page.

The background of the slide is a photograph of a modern interior. It features a wooden sideboard with a white cabinet door, a large green plant in a white pot, and a small wooden stool. A pendant lamp hangs from the ceiling. The text 'Indoor AirBox' is overlaid in a large, white, sans-serif font.

# Indoor AirBox

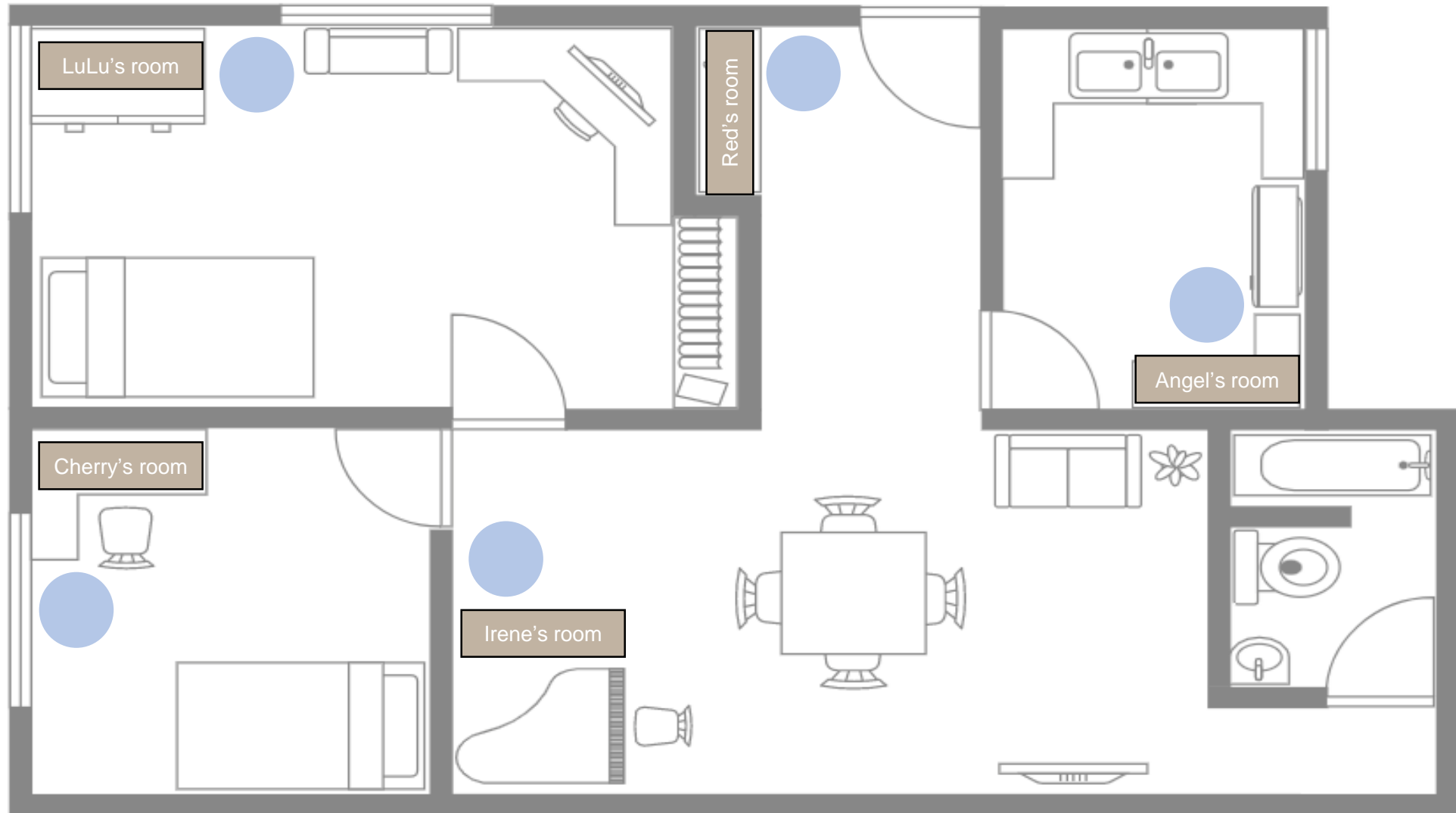
- Style of AirBox
- Schematic Diagram
- AirBox-Hardware
- MariaDB
- System Architecture
- Flow Chart
- User Interface

# Style of AirBox





# Schematic Diagram



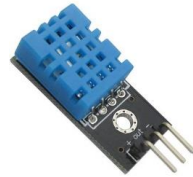
# AirBox-Hardware

## Range

Temp. : 0°C - 50°C

Humidity : 20% - 95%

## DHT11 Module



## Range

Air-Quality : 0ppm – 1023ppm

Normal : 100ppm – 150ppm

Alcohol : 700ppm

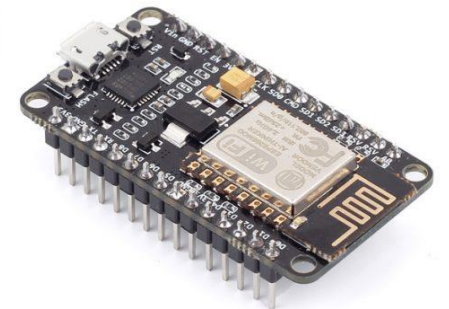
Natural Gas : 750ppm

## MQ-135 Module

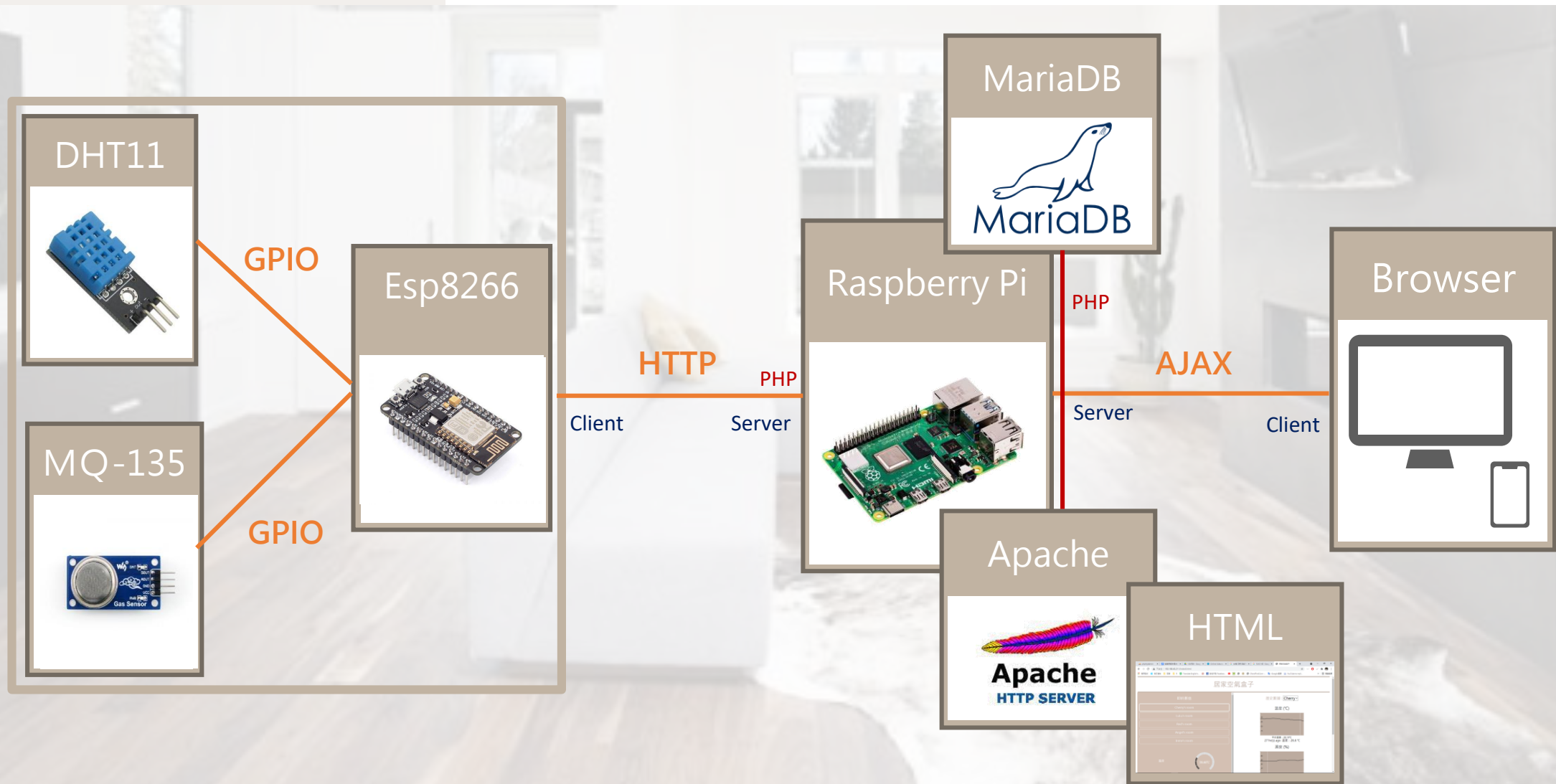


## NodeMCU

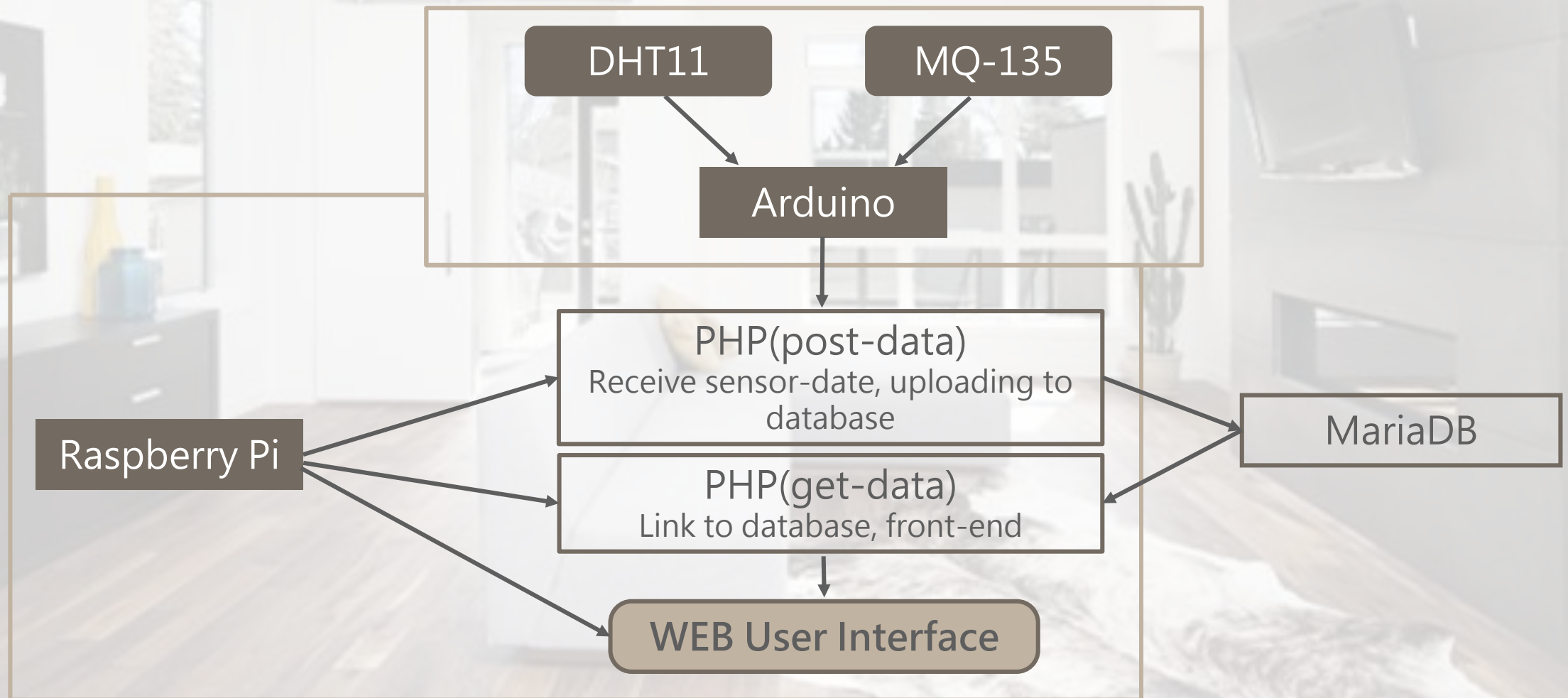
ESP8266



# 系統架構圖



# System Archit





# MariaDB

## phpMyadmin

The screenshot shows the phpMyAdmin web interface in a browser. The URL is `192.168.43.211/phpmyadmin/sql.php?server=1&db=phpmyadmin&table=SensorData&pos=0&token=0681b9261944b47bf...`. The interface displays the table structure for 'SensorData' in the 'phpmyadmin' database. The table has 7 columns:

#	名稱	型態	編碼與排序	屬性	空值	預設值	備註	額外資訊	動作
1	id	int(6)		UNSIGNED	否	無		AUTO_INCREMENT	修改 刪除 更多
2	sensor	varchar(30)	utf8mb4_general_ci		否	無			修改 刪除 更多
3	location	varchar(30)	utf8mb4_general_ci		否	無			修改 刪除 更多
4	value1	varchar(10)	utf8mb4_general_ci		是	NULL			修改 刪除 更多
5	value2	varchar(10)	utf8mb4_general_ci		是	NULL			修改 刪除 更多
6	value3	varchar(10)	utf8mb4_general_ci		是	NULL			修改 刪除 更多
7	reading_time	timestamp		on update CURRENT_TIMESTAMP	否	CURRENT_TIMESTAMP	ON UPDATE CURRENT_TIMESTAMP		修改 刪除 更多

Below the table structure, there are options to '增加' (Add) or '刪除' (Delete) columns, and a '執行' (Execute) button. The '分區' (Partitions) section shows a message: '沒有已定義的分區!' (No partitions defined!).

The diagram shows a simplified version of the phpMyAdmin interface. At the top, it says '歡迎使用 phpMyAdmin' (Welcome to phpMyAdmin). Below this, there is a '語系 - Language' (Language) section with a dropdown menu set to '中文 - Chinese traditional'. The '登入' (Login) section contains fields for '使用者名稱:' (Username) with the value 'phpmyadmin' and '密碼:' (Password) with a masked input. A '執行' (Execute) button is located at the bottom right.

# MariaDB

## Rows of data-table



The screenshot shows the phpMyAdmin interface for the 'SensorData' table. The table structure is as follows:

#	名稱	型態	編碼與排序	屬性	空值	預設值	備註	額外資訊	動作
1	id	int(6)		UNSIGNED	否	無		AUTO_INCREMENT	修改 刪除 更多
2	sensor	varchar(30)	utf8mb4_general_ci		否	無			修改 刪除 更多
3	location	varchar(30)	utf8mb4_general_ci		否	無			修改 刪除 更多
4	value1	varchar(10)	utf8mb4_general_ci		是	NULL			修改 刪除 更多
5	value2	varchar(10)	utf8mb4_general_ci		是	NULL			修改 刪除 更多
6	value3	varchar(10)	utf8mb4_general_ci		是	NULL			修改 刪除 更多
7	reading_time	timestamp		on update CURRENT_TIMESTAMP	否	CURRENT_TIMESTAMP		ON UPDATE CURRENT_TIMESTAMP	修改 刪除 更多

#	名稱	型態	編碼與排序	屬性	空值	預設值
<input type="checkbox"/>	1	id	int(6)	UNSIGNED	否	無
<input type="checkbox"/>	2	sensor	varchar(30) utf8mb4_general_ci		否	無
<input type="checkbox"/>	3	location	varchar(30) utf8mb4_general_ci		否	無
<input type="checkbox"/>	4	value1	varchar(10) utf8mb4_general_ci		是	NULL
<input type="checkbox"/>	5	value2	varchar(10) utf8mb4_general_ci		是	NULL
<input type="checkbox"/>	6	value3	varchar(10) utf8mb4_general_ci		是	NULL
<input type="checkbox"/>	7	reading_time	timestamp	on update CURRENT_TIMESTAMP	否	CURRENT_TIMESTAMP

## Data-table

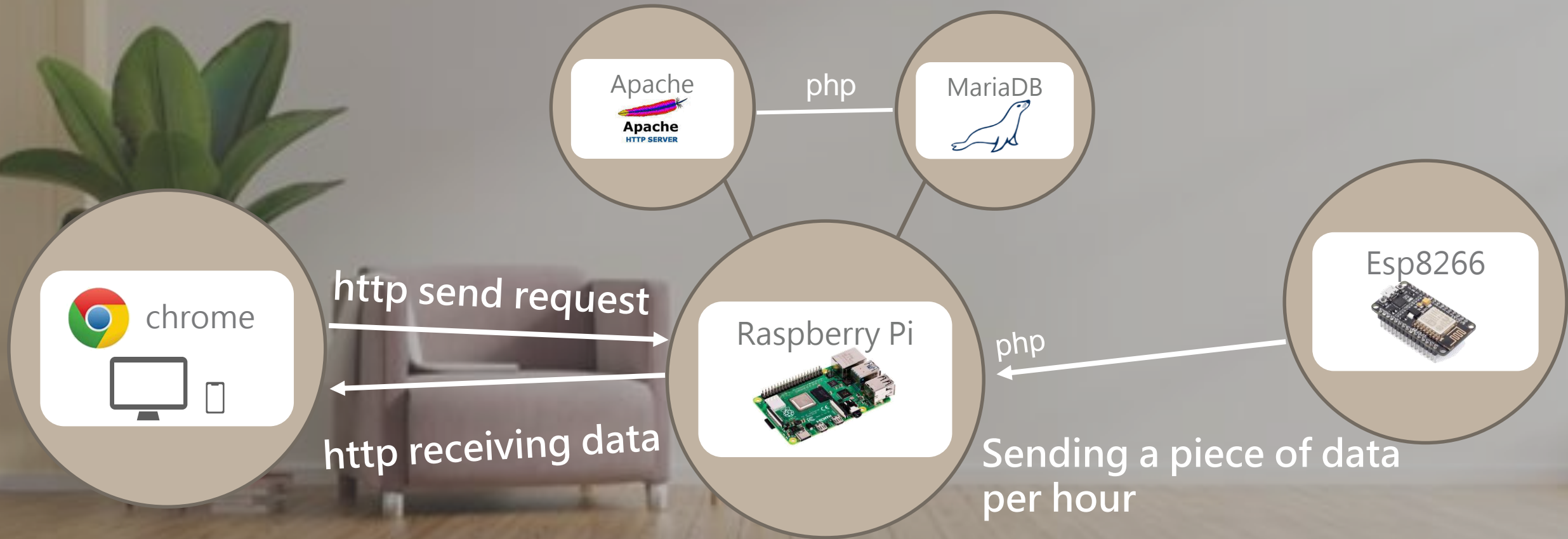


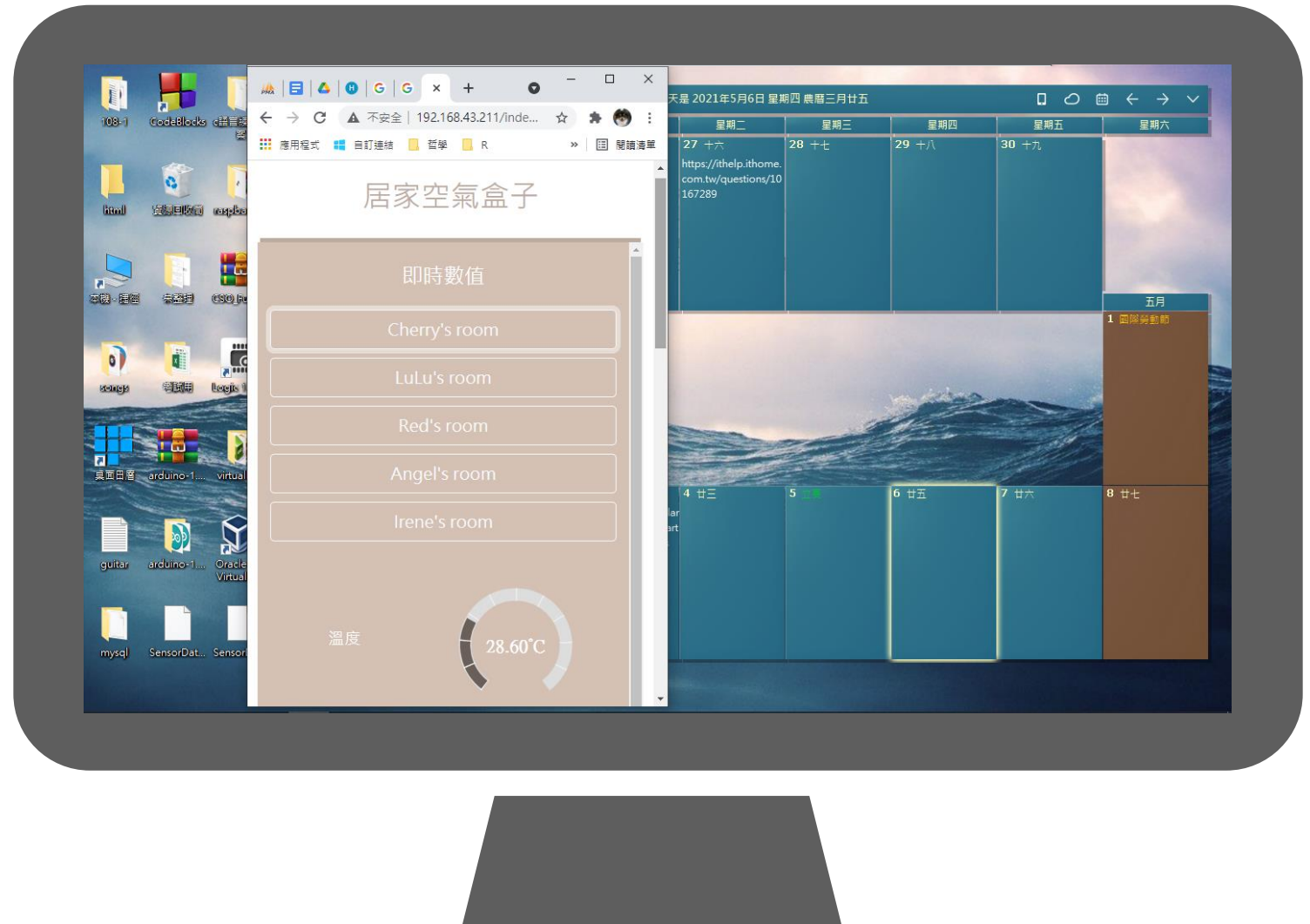
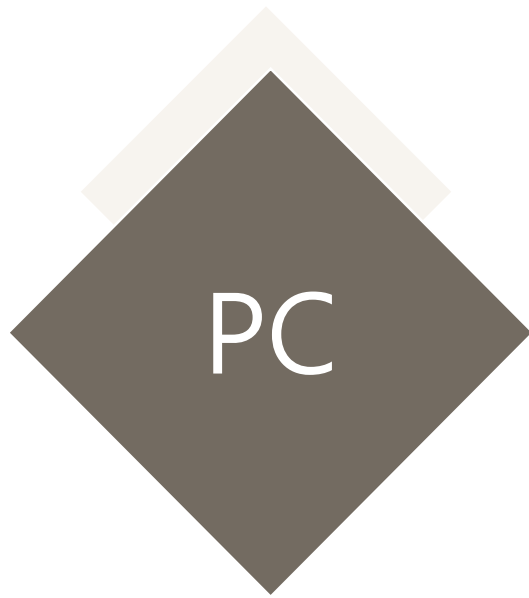
The screenshot shows the phpMyAdmin interface displaying the data of the 'SensorData' table. The data is as follows:

id	sensor	location	value1	value2	value3	reading_time
1540	Irene	myroom	26.80°C	62.00%	755.52ppm	2021-05-04 15:10:05
1539	Irene	myroom	27.00°C	58.00%	735.00ppm	2021-05-05 02:38:48
1538	Irene	myroom	27.10°C	63.00%	643.34ppm	2021-05-05 02:39:14
1537	Irene	myroom	27.50°C	65.00%	67.20ppm	2021-05-05 02:42:37
1536	Red	myroom	27.00°C	59.00%	644.00ppm	2021-05-05 02:42:12
1535	Angel	myroom	24.60°C	62.00%	713.32ppm	2021-05-05 02:42:52
1534	LuLu	myroom	25.00°C	61.00%	723.21ppm	2021-05-05 02:43:23
1533	Irene	myroom	26.70°C	61.00%	623.65ppm	2021-05-05 02:43:46
1532	cherry	myroom	28.60°C	59.00%	755.25ppm	2021-05-04 15:10:27

	id	sensor	location	value1	value2	value3	reading_time
<input type="checkbox"/>	1						
<input type="checkbox"/>	1540	Irene	myroom	26.80°C	62.00%	755.52ppm	2021-05-04 15:10:05
<input type="checkbox"/>	1539	Irene	myroom	27.00°C	58.00%	735.00ppm	2021-05-05 02:38:48
<input type="checkbox"/>	1538	Irene	myroom	27.10°C	63.00%	643.34ppm	2021-05-05 02:39:14
<input type="checkbox"/>	1537	Irene	myroom	27.50°C	65.00%	67.20ppm	2021-05-05 02:42:37
<input type="checkbox"/>	1536	Red	myroom	27.00°C	59.00%	644.00ppm	2021-05-05 02:42:12
<input type="checkbox"/>	1535	Angel	myroom	24.60°C	62.00%	713.32ppm	2021-05-05 02:42:52
<input type="checkbox"/>	1534	LuLu	myroom	25.00°C	61.00%	723.21ppm	2021-05-05 02:43:23
<input type="checkbox"/>	1533	Irene	myroom	26.70°C	61.00%	623.65ppm	2021-05-05 02:43:46
<input type="checkbox"/>	1532	cherry	myroom	28.60°C	59.00%	755.25ppm	2021-05-04 15:10:27

# Flow Chart



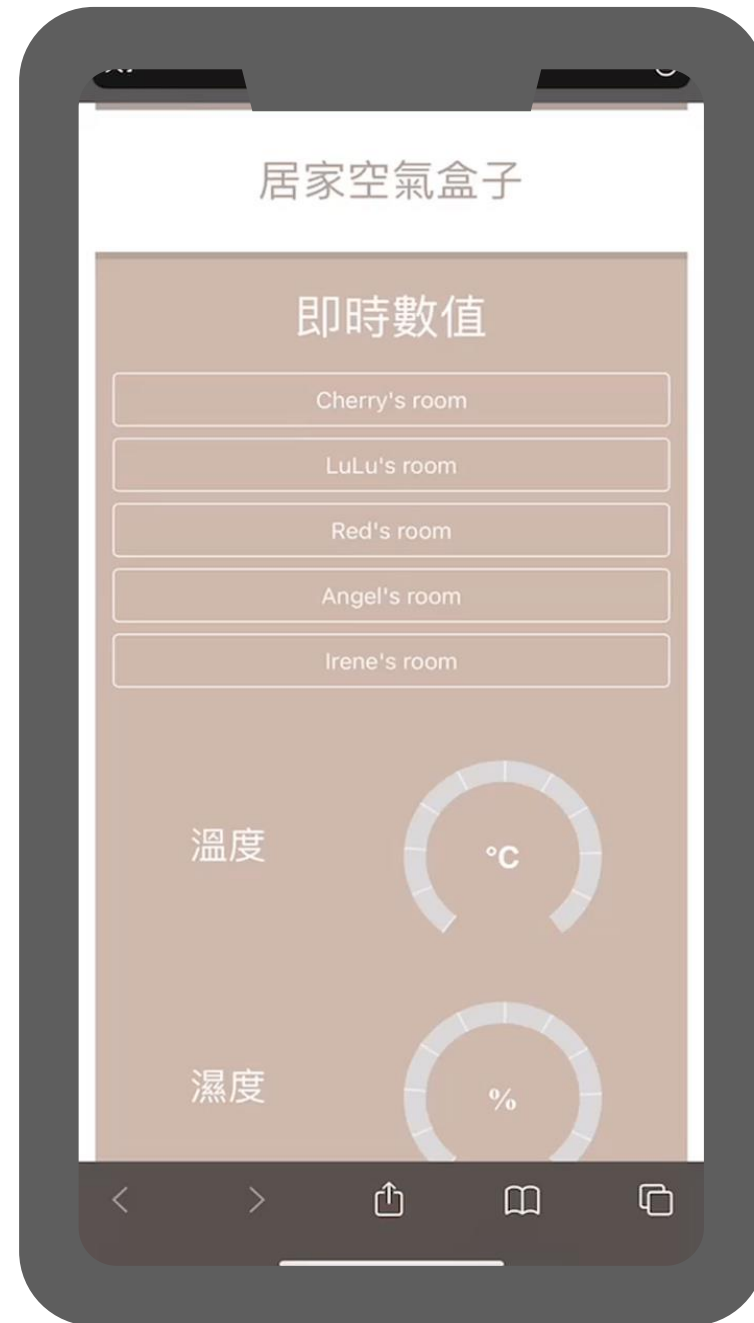




# WEB User Interface

Phone

Data  
Visualization  
SVG Chart



# WEB User Interface



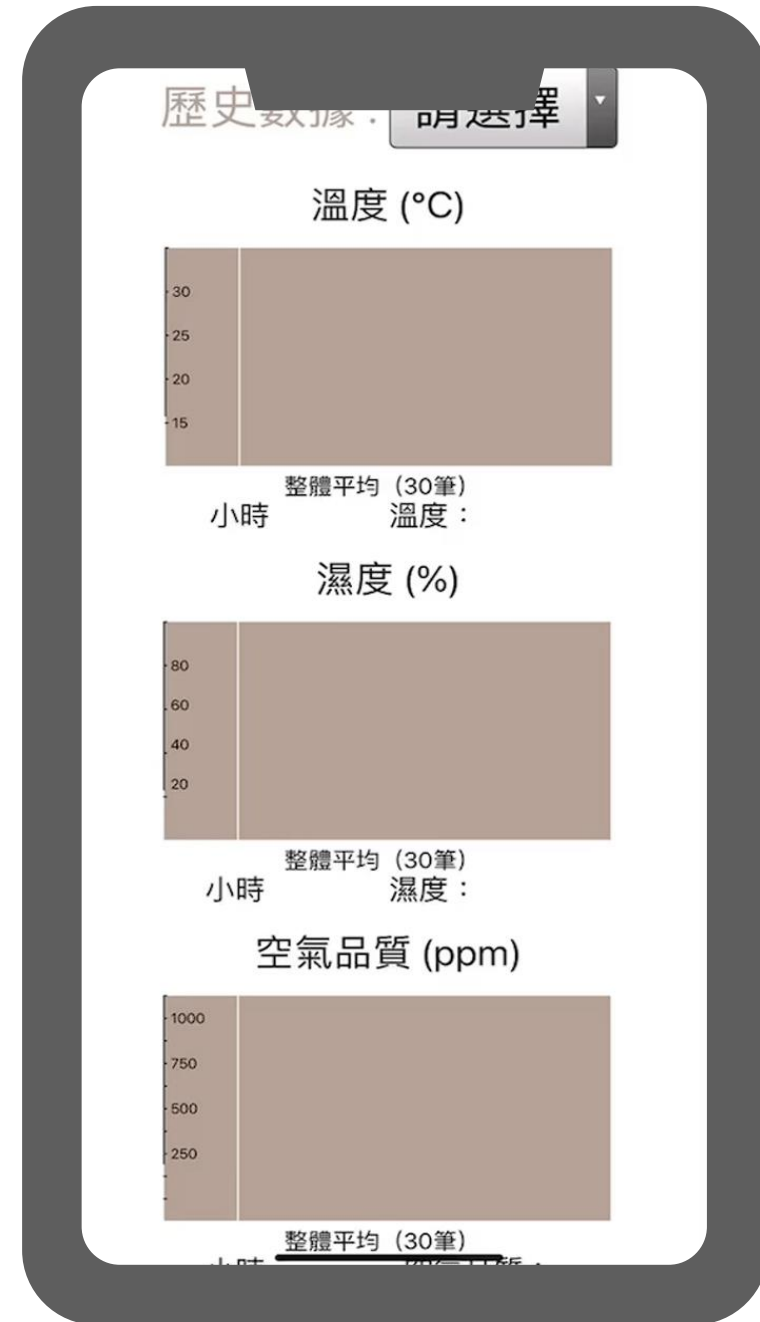
- Real-time  
(SVG)
- Button  
(Outline button)



# WEB User Interface

Phone

- History Values
- Drop-down Menu



A photograph of a modern interior space. On the left, a large green plant in a white pot sits on a wooden stand. Next to it is a wooden sideboard with a white cabinet door. On top of the sideboard are two more potted plants and a stack of books. Two orange pendant lights hang from the ceiling. The floor is made of light-colored wood.

# Appendix

■ Reference

■ Feedback

■ Model



# Reference

- W3schools

<https://www.w3schools.com/>

- Random Nerd Tutorials

<https://randomnerdtutorials.com/esp32-esp8266-mysql-database-php/>

# Feedback

透過這次的專題，累積了開發專案的實際經驗，雖然為期只有一個月，在與不同專業領域的指導老師以及同學的互動交流中，對物聯網開發有了較深入的了解。


在我們的專案當中，每位組員都有不同的提案，題目經過多次的討論與整合，分別在物聯網的感測層、蒐集資料平台以及應用層上，皆有不同的收穫，舉例來說在感測層上，我們能夠透過嵌入式系統開發板，連結不同的感測器，並且能夠將讀取的資料，上傳至蒐集資料平台並且了解多種通訊協定，如MQTT、TCP、HTTP、AJAX，以及不同資料回傳的格式，如JSON、XML，並在Raspberry Pi上安裝Apache2，並使用MariaDB資料庫做為資料儲存的平台。

# Feedback

在應用層上，我們使用瀏覽器如：Chrome存取我們設計的網頁，我們使用HTML、PHP、CSS、SVG、Javascript，並引用Bootstrap的框架來實現響應式網頁的功能。

在後端應用上，熟悉了如何使用PHP來接收資料，並讀取或寫入資料庫。前端應用方面，以HTML語法作為主體，嵌入多種前述的語法與框架，以實現讀取資料，並將資料視覺化的功能。其中將資料視覺化的實現過程中，我們遇到了最多困難，包括數值轉換與呈現，以及在不同語法下接收變數的過程，我們受苦良多。

# Feedback



當我們寫程式遇到瓶頸時，我們會一起製作模型與吃甜食來紓壓，常因此得到新的靈感。我們能完成此專題，實在是非常感謝各講師的幫忙，以及與其他組別的交流。不過最开心的事情是.....!!! 每天能跟組員一起享受短暫卻幸福的午餐時光，一起想辦法解決問題，聊八卦，是一個難以忘懷的、快樂的專題經驗。



# Model



**Thank you for listening.**

