SWS3025

Voice-Controlled and Environment Detection Air Conditioning System

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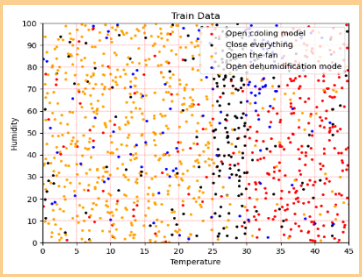
Introduction

- Our project mainly focused on environment detection and control air conditioning system. And our project source code has been uploaded to https://github.com/Gaoyuan-Wang/P03_Project
- The collected data will be used to training the Support Vector Machine (SVM) model in order to make the decision about when to turn on the fan or the air-conditioner. A voice senor is applied to detect voice command. Also, we design a website and WeChat mini-program to interact with the users.
- Three led lights are connected to the Raspberry Pi, which represent the status of fan and the model of air-conditioner.

LED color	Function
Yellow	Fan
Blue	Dehumidification mode
Red	Refrigeration mode

Machine Learning

In our project, we get two group of data and add labels for them. Then we use SVM to train a binary linear classifier as the fan model and a multiple classifier as the air condition model.



Train Data

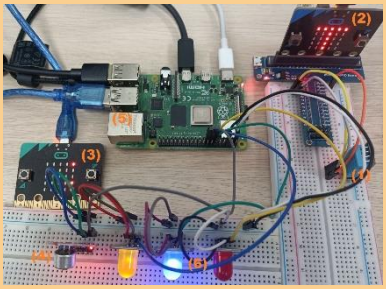
```
Train fan model:
Train Accuracy: 0.8890000
Train air condition model:
Train Accuracy: 0.8490000
```

Model Accuracy

```
Current time is 2022-07-27 19:20:32.458156
Current temperature is 28.197.
Current humidity is 19.700.
AI suggests you turn on the fan.
AI suggests you close the Air condition.
Send `foa` to topic `Control`
Send `cfa` to topic `Control`
```

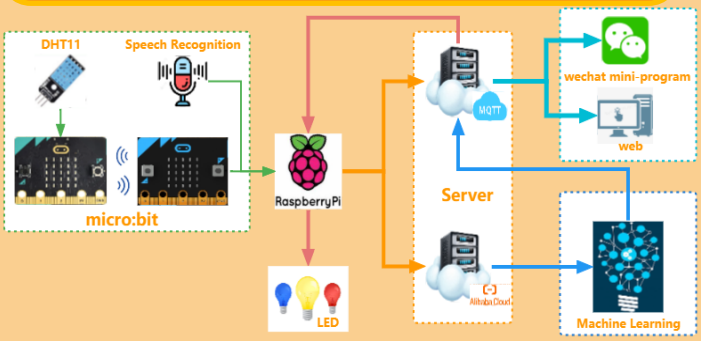
Test Current Data

Hardware



(1) DHT11
(2) micro:bit1
(3) micro:bit2
(4) sound senser
(5) Raspberry Pi
(6) LED

Structure

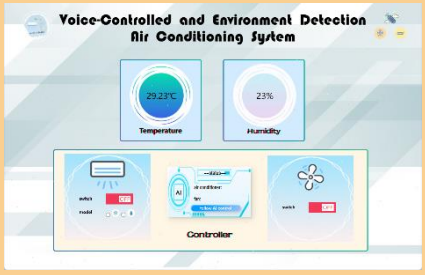


Server

The MQTT server is used to notify the client the current temperature and humidity. Besides, the command from AI and user will be send to the MQTT to control the three lights on Raspberry Pi. The web server will receive the data as well in order to record data for ML training. Additionally, the client website is running on the web server.

Application

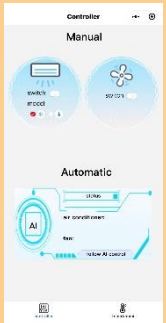
Smart Control Website



Welcome to our website http://gaoyuanwang.top:8080/microbit/.

Main Function

1.Display the current temperature and humidity
2.On/off and mode control of the air conditioner
3.On/off control of the fan
4.Current control state display of AI



WeChat mini-program