**README File for Smart Home from Group 7**

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Generally, we designed and built a system called Smart Home, which can sense and process the real-time data of temperature, light and humidity in our house. It aims at making people more convenient to know the environmental condition of their house. The whole system is run and operated on Linux system.

First we utilized PIP tag to sense the environmental condition. The data being sensed will be stored into a text file. Then we wrote a Python file to read data from the text file and compare them with the threshold we set before. The latest data will be shown to the user in a more acceptable way. For example, we set four conditions, cold, cool, warm and hot for temperature. If the data breaches the threshold, the system will automatically send a notification to the user by email. All the information will be shown in a web server we designed. Users are also allowed to change the threshold freely according to their feeling.

The system is divided into several parts. Haocong Wang is in charge of the data extraction, including setting up the PIP tag and extract data to the file. Yuxiang Song is responsible for data processing, including setting the threshold and comparing the date with threshold. Xinyi Yang wrote the function of sending email in a Python file. Sifan Yuan created the web server with Haocong Wang and added the function of changing the threshold in it. We put all the sections and solved problems we encountered into by several times of team work.

In the data extraction, we first downloaded all the package we need in the Linux system and typed in this command, “sudo stdbuf -o0 ./pip\_sense.v2 l l | stdbuf -o0 grep TX:03400 | tee data.txt”, to read data from the PIP tag 03400 and load the data in a text file, data.txt, at the same time. As the process continues, this text file will keep storing the data. Then we wrote a Python file, test.py, to keep reading the last line of the file and load this line into another text file, result.txt. This new file will always contain the latest data, which can be easily processed in the next step.

In the data processing part, we first opens and reads the file of the result including temperature, humidity and light. Then we compare the data with the comfortable data which we tested in the daily life and found on the internet, if the number we read from the file is out of range, program will send the email to manager and says one of the data is out of range. We also use root.after to make our GUI interface refresh every 10 seconds, which means the program can read the data from the result file every 10 seconds. We added some buttons, which allow people to change the range of comportable data as they want.

In the Web part, we first use index to define the threshold and the tags for temperature, humidity and light. By using this method, we can make the code easier to understand and more efficient to write. Also, we use another function called checker to put the processed tags and the data together, e.g. Warm(35). Then we use three functions to preprocess the data. At last, we get the grape the data from web outcome, use this output to change the threshold. And this is the way to let the user change the threshold on their own. On the web, we use a text-area to output the tags and data. Also, we apply four buttons to change the data. When user clicks on the buttons, the web will send a data to our program, then the program will change the threshold.

In the email transferring, first we import the smtp library to send email. Then we import email library to construct email content. After that, we set QQ mail as the host server. After finishing that, we first connect the host server, then login and send email, finally, quit.