HOME - AI

HOME-AI

This is a simple and easy to use basic AI based software. This is a 1st year (1st Semester) physics project.

We have tried to minimize the product cost as well as the hardware components as much as possible.

For now, I have not initialized any online functionality. The Online Functionality may be available later on.

This project is fully based on Python programming.

Thankyou,

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Madhav Bhargava [https://github.com/madhavbhargava]

For contributing their time, knowledge and money in this project.

If you want to support our work, please do provide your support at https://arijit-bhowmick.github.io/supportive_webpages/support.html

PHYSICS PROJECT TEAM :

- This is a 1st year (1st semester) physics project

Members :

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Currently Learning:

Arijit Bhowmick [BTech in Cybersecurity and Digital Forensic]

Vidhi Patel [BTech in Artificial Intelligence]

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HARDWARE REQUIREMENT

[01] Laptop/Workstation/Raspberry pi related machine
[02] Arduino
[03] Supportive Microphone
[04] Relay Module
[05] Jumper Wires
[06] Power Supply
[07] Switch
[08] Wires
[09] PCB
[10] LED's
[11] Home Appliances

SOFTWARE REQUIREMENT

[01] Python 3.x.x or greater
[02] Supportive python modules listed in requirements.txt
[03] Arduino IDE

USAGE:

You can start the program as:

```
python3 home-ai.py
```

The hardware and software setup we are using:

HARDWAREs:

[01] Windows 10 pro-2020
[02] Arduino UNO R3
[03] 4 * 5V Relay Module
[04] Jumper Wires
[05] Copper Wires
[06] LEDs
[07] PCB
[08] Microphone
[09] Light Bulb, Fan, and other electrical Devices
[10] Power Supply
[11] Switch

SOFTWAREs:

[01] Python 3.8.6
[02] Arduino IDE

HARDWARE AND SOFTWARE DESCRIPTIONS:

//Hardwares:

[01] Windows 10 pro-2020

As the host machine I am using Windows 10 pro-2020. I have installed the Windows OS in my Workstation. Apart from that I have 8 GB DDR4 RAM, AMD Ryzen 5 3550h processor and 250 GB of NVMe SSD.

[02] Arduino UNO R3

For switching the Home applications and controlling the relay modules, I am using Arduino UNO R3 for its quick response and quick switching ability. I am using it's 4 Digital pins for this project, but it can later be modified as your own requirement.

[03] 5V Relay Module

For switching the Connected Appliances (Light, Fan, etc). The power supply for powering the Appliances and the power supply for changing its state (From ON to OFF or OFF to ON) that are to be provided by the Arduino are to be connected to this relay module.

We are using the 5volt relays because Arduino Digital Pin can initialize two states 0volt and 5volt, which is usually referred to as 0 and 1.

So, these 5v relay modules can work with that voltage.

[04] Jumper Wires

I am using Jumper Wires to connect the Arduino pins with the Relay modules.

[05] Copper Wires

I am using Copper Wires to connect the appliances and the power supply for the application with the Relay modules.

[06] LEDs

I am using LEDs for testing circuits as well as verifying the connections and switching processes of the circuit.

You can use whatever your LED colour would be. But I am using Red, Blue, Green, and White colour LEDs.

[07] PCB

The PCB is used to create circuit for our hardware components.

[08] Microphone

I am using a headphone's/earphone's microphone in this project, which should be connected to our host system for providing audio input to the AI.

[09] Light Bulb, Fan, and other electrical Devices

I am using a light bulb, a fan, a table lamp, and a router for testing purpose.

You can use whatever you want, but remember to verify the maximum power and Current supply that the Relay can support.

You can also use multiple relay module for powering devices that require high power and current supply.

[10] Power Supply

I am using 220 V AC power supply for powering the Home appliances.

The Power supply are to be connected to the relay module.

[11] Switch

Switches are used for safety and powering the whole device. If any issues occur then we can manually turn the switches ON/OFF to protect the circuit and other devices.

// *Softwares:*

[01] Python 3.8.6

I am using Python 3.8.6 for running this HOME-AI program. The additional python modules are listed in the requirements.txt file.

This project is fully made with python3.

The "pyfirmata" module is used to make connection with the Arduino board.

You can install additional supportive modules by running the command:

```
pip3 install -r requirements.txt
```

[02] Arduino IDE

The Arduino IDE is used to upload the "Firmata framework" in Arduino to make it work and initialize python calls from host to the Arduino board.

SETUP STEPS:

(1) Clone the repository (https://github.com/Arijit-Bhowmick/HOME-AI.git) to work with this project.

You can use:

```
git clone https://github.com/Arijit-Bhowmick/HOME-AI.git
```

(2) Then cd into "HOME-AI-main" directory and run

```
pip3 install -r requirements.txt
```

to install required modules for running this project.

(3) Connect Your Arduino board and run the Arduino IDE. Locate the port number that it is connected to and upload the "firmata" framework using Arduino IDE to Arduino Board.

*** It is important to upload the firmata framework to the Arduino board to make it work with Python Software. ***

(4) Disconnect the Arduino Board from your host machine and connect the "pin numbers" of the Arduino and the Relay module with each other. Connect the home appliances and power supply with the Relay modules port, connect the switches, leds etc and check the connections twice before switching on the circuit.

(5) After you are confirmed that all the circuit are properly connected, close the Arduino IDE Software and connect your Arduino Board with your host machine (in this case we are using windows).

(6) Switch on the power supply that will power the home appliances.

(7) If you are not in the "HOME-AI-main" directory then, cd into it using CMD/Terminal/PowerShell. In this case we are using CMD.

Run the command:

```
python3 home-ai.py
```

(8) Then you are good to go with this project. Order your AI to on/off light, fans etc home appliances that are connected in the circuit.

- You can also ask your AI to perform some basic tasks in the host machine. You can additionally create your own commands. We will discuss it later on.

For example:

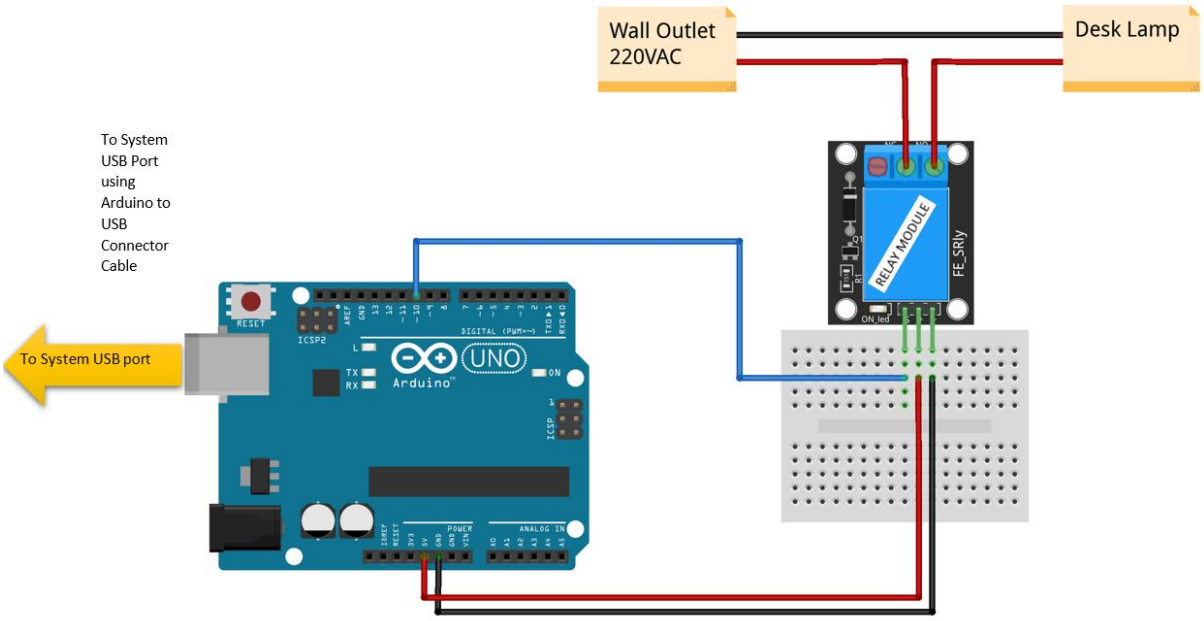
Opening File Explorer
Shutting down the host machine
Opening up the command prompt
etc.

- You can also chat with this AI, just ask it.

  “Hey Friday, How are you”
  etc.

  You can also change the calling name of the AI. In this case we are using “Hey Friday” for calling our AI. We will discuss this later on.

Basic Circuit Diagram:



In the circuit Diagram only one Arduino port and only one relay module is shown but we can add much more if we want. It usually depends on the ports of the Arduino. As we are only using Digital ports in this project, we have 14 Digital outlet pins for Arduino UNO. So, we can add 14 Devices with this Arduino Board.

Questions/Answers:

1. *Do you want to change the name of your AI?*

➔ Then open the text file "ai_name.txt" from the "commands_data" folder in "HOME-AI-main" directory.

Change the variable value from "F.R.I.D.A.Y" to whatever you want or you can stick with this name.

We are using "F.R.I.D.A.Y" as our default name for our AI.

If there is any error in the format of the data in the "ai_name.txt" file then, the default name of the AI is taken as "AI".

If you want to put some comments on the text file then use "#" The lines starting with # will automatically skipped.

The format for assigning the name is:

"ai_name = <name of the AI>"

2. Do you want to add the names for calling your AI?

➔ You can assign the names for calling your AI. Open the text file "ai_calling_data.txt" from "commands_data" folder and add the calling names for your AI.

** Calling names are the names without which the AI will not respond if you will not specify it at first while talking with your AI **

If you want to put some comments on the text file then use "#" The lines starting with # will automatically skipped.

The format for assigning names is:

"<The calling name you want to assign>"

3. Do you want to specify Arduino pins and commands that it will function when you want to call for it?

➔ Then open the text file "Arduino_commands.txt" from the "commands_data" folder in "HOME-AI-main" directory.

Open the text file and specify the command for which the Arduino have to respond, it's port number and port state.

** Remember you have to specify both on and off state for a pin and their commands **

If you want to put some comments on the text file then use "#" The lines starting with # will automatically skipped.

The format for assigning commands is:

"<Command for performing Arduino function> > <pin number> : <pin state>"

4. Do you want to perform system functions?

➔ Then open the text file "bot_commands.txt" from the "commands_data" folder in "HOME-AI-main" directory.

The bot_commands are used to perform system functions (Example: Opening File Explorer, shutting down your host machine, etc)

You can specify your own bot commands if you want to.

If you want to put some comments on the text file then use "#" The lines starting with # will automatically skipped.

The format for assigning the bot commands is:

"<specific names you want to give to a particular function> : <command to perform the function>"

5. Want to change your name that is shown on the output field?

➔ In default the user name on your system is taken as the user to show in the output field, but you can change it if you want to.

Just open the “commands_creater.py” in the “HOME-AI-main” directory and then search for “username” variable.

The variable will be available at “user_name()” function. There just you have to uncomment the line specifying

```
# username = "Your desired username you want to set"
```

Change the value of “username” variable to your desired username you want to provide.

6. Do you want to change the port number for your Arduino?

➔ In default the port number is specified as “COM3”, but you can change it if you want to.

Just open “arduino_controller.py” from the “HOME-AI-main” directory and change the “Arduino_port” value for your desired Arduino port in which the Arduino is connected to.

** Remember that the Arduino port value for Windows and Linux are different **

The format for assigning the port number is:

"arduino_port = <port_number>"

7. Want to make your AI hear you for long time?

➔ Then open "speech_recognizer.py" from your "HOME-AI-main" directory and locate the variable name "phrase_time_limit". There you can assign for how much seconds the AI will hear you before the next hearing process.

In default it is set to 6 seconds, but you can also decrease and increase it.

The format for assigning the value is:

"phrase_time_limit=<time in seconds>"

8. Want to add some aiml data for your chat bot?

➔ Then upload your AIML files to "AIML" folder from "HOME-AI-main" directory, and delete "brain.dump" file from "brain_dump" folder from HOME-AI-main" directory.

The script will automatically load all the AIML files to brain_dump, when you run the "home-ai.py" script again.

Conclusion:

This project is basically an initiative for low-cost python based AI project for basic usages.

For now, it only requires internet connection to recognize the voice after complete setup, but later on this project may update to support tasks that require internet connection.

Support us by:

- ❖ Do you want to support my projects?
- ➢ Then visit

https://arijit-bhowmick.github.io/supportive_webpages/support.html

If You have made any project with this project, then let me know if you want to, by tagging me up at

Twitter -> @sys41414141
Instagram -> @sys41414141
Facebook -> @arijit.bhowmick41414141
Discord -> @sys41414141
GitHub -> @Arijit-Bhowmick
@sys41414141

wherever you want. It makes me feel happy to see about how this project has spread a lot to the community and makes me improve the Source Code further more.