(Letter Head of the external organization)

Annexure3b- Complete filing

INVENTION DISCLOSURE FORM

Details of Invention for better understanding:

1. TITLE: Smart home hub: micropython-based home automation with esp32.

2. INTERNAL INVENTORS/ STUDENTS:

TEACHER

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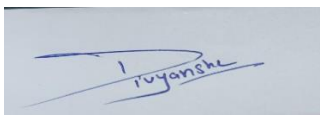
Signature (Mandatory)	

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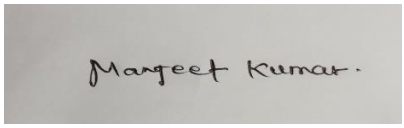
Signature (Mandatory)	

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3. DESCRIPTION OF THE INVENTION:

smart home hub micro-python-based home automation system is project that combines IOT (internet of things) with home automation. This project function is to automate home appliances and control them remotely using mobile and increase the convenience of user life. Our project makes user home automate, safe and comfortable. in this project we have used various sensors, devices and components. The detailed description of devices is given as below:

TECHNICAL WORKING

ESP 32 is a brain of smart home hub. It is powerful micro controller with features of in-built WIFI and Bluetooth capabilities. it is controlling all devices and components of project. DHT22 sensor is used to measure temperature and humidity of room. It will send the signal to esp32 for temperate and humidity range. RELAY MODULE is used as on/off switch. esp32 will send it signal according to given conditions in program to make system on/off. DC MOTOR is attached with relay module and esp. it is working as fan or cooling system. GAS SENSOR is attached to detect presence of gas e.g. carbon, methene, lpg gases that causes fire. It ensures home safety by providing early warning of gas leakages. BUZZER is audible alert device used in this project. It is used to notify the users of important event and alarm. When gas is detected by above certain range esp will make this buzzer on to notify user. IR SENSOR is another important sensor in this project that is used to detect motion or presence of object by measuring changes in its radiations. It will detect any intruder and will send signal to esp32. Also, we are using BLYNK APP to control all of these devices with our mobile phone.

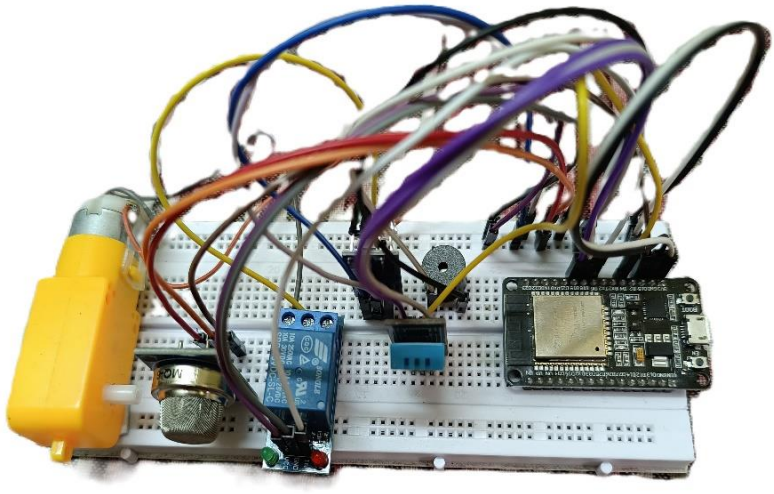
WORKING

In this project of smart home hub, DHT22 sensor will measure temperature and humidity of room. It will send the signal to esp. according to given conditions of program/code when temperature and humidity is above certain range esp will send signal to relay module to make motor on. Another sensor is GAS SENSOR that will detect the presence of gas or gas leakage. When presence of gas is above certain limit then esp will make on the buzzer to aware user about leakage. By this ensure safety so that user will timely take proper actions. It also helpful in keeping an eye out for any sudden movement in user home with help of motion sensor. IR SENSOR is used in this to detect motion of any object when there is any movement occur it will send signal and set off loud alarm to make aware user from intruders.

PURPOSES

The project purposes are to enhance customer convenience, efficiency, comfort, security for home owners. Here are some main purposes.

1. Centralized control: The main purposes of this system is to centralize the control over various smart devices and system within home. User can control his multiple devices with single interface through mobile app.
2. Automation: Smart home hub makes automates the working of various devices. It automates the routine tasks and process, create schedule and trigger events on specific conditions. For example: it automates turn on fan when temperature is above certain range, detect intruders, detect gas and trigger alarm.
3. Remote access: users can remotely control their smart home devices from anywhere with internet connection. Users can check the status of their home, adjust settings and receive alerts. They can remotely control the working of their devices through mobile app.
4. Energy efficient: smart home hub is energy efficient. It saves energy and reduces high utility bills by optimizing the use of energy consuming devices. For example, automating turn off led or fan when they are not in use.
5. Security and safety: smart home hub offers the features of security and safety by integrating motion sensor which will detect the motion of object and presence of intruders and trigger alarm. Gas sensor detect smoke and gas leakages, receive immediate alerts in case of emergency.
6. Customization: smart home is highly customizable project. It can be customized to enhance its features and capabilities. User can tailor settings to suit their lifestyle and routines.



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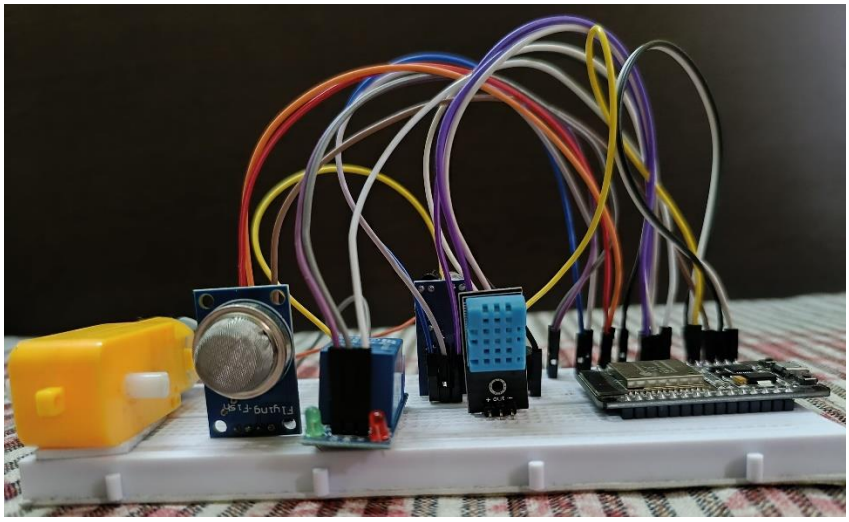


A. PROBLEM ADDRESSED BY THE INVENTION:

In traditional times smart devices required controllers to manage them. They required more human intervention and physical control over devices. They required separate apps to manage them. It leads to inefficiency, inconvenience and consumption of user time. smart home hub serves centralized platform for all devices that can seamlessly integrate and control all these smart devices. It can monitor, control and automate home devices.

B. OBJECTIVE OF THE INVENTION

1. **Centralized Control:** The objective is to centralized centralize the control over various smart devices and system within home. User can control his multiple devices with single interface through mobile app.
2. **Automation:** automation is the key objective of smart home hub. It automates the working of various devices that required less human intervention. For example, automate off/on fan and lights.
3. **Safety and security:** smart home hub aims to provide safety and security by integrating motion sensor that will detect intruders and trigger alarm. Another sensor is gas detector that will detect harmful gas leakages.
4. **Remote control:** Providing remote control capabilities is the important objective of smart home hub. Users can remotely control and monitor their smart home devices from anywhere with internet connection. users can receive alerts and messages about his system on his phone.

5. **Scalability:** smart home hub project should be scalable, so that it could be accommodate for future expansion and integration with additional devices and sensors. It should be flexible to add or remove various other devices.

C. STATE OF THE ART/ RESEARCH GAP/NOVELTY: Describe your invention fulfil the research gap?

Sr. No.	Patent I'd	Abstract	Research Gap	Novelty
1.	202441029340	This invention discloses the innovative approach to electricity consumption prediction and control within a smart home environment		
2.	202441028599	With unmatched levels of monitoring, control, and security, smart home automation systems have evolved beyond simple convenience to become essential elements of contemporary life.		
3.				

D. DETAILED DESCRIPTION:

Smart home hub is centralized management system that integrates various sensors and devices. It serves as a command centre for multiple devices and home appliances. It provides centralized control, automation, monitoring capabilities, safety and security and remote access. This project aims to automate home appliances and control them remotely using mobile and increase the convenience of user life. This project includes various sensors and devices that are ESP32, DHT22, IR sensor, Gas sensor, DC motor and buzzer.

ESP32 is a microcontroller that controls all sensors and devices. It is brain of whole system. It has in built capabilities of wifi and Bluetooth to connect multiple devices with it to control them automatically. DHT 22 is a sensor connected with microcontroller. It is used to measure temperature and humidity of room. It will send the signal to esp32 for temperate and humidity

range. RELAY MODULE is another sensor used in this system it works as on/off switch. esp32 will send it signal according to given conditions in program to make system on/off. DC MOTOR is attached with relay module and esp. it is working as fan or cooling system. GAS SENSOR is attached to detect presence of gas e.g. carbon, methene, lpg gases that causes fire. It ensures home safety by providing early warning of gas leakages. BUZZER is audible alert device used in this project. It is used to notify the users of important event and alarm. When gas is detected by above certain range esp will make this buzzer on to notify user. IR SENSOR is another important sensor in this project that is used to detect motion or presence of object by measuring changes in its radiations. It will detect any intruder and will send signal to esp32. Also, we are using BLYNK APP to control all of these devices with our mobile phone. Users can remotely control and monitor their smart home devices from anywhere with internet connection. users can receive alerts and messages about his system on his phone through this app.

In this project of smart home hub, DHT22 sensor will measure temperature and humidity of room. It will send the signal to esp. according to given conditions of program/code when temperature and humidity is above certain range esp will send signal to relay module to make motor on. Another sensor is GAS SENSOR that will detect the presence of gas or gas leakage. When presence of gas is above certain limit then esp will make on the buzzer to aware user about leakage. By this ensure safety so that user will timely take proper actions. It also helpful in keeping an eye out for any sudden movement in user home with help of motion sensor. IR SENSOR is used in this to detect motion of any object when there is any movement occur it will send signal and set on loud alarm to make aware user from intruders.

E. RESULTS AND ADVANTAGES:

Smart home hub results into providing various functionalities such as automation, safety and security, remote access and many other that increase user convenience and comfort. Here are some advantages:

- It streamlines various daily routines and tasks of user’s life. It reduces user intervention and physical controls. it automates the process of working of multiple devices. With centralized control and remote-control capabilities home owners can easily manage and control their smart devices and appliances through single interface.
- It prevents user privacy and unauthorized access to user’s devices to user’s home devices. It uses IR sensor that will detect intruders give the alert to user. Gas sensor will detect gas leakages and prevent user’s home from any dangerous effect. User can receive alerts and messages on his mobile phone and take immediate action regarding his devices.
- It provides user-friendly interface for interfacing with connected devices and configuring settings.

- It monitors and analyse the energy consumption of various devices. Automatic switch on/off capabilities reduce energy consumption of devices.
- It is scalable to accommodate with future expansion and integration of additional devices. It can be customized according to user requirements.

F. EXPANSION:

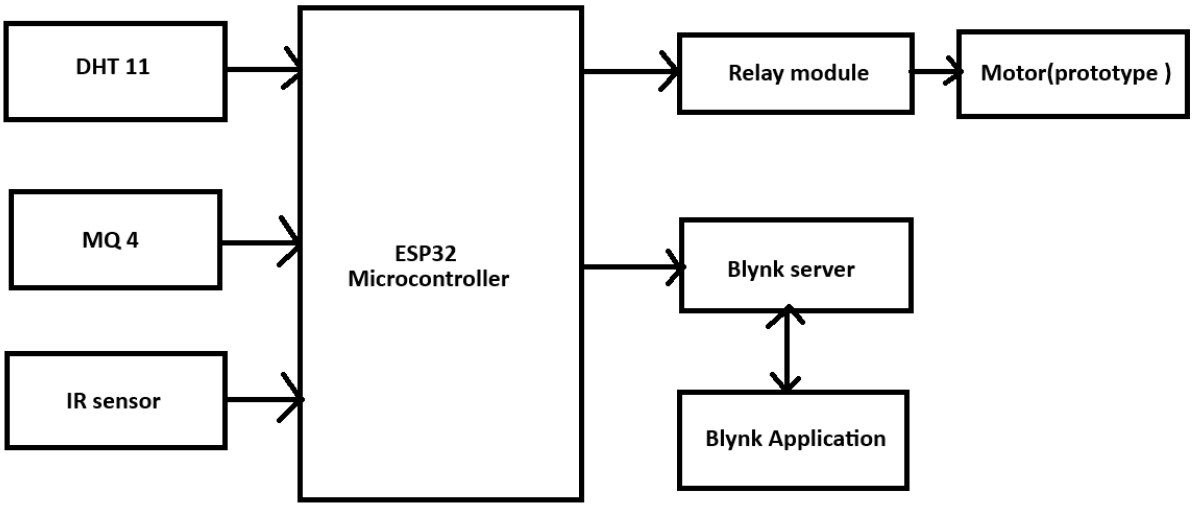
N/A

G. WORKING PROTOTYPE/ FORMULATION/ DESIGN/COMPOSITION:

Is your working prototype or other ready. Provide the images/data of the prototype

YES

BLOCK DIAGRAM



CIRCUIT DIAGRAM

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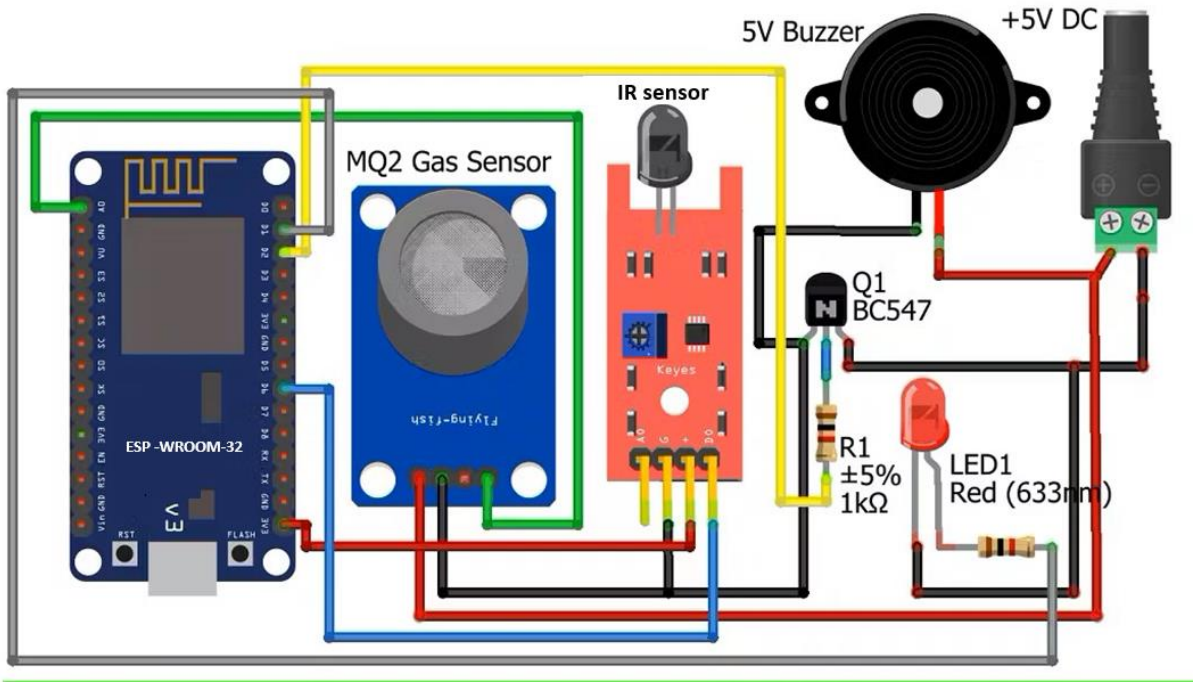

G. EXISTING DATA: Any clinical or comparative data necessary enough to support your invention. (Comparative)

N/A

4. USE AND DISCLOSURE (IMPORTANT):

A. Have you described or shown your invention/ design to anyone or in any conference?	YES ( )	NO (✓)
B. Have you made any attempts to commercialize your invention (for example, have you approached any companies about purchasing or manufacturing your invention)?	YES ( )	NO (✓)
C. Has your invention been described in any printed publication, or any other form of media, such as the Internet?	YES ( )	NO (✓)

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D. Do you have any collaboration with any other institute or organization on the same? Provide name and other details.	YES ( )	NO (✓)
E. Name of Regulatory body or any other approvals if required.	YES ( )	NO (✓)

5. Provide links and dates for such actions if the information has been made public (Google, research papers, YouTube videos, etc.) before sharing with us.

N/A

6. Provide the terms and conditions of the MOU also if the work is done in collaboration within or outside university (Any Industry, other Universities, or any other entity).

N/A

7. Potential Chances of Commercialization.

YES

8. List of companies which can be contacted for commercialization along with the website link.

N/A

9. Any basic patent which has been used and we need to pay royalty to them.

N/A

10**. FILING OPTIONS:** Please indicate the level of your work which can be considered for provisional/ complete/ PCT filings (Mandatory to mention).

COMPLETE FILE

11. **KEYWORDS:** right keywords for searching our invention.

SMART HOME HUB.

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NO OBJECTION CERTIFICATE

This is to certify that I (Name of the external person) have no financial assistance in filing any patent form from Lovely Professional University.

We have no objection if Lovely Professional University files any patent with the name of our employee (name of the external person) as co-inventor with (Names of LPU faculty/Staff and all co-inventors) having title as per the patent idea request file (LPU Idea Request I'D….).

Further, our institution will not raise any objections later concerning the filing and commercialization of the said patent.

(Authorised Signatory)