

HOME AUTOMATION AND SECURITY USING IOT

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Abstract - The need for comfort and convenient life essential in smart homes. Thus, home automation become most essential and critical components for the IoT-based smart home technology. Home automation systems are used to control home devices or appliances in smart homes it provide automatic remote control inside or outside homes.

Key Words: IOT, Arduino Mega, Ultrasonic Sensor, Fire Sensor, Gas Sensor, RFID, LCD Buzzer, Pump Motor, DC Fan, Solenoid Lock.

1. INTRODUCTION

IOT is the technology that connects all the things. The devices are smartly linked together allowing new forms of communication between people and things, and among things themselves. IoT technology has advanced significantly in the last few years since it has added a new dimension to the world of communication and information technologies. IOT have been applied widely such as Agriculture, Smart Home, Comfort, Safety, Security, Energy conservation. Now-a-days need for the people is increase, they all need to control all things in one hand. People also need their home safe, secure and smart .This Home automation and security using IoT help us to control outside and inside homes[1],[2]

2. PROJECT DESCRIPTION

This systematic survey aims to provide a comprehensive analysis of all the studies published on smart home safety and security systems using the Arduino platform by identifying, reviewing, and categorizing the state-of-the-art contributions. This is achieved by answering several related research questions and thus helping researchers and developers to better understand these systems and contribute to their Development and research. In this system, we have Arduino MEGA microcontroller which acts as brain of our system; hence the entire system program is stored in it. Ultrasonic sensor is used to

measure the water level in the water tank, if less automatically turn ON the pump motor. Gas sensor is used to check the gas leakage. Fire sensor is used to check the fire detection due to gas leakage, which triggers the servo motor (fire extinguisher) automatically. Buzzer is used to give alarm signal for abnormal condition. RFID tag and reader are used to unlock the door (solenoid lock) only for the authenticated people. LED and DC fan is controlled by the IOT. All the information is displayed.

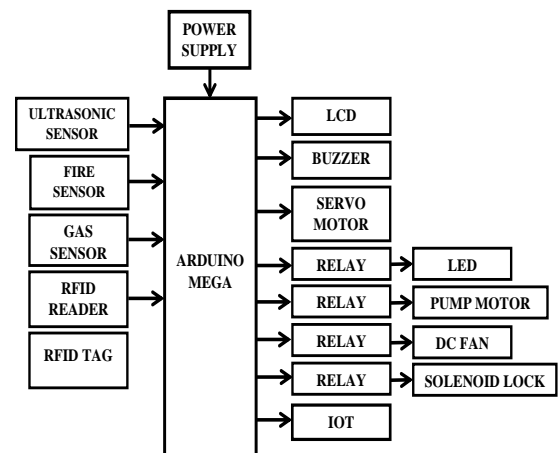


Fig -1; Block Diagram

3. HARDWARE REQUIREMENTS:

3.1 Arduino mega:

The MEGA 2560 is designed for more complex projects. With 54 digital I/O pins, 16 analog inputs and a larger space for your sketch it is the recommended board for 3D printers and robotics projects. This gives your projects plenty of room and opportunities. The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It

contains everything needed to support the microcontroller; simply connect it to computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The Mega 2560 board is compatible with most shields designed for the Uno and the former boards Duemilanove or Diecimila..[5],[6]

3.2 Gas sensor (MQ-2):

Sensitive material of MQ-2 gas sensor is SnO₂, which with lower conductivity in clean air. When the target combustible gas exist, The sensor's conductivity is more higher along with the gas concentration rising. Please use simple electro circuit, Convert change of conductivity to correspond output signal of gas concentration. MQ-2 gas sensor has high sensitivity to LPG, Propane and Hydrogen, also could be used to Methane and other combustible steam, it is with low cost and suitable for different application. Sensor is sensitive to flammable gas and smoke. Smoke sensor is given 5 volt to power it. Smoke sensor indicate smoke by the voltage that it outputs .More smoke more output..[12],[13]

3.3 water pump motor:

As the name implies, water pumps pump water. Whether that is in a vehicle, at a business, in the home, or in a well, shoppers can probably find a water pump to fit their vehicle or to help them draw water from the ground in a self-dug well to be used in pressure tanks within the location. Vehicle water pumps help regulate the flow of water through a vehicle's cooling system; when the seal on these go bad, the whole pump must be replaced. Located within the home or business, pressure water pumps regulate the water pressure year round, controlling water flow to different areas of the location.

3.4 RFID:

Radiofrequency identification (RFID)uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information Passive tags collect energy from a nearby RFID reader's interrogating radio waves.[7]

3.5 Ultra sonic sensor:

Ultrasonic detection is most commonly used in industrial applications to detect hidden tracks, discontinuities in metals, composites, plastics, ceramics, and for water level detection. For this purpose the laws of physics which are indicating the propagation of sound waves through solid materials have been used since ultrasonic sensors using sound instead of light for detection.[8]

3.6 Liquid crystal display:

LCD screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven

segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

3.7 Light emitting diode:

The Light emitting diode is a two-lead semiconductor light source. In 1962, Nick Holonyak has come up with an idea of light emitting diode, and he was working for the general electric company. The LED is a special type of diode and they have similar electrical characteristics of a PN junction diode.

4. Model Evaluation Criteria

Inclusion criteria:

- Publications related directly to smart home safety and security systems using Arduino. Arduino has been selected because it represents the most used microcontroller-based board in various smart home systems. It has a user-friendly development environment and is affordable. In addition, it is appealing due to its large support community, extensive set of support. Software libraries, and various shields/modules boards to extend its interfacing capabilities [19].

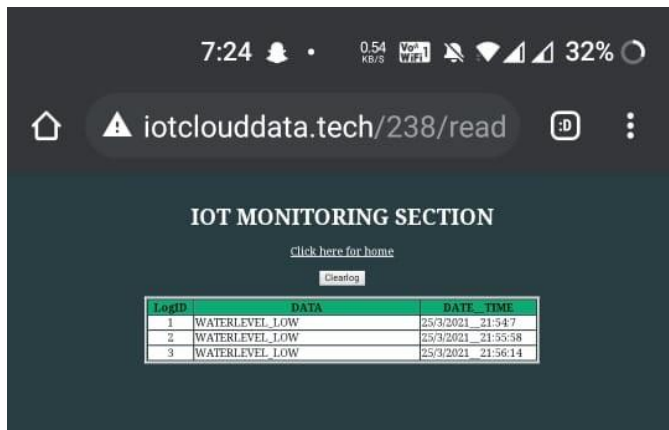
- Publications published online over the last six years (2014–2019). According to our search and exploration of the literature, publications on smart home safety and security systems using Arduino started in 2014.[3],[4]

Exclusion criteria:

- Publications not published in English.
- Publications not peer reviewed (e.g., gray literature).
- Publications not published electronically.
- Publications that are duplicates of other previous publications.
- Publications without clear experimental results and evidence.

5. RESULT

In this output, water level low is detected by using ultrasonic sensor.Likewise using all the sensors if it acts and it will be monitored by the iot cloud URL with date and time. We can monitor the home simply by using URL from far away distance. Who are all know the URL can monitor the home easily.



LogID	DATA	DATE - TIME
1	WATERLEVEL_LOW	25/3/2021_21:54:7
2	WATERLEVEL_LOW	25/3/2021_21:55:58
3	WATERLEVEL_LOW	25/3/2021_21:56:14

Fig -2; Results

6. CONCLUSION

The home automation using Internet of Things has been experimentally proven to work by connecting simple appliances to it. These appliances were successfully controlled remotely through the internet. The designed system instigates a process according to the user's requirements, for example switching on a fan when it gets hot. Sensors can be implemented to store data which can later be used to analyze the system at hand.

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