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A Review on Classification of Techniques for IoT Based Home Security

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ABSTRACT

Internet of Things(IoT) refers to the infrastructure of connected physical devices that square measure connected through Arduino and multiple sensors and do wireless communication through web. Home security can bell be an awfully helpful application of IoT which we square measure exploitation it to make a security system for homes and industrial security purpose. The system can inform the owner concerning any unauthorized entry or whenever the door is opened by causation a notification to the user. Once the user gets the notification, he will take the necessary actions. This security system uses a microcontroller as Arduino UNO as associate degree interface between the elements of connected devices through the sensors that monitor the standing, a buzzer to sound the alarm and sends SMS, email to receiver if any suspicious activity happens.

Keywords — IoT, Arduino Uno, network sensors, embedded C, Wi-Fi, cloud, home security system, Sensor based Security System.

I. INTRODUCTION

There are lots of on-going projects on intruder detection systems with seismic sensors. The main purpose of these systems is to protect the border line from unauthorized entrance. There are many intrusion detection algorithms to achieve this goal. The main features that these algorithms differ from each other are; Detection range, False alarm rate, Power consumption, Noise reduction algorithms, Classifying the intruder The main disadvantage of these seismic sensors is that they can detect earth movements or wind as an intruder. Therefore, algorithms must be efficient. Some of the algorithms available are: Looking for the regular cadence of a typical human gait. [2]. Measuring the statistical distribution and detecting the extreme deviations from mean (Kurtosis) According these algorithms, noise and the detection range are inversely proportional. In the real world, it is assumed that the noise level is approximately medium, which means that intrusion detection range is approximately 20 meters. Applying Kurtosis in a high noise area with a specific threshold value can result to the misdetection of the intruder, because the noise level of the area is not always the same. [4] Another approach can be pursued. This approach is using strings of geophones for intrusion detection, and summation of the seismic signals. This contributes to the detection range. Even though all of the geophones have separate noises, only one geophone which is the closest to the walking person provides the main intruders signal.

II. WORKING PRINCIPLE

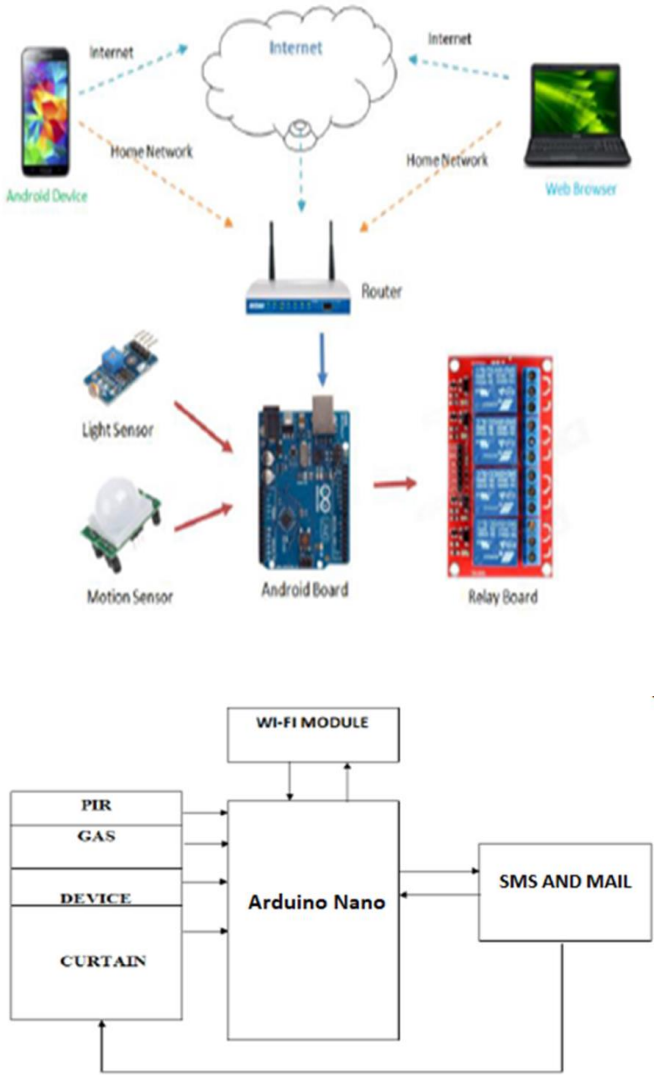

Fig1. Overview and Block Diagram of Proposed Project

III. PROPOSED SYSTEM

Our proposed system is an Arduino based home automation through with Arduino connected to a Wi-Fi and controlled via android app or a social media network. This system deals with the safety in home and smart home technologies, which will be cost efficient. Block Diagram of the proposed system is shown in Fig (1)

Arduino can sense the environment by receiving input from a range of sensors and might affect its environment via actuators. An analog temperature sensor is a chip that tells you what the ambient temperature is. The DHT11 might be a basic, ultra-low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and Hermiston to live the encircling air, and spits out a digital signal on the information pin (no analog input pins needed). It's fairly simple to use, but needed accurate timing to grab data. The only real downside of this sensor is you will be ready to only get new data from it once every 2 seconds, so when using our library, sensor readings are often up to 2 seconds old.

The Passive Infra-Red sensors allow one to sense motion, almost always and are used to detect whether a human has moved in or out of the sensors range. The PIR sensor could be a hydroelectric device that detects motion by measuring changes within the infrared level emitted by surrounding objects. This motion will be detected by checking for a high signal on a sign I/O pin.

They are small, economical, low-power, convenient and deteriorate. For that reason, they're commonly found in appliances and gadgets employed in homes or businesses. MQ6 may be a semiconductor type sensor, which might appropriately sense the presence of smoke, LPG, methane, butane, propane and other hydrocarbon combustible gases. The sensitive material in this sensor is tin-dioxide(SnO2). When it comes up-to-date with the gas to be monitored, the electric resistance of the sensor decreases; enabling the microcontroller to reply to the case. The sensitive material in this sensor is tin-dioxide(SnO2). When it comes up-to-date with the gas to be monitored, the electric resistance of the sensor decreases; enabling the microcontroller to reply to the case.

When it detects the concentration of combustible gas in the air it outputs its reading as an antilog voltage. The sensor can calculate concentrations of unstable gas of 300 to 10,000ppm. The sensor can operate at

temperatures from -20 to 50°C and consumes but 150 mA at 5 V. To allow connection for power plugs and switching of electrical load within the home, relay switches are used. The relay switches have capability to carry a maximum load of10A at 240V. This is sufficient to carry any household appliance as these devices do not draw much current. The Wi-Fi shield provides internet connectivity for the embedded micro web server which allows internet access and controls from a web application.

IV. LITERATURE REVIEWS OR SURVEY

Arduino Nano is a microcontroller board designed by Arduino.cc. The microcontroller used in the Arduino Nano is Atmega328, the same one as used in Arduino Nano. It has an extended range of applications and is a major microcontroller board because of its small size and flexibility. So, now let's have a look at its basic features:

Embedded System:

An embedded system is a computer system with a committed function within a bigger mechanical or electrical system, often with real-time computing constraints. It is embedded as part of a absolute device frequently including hardware and mechanical parts. Embedded systems run many devices in regular use today. 98 percent of all microprocessors are produced as elements of embedded systems. Examples of properties of typically embedded computers compared with general-purpose counterparts are low power consumption, small size, rugged operating ranges, and low per-unit cost. This comes at the worth of limited processing resources, which make them significantly tougher to program and to interact with. However, by building intellect mechanisms on top of the hardware, taking edge of possible existing sensors and also the extant of a network of embedded units, one can both optimally manage available resources at the unit and network levels also as provide augmented functions, well beyond those available. as an example, intelligent techniques may be designed to manage power consumption of embedded system.

An Embedded system could be a combination of hardware and software. like any electronic system, this technique requires a hardware platform which is constructed with a microprocessor or microcontroller. The Embedded system hardware includes elements like user interface, Input/output interfaces, display and memory, etc. Usually, an embedded system contains power supply, processor, memory, timers, serial transmission ports and system application affiliated circuits.

Embedded Systems are classified into three types supported the performance of the microcontroller like

1. **Small scale embedded systems**
2. **Medium scale embedded systems**
3. **Sophisticated embedded systems**

- **Small Scale Embedded Systems**

These types of embedded systems are designed with a single 8 or 16-bit microcontroller, that may even be activated by a battery. For developing embedded software for small scale embedded systems, the foremost programming tools are an editor, assembler, cross assembler and integrated development environment (IDE).

- **Medium Scale Embedded Systems**

These kinds of embedded systems design with one or 16 or 32-bit microcontroller, RISCs or DSPs. These kinds of embedded systems have both hardware and software complexities. For developing embedded software for medium scale embedded systems, the main programming tools are C, C++, JAVA, Visual C++, RTOS, debugger, source code engineering tool, simulator and IDE.

- **Sophisticated embedded Systems**

These sorts of embedded systems have enormous hardware and software complexities, which will need ASIPs, IPs, PLAs, scalable or configurable processors. they're used for cutting-edge applications that require hardware and software Co-design and components which need to assemble within the final system.

- **Embedded C**

Embedded C is a set of language extensions for the C Programming language by the C Standards committee to address commonality issues that exist between C extensions for different embedded systems. Traditionally, embedded C programming needs nonstandard extensions to the C language in order to support tropical features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations.

In 2008, the C Standards Committee increased the C language to address these issues by providing a common quality for all applications to adhere to. It includes a number of characteristics not available in normal C, such as, fixed-point arithmetic, named address spaces, and basic I/O hardware addressing.

Embedded C uses most of the syntax and semantics of merit C, e.g., main () function, variable definition, datatype declaration, conditional statements (if, switch, case), loops (while, for), functions, arrays and strings, structures and union, bit operations, macros, etc.

V. EXISTING SYSTEM

Gill et al. (2009) describes network enabled digital technology is rapidly established in the home automation. For the intent of home automation this technology introduces new and existing opportunities to increase the connectivity of the devices. The remote-control technology is quickly synchronizing with the growth of Internet.

Upadhyay et. Al. (2016) proposed a Home Indoor Positioning System (HIPS), gives location of mobile devices like smart phones and location comprised of IoT applications. This paper induces home indoor placed system using Wi-Fi signals. In suggested system an intelligent mobile robot automatically builds radio maps for the system.

Shetel and Agarwal (2016) describes in their paper that IoT authorize internet connectivity for all types of devices and physical objects in real time system. The virtualization of this system allows to perform project without direct physical synchronization among the devices. The IoT enables to run multiple jobs without any restriction of distances with the help of intelligent devices and high-speed network.

Lee et al. (2017) describes in their paper the web of physical objects is Internet of Thing which consist the embedded technology helping in constructing machine to machine or man to machine communication. This paper provides a dynamic data sheet about the city territory parameters taken from the stand-alone system.

Chou et al. (2017) describes in their paper a home automated system has remote controlled operation. This paper describes about the problem on their setup, finding out the multiple solutions through different network technologies and trying to improve the use of these system. The Home Automation System (HAS) needs heterogeneous, an eternal and transitive computing environment's careful study to develop the suitable HAS.

Kamal et al. (2017) describes in their paper how this paper used Raspberry Pi as the network gateway. This paper uses MQTT (Message Queuing Telemetry Transport) protocol for sending and receiving the data. All the sensors used in this paper is been managed by the web page executing the Access Control List (ACL) for providing encryption method for the secure transaction of the data's. This paper

makes use of multiple sensors, wired and wireless, are connected with the Raspberry Pi.

Sahadevan et al. (2017) describes in their paper how the Internet of Things is surprisingly affecting the attention of customer and the enterprise electronics market quickly implementing in home automation, smart cities, automated industries, etc. To construct these applications many efficient and low cost sensors are available in the market for the developers. The server side is taking caution of computational work whereas the client side is taking caution of sensor actuator work. This needs robust networking infrastructure over the world. This paper put forward an offline online asynchronous communication course of action for Internet of Things application where Message Queuing Telemetry Transport (MQTT) protocol is used. This paper has conveyed out a portable device system on Intel Galileo which exhibits the chance of such a system without come to an understanding the functionality.

VI. CONCLUSION

In this way as a part of home security purpose it become every essential to deal with home security parameters associated with it. In the proposed system it was cleared that whenever we need a physical parameter when we are not at home this system helps to maintain the security essentials by making use of some Arduino circuit and integrating it with IoT related features. It helps to secure the parameter of your house and maintained the essential need.

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