

Internet of Things (IOT) Based Security System

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I. INTRODUCTION

The proposed system eliminates this and integrates the safety and security system. It also connects these systems through wifi module thus can also alert the owner online, who can then take the desired action. Also the manual operation of the security system is also eliminated maintaining the Integrity of the Specifications

In this present age, safety has become an essential issue for most of the people especially in the rural and urban areas. Some people will try to cheat or steal the property which may endanger the safety of money in the bank, house, and office. To overcome the security threat, a most of people will install bunch of locks or alarm system. There are many types of alarm systems available in the market which utilizes different types of sensor. The sensor can detect different types of changes occur in the surrounding and the changes will be processed to be given out a alert according to the pre-set value.

In this project by using this Smart Security System we can carry out various functions like turning alarms on and off depending on the requirement, check readings of sensors on website and send messages using GSM Module.

It also carries security based functions like ringing the Burglar Alarm on sensing the removal of cash from locker. Arduino board will be connected to Internet and will be sync with laptop. IOT Module is used through which we can access the WiFi network.

A. Findings

The present system is like, the security is not integrated. The various alarms are used individually but are not integrated to work together and make the owner aware about the situation. The various alarms like burglar alarm, fire alarm, motion sensor alarms not integrated together.

II LITERATURE SURVEY

These are some of the existing Smart Security designs that have been implemented-

(a) GSM Based Security System

PIR sensor detects motion by sensing the difference in infrared or radiant heat levels emitted by surrounding objects. The output of the PIR sensor goes high when it detects any motion. The range of a typical PIR sensor is around 6 meters or about 30 feet.

When the PIR sensor detects any motion, the output of the sensor is high. This is detected by the Arduino. Arduino then communicates with the GSM module via serial communication to make a call to the preprogrammed mobile number. An important point to be noted about PIR sensors is that the output will be high when it detects motion.

(b) IR based security alarm system-

IR based security alarm circuit can detect any movement and trigger the alarm. This circuit is very useful in homes, banks, shops, restricted areas where an alert alarm is needed on any movement.

This circuit is based on IR sensor where an IR beam is continuously falling on a photodiode, and whenever this Infrared beam breaks, by any kind of movement, alarm is triggered.

In this IR based security alarm circuit, we have placed IR LED in front of photodiode, so that IR light can directly falls on photodiode. Whenever someone moves through this beam, IR rays stops falling on photodiode and Buzzer start beeping.

Drawback of Existing System

° For proper operation of PIR sensor, it requires a warm up time of 20 to 60 seconds. This is required because, the PIR sensor has a settling time during which it calibrates its sensor according to the environment and stabilizes the infrared detector thus the existing system is not suitable.

° The existing GSM system communicates to the specific mobile number which may not be sufficient as just having a single mode of communication in case of a security or safety issue. Thus there is need of integrating the existing system with internet.

° The present system is like, the security is not integrated. There is no indication while there is any movement in the lockers. And no readings is being noted automatically.

° Usually the technologies that are developed are single dimensional i.e. they are developed either for the purpose of security or for safety. The various alarms are used individually but are not integrated to work together and make the owner aware about the situation.

Therefore there is need of integrating the various alarms like burglar alarm, fire alarm, motion sensor alarms together.

° Such complex systems may be expensive and may not be affordable by everyone. There are individual security systems based on the requirement.

All these drawbacks indicate the firm need of coming up with better systems to tackle the various safety and security concerns in a more efficient, cheaper and smart way.

Proposed System

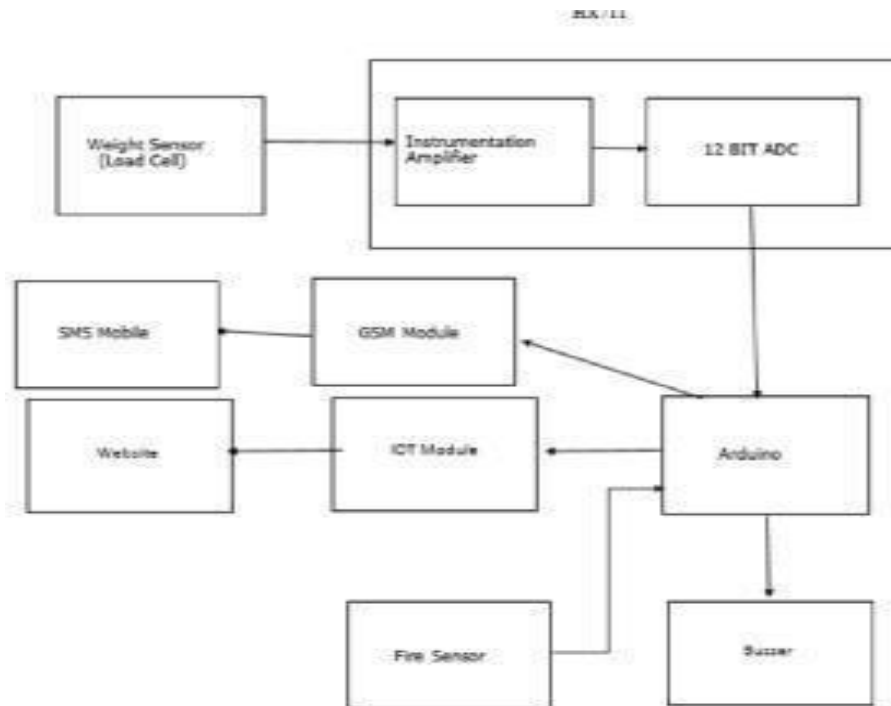
The proposed system eliminates this and integrates the safety and security system. It also connects these systems though IOT module thus can also alert the owner online, who can then take the desired action. Also the manual operation of the security system is also eliminated.

So we are using arduino Uno microcontroller which will be further connected to fire sensor, Wi-Fi module, Instrumentation amplifier which is further connected to weight sensor.

All the weight added or removed in the locker its readings will be displayed on the website which we will connect via IOT module.

Similarly fire sensor is being used if there will be any fire then it will be detected and buzzer will start ringing and it will alert the owner.

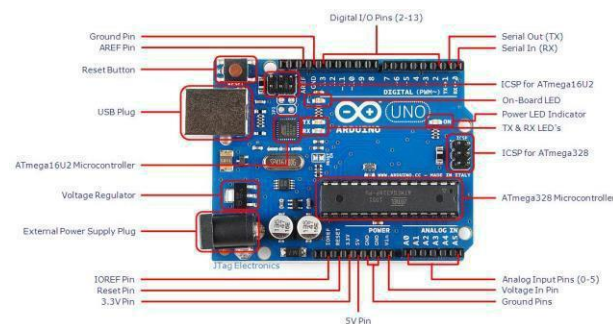
Detailed Design



Requirements

- ┆ ARDUINO circuit board
- ┆ Arduino IDE
- ┆ IOT Module
- ┆ Fire sensor
- ┆ Weight sensor
- ┆ Instrumentation Amplifier
- ┆ Buzzer
- ┆ USB wires
- ┆ Website(Using HTML,CSS,JS,PHP)

Hardware and Software Requirements Arduino Circuit Board



7.3 Instrumentation Amplifier

This module is based on HX711, a 24-bit high precision A/D converter chip designed for electronic scales to measure force, pressure displacement, strain, torque and more

This module features two analog input channels, an internet integrated 128x programmable gain amplifier, and configurable input circuitry to provide a voltage bridge for various applications that require instrumentation measurements.

It is suitable for measuring pressure, weight etc.

Fire Sensor:

A **fire detector** is a sensor designed to detect and respond to the presence of a flame or fire. A fire detector can often respond faster and more accurately than a smoke or heat detector due to the mechanisms it uses to detect the fire.

Weight Sensor

This Weight Sensor amplifier is based on HX711, which consist of an amplifier and a precision 24-bit analog-to-digital convertor designed for weigh scale and industrial control applications to interface directly with a bridge sensor. Compared with other chips, HX711 not only has a few basic function, also contains high integration, fast response, immunity, and other features. The chip lowered the cost of the electronic scale, at the same time, improving the performance and reliability.

The input interface of this weight sensor module is used sensor interface, which is compatible with Arduino I/O ports. The output adopts compact terminal that makes weight sensor module easier to connect the weight sensor. It's the best choose for electronic enthusiast to do some tiny home scale.



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Functional Requirements

Product Perspective- The objective of project is to build a safety and security system that carries out various functions, like remotely controlling and checking the status of devices connected in the banks like fire alarm, Burglar Alarm etc using Arduino Uno.

Product features- The proposed system eliminates this and integrates the safety and security system. It also connects these systems though Wi-Fi module thus can also alert the owner online, who can then take the desired action. Also the manual operation of the security system is also eliminated.

So we are using arduino Uno microcontroller which will be further connected to fire sensor, Wi-Fi module, Instrumentation amplifier which is further connected to weight sensor.

All the weight added or removed in the locker its readings will be displayed on the website which we will connect via IOT module

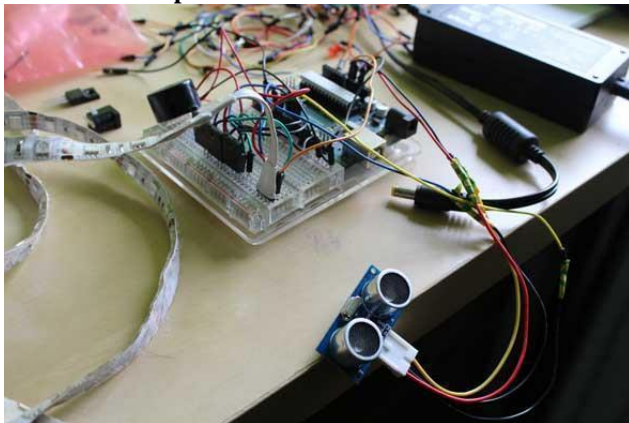
Similarly fire sensor is being used if there will be any fire then it will be detected and buzzer will start ringing and it will alert the owner.

Assumption & Dependencies-

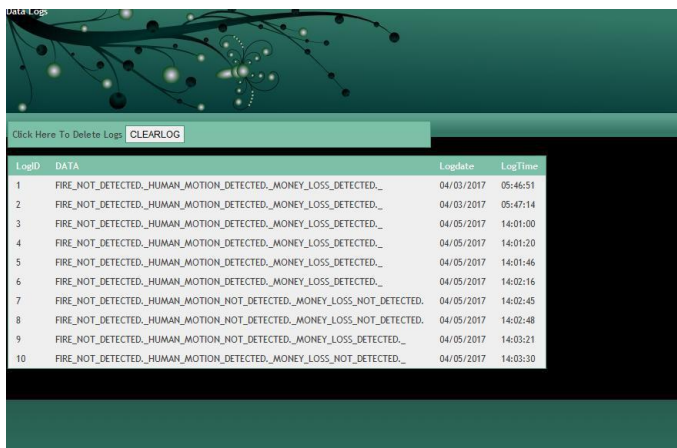
1. Suitable installation system in the prototype
2. Hardware is properly configured and set up
3. Appropriate net connection to view it in website

SNAPSHOTS-

1. Hardware Setup



2. Website



LogID	DATA	LogDate	LogTime
1	FIRE_NOT_DETECTED_HUMAN_MOTION_DETECTED_MONEY_LOSS_DETECTED_	04/03/2017	05:46:51
2	FIRE_NOT_DETECTED_HUMAN_MOTION_DETECTED_MONEY_LOSS_DETECTED_	04/03/2017	05:47:14
3	FIRE_NOT_DETECTED_HUMAN_MOTION_DETECTED_MONEY_LOSS_DETECTED_	04/05/2017	14:01:00
4	FIRE_NOT_DETECTED_HUMAN_MOTION_DETECTED_MONEY_LOSS_DETECTED_	04/05/2017	14:01:20
5	FIRE_NOT_DETECTED_HUMAN_MOTION_DETECTED_MONEY_LOSS_DETECTED_	04/05/2017	14:01:46
6	FIRE_NOT_DETECTED_HUMAN_MOTION_DETECTED_MONEY_LOSS_DETECTED_	04/05/2017	14:02:16
7	FIRE_NOT_DETECTED_HUMAN_MOTION_NOT_DETECTED_MONEY_LOSS_NOT_DETECTED.	04/05/2017	14:02:45
8	FIRE_NOT_DETECTED_HUMAN_MOTION_NOT_DETECTED_MONEY_LOSS_NOT_DETECTED.	04/05/2017	14:02:48
9	FIRE_NOT_DETECTED_HUMAN_MOTION_NOT_DETECTED_MONEY_LOSS_DETECTED_	04/05/2017	14:03:21
10	FIRE_NOT_DETECTED_HUMAN_MOTION_DETECTED_MONEY_LOSS_NOT_DETECTED_	04/05/2017	14:03:30



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Pseudo Code-

Example code of Arduino-

```
/*  
  
//IOT based safety and security system Flame - A0  
  
PIR - A1 LOAD Cell - A2 IoT - 10 & 11  
  
*/  
  
#include<SoftwareSerial.h> SoftwareSerial IoTSerial(10,11); #define ledPin 13  
#define Buzzer 12  
  
const int Flame = A0; // pin that the sensor is attached to const int PIR =  
A1; const int Load = A2;  
  
int sensePin = 2; int i=0;  
  
int BluetoothData;  
  
char fd[]="FIRE DETECTED. !";  
  
char fnd[]="FIRE NOT DETECTED. !";  
  
char hd[]="HUMAN MOTION DETECTED. !";  
  
char hnd[]="HUMAN MOTION NOT DETECTED. !"; char ml[]="MONEY LOSS DETECTED. !";  
char mnl[]="MONEY LOSS NOT DETECTED. !";  
  
void setup()  
  
{  
  
  pinMode(ledPin, OUTPUT); pinMode(Buzzer, OUTPUT);  
  
  Serial.begin(9600);  
  
  IoTSerial.begin(9600);  
  
  IoTSerial.println(" ARDUINO BANK SECURITY S/M:"); delay(200);  
  
  // initialize timer1  
  
  noInterrupts();    // disable all interrupts  
  
}  
  
void loop()  
  
{  
  
  char x;  
  
  int FValue = analogRead(Flame); delay(2);  
  
  int PValue = analogRead(PIR); delay(2);  
  
  int LValue = analogRead(Load); delay(2);
```



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Serial.println("F=");



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```
Serial.print(FValue);
Serial.println("P=");

Serial.print(PValue);

Serial.println("L=");

Serial.print(LValue);
delay(20000);

// if the analog value is high enough, turn on the LED: if ((FValue < 100) || (PValue > 500) || (LValue < 100) )
{
    digitalWrite(ledPin, HIGH); digitalWrite(Buzzer, HIGH);
}

else
{
    digitalWrite(ledPin, LOW); digitalWrite(Buzzer, LOW);
}

IoTSerial.write('*');

Serial.write('*');
delay(200);

if(FValue<100)
{
for(i=0;fd[i]!='!';i++)
{
    IoTSerial.write(fd[i]);

    Serial.write(fd[i]);

    delay(200);
}
}

else
{
for(i=0;fnd[i]!='!';i++)
{
    IoTSerial.write(fnd[i]);

    Serial.write(fnd[i]);

    delay(200);
}
}
```



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}

Results-

Performance Metrics-

- Security and safety measures included
- Business financial impact
- Business performance measure impact
- Milestones completed on-time
- Milestones completed on-budget Results Obtained-

The module works and some more features can be added later which will improve it further. The project accomplishes what the objective of the project.

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