

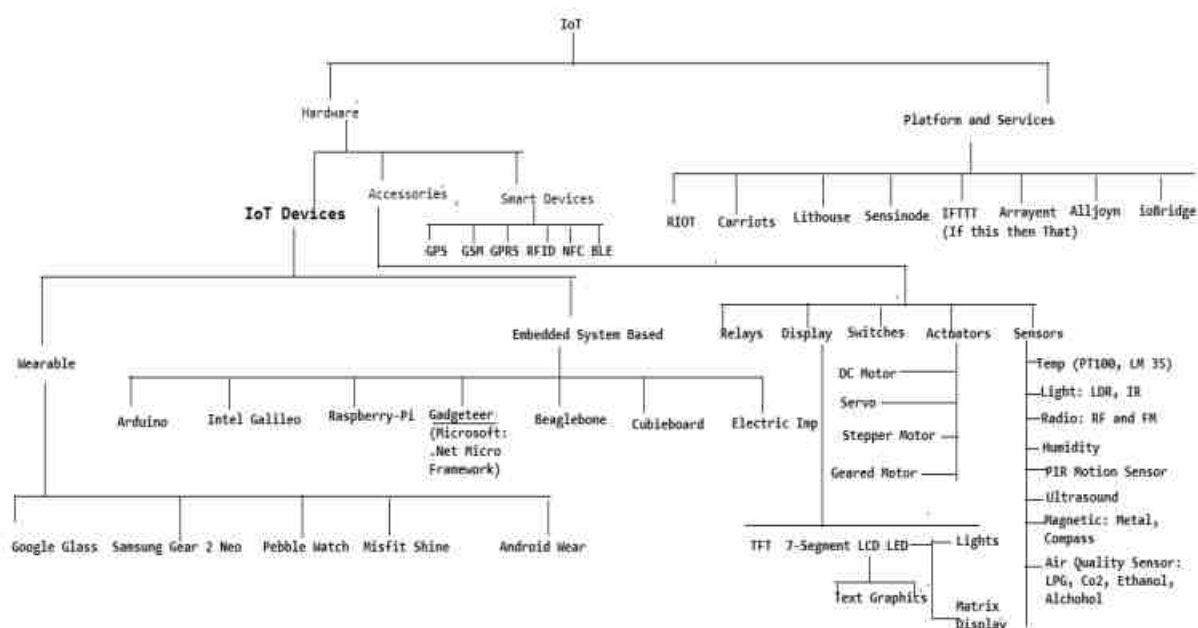
Agrim Nautiyal

Dear Student,

An IoT project is assigned to each one of you, study and analyse the project, prepare a detailed report to explain the sensors/devices used, connectivity methods established, its platform for data processing, and user interface. **Deadline for online submission of report is 26<sup>th</sup> October, 2018.** Please find the following table for respective question.

Reg. No.	Question No.
16BCB0030	1
17BCB0012	2
17BCB0026	3
16BCE0212	4
16BCE0239	5
16BCE0401	6
16BCE0428	7
16BCE0474	8
16BCE0581	9
16BCE0667	10
16BCE0949	11
16BCE2006	12
16BCE2011	13
16BCE2028	14
16BCE2080	15
16BCE2143	16
16BCE2213	17
16BCE2291	18
16BCE2296	19
17BCE0048	20
17BCE0093	21
17BCE0232	22
17BCE0246	23
17BCE0302	24
17BCE0374	25
17BCE0420	26
17BCE0578	27
17BCE0634	28
17BCE0662	29
17BCE0684	30
17BCE0744	1
17BCE0862	2
17BCE0875	3
17BCE2041	4
17BCE2046	5

17BCE2245	6
17BCE2319	7
17BCE2320	8
17BCE2346	9
17BCE2407	10
16BCI0111	11
17BCI0125	12
17BCI0194	13
17BEC0051	14
17BEC0141	15
17BEC0240	16
17BEC0393	17
17BEC0578	18
17BEC0884	19
16BEE0104	20
16BEE0143	21
17BEE0014	22
17BEE0047	23
17BEE0100	24
16BEI0071	25
17BIS0114	26
17BIT0201	27
16BME0981	28
17BME0573	29
17BME0711	30



**Fig. 1. IoT Devices and Technologies**

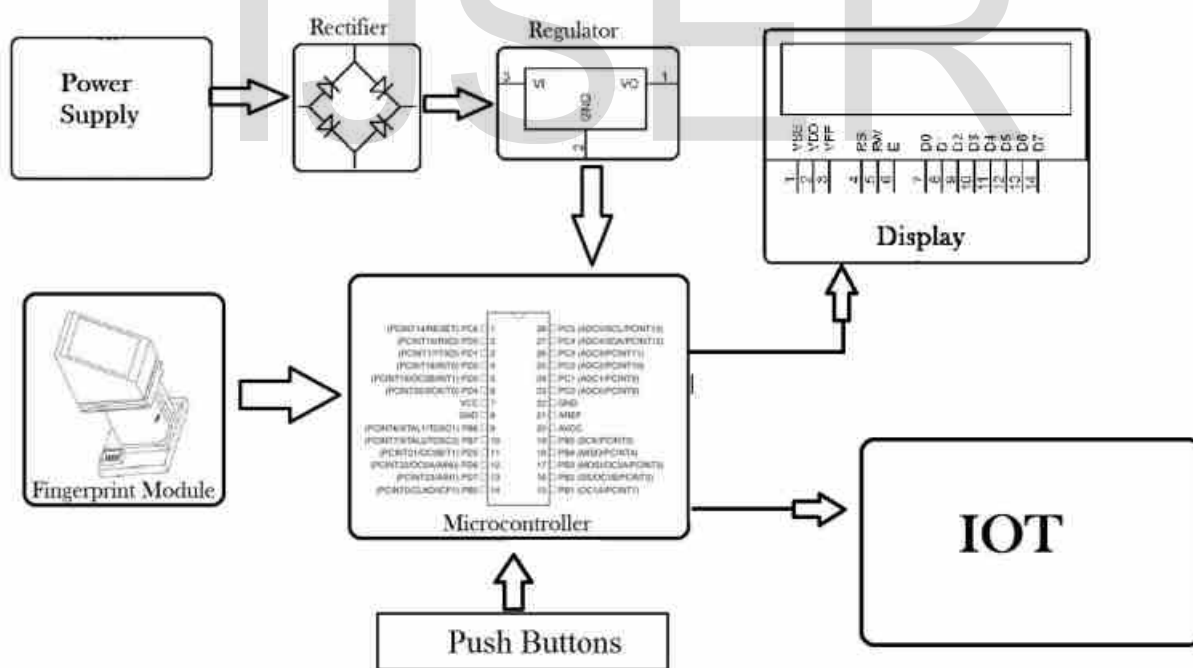


**Fig. 2. IoT Platform**

# 1. Biometric Attendance System over IOT

Here we propose a smart fingerprint based biometric attendance system that works over IOT so that attendance can be monitored from anywhere in the world. Our system uses a microcontroller based circuit with fingerprint sensor, push buttons, power supply, power supply and wifi modem to interact with internet based system. We here use IOTGecko to develop the online attendance display system. Our system allows users/employees/students to first register their fingerprint on the system. After successful registration the print is stored in system with class assigned using push buttons. The system also displays these details over LCD display. Now as soon as the next time a registered user scans the modem, the system checks for authentication and authenticated users data is transferred online to IOTGecko using the gecko development API codes. Now the online system stores and displays the required data to users as per online login. Thus our system allows for remote monitoring of biometric based attendance from anywhere over IOT.

## Block Diagram:



### **Hardware Specifications**

- ATmega328P AVR MC- Buy ATmega328P Online
- R305 Fingerprint Sensor -Buy Fingerprint Sensor Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- Buzzer- Buy Buzzer Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

### **Software Specifications**

- Python compiler
- Programming Language: Python
- IOTGecko

IJSER

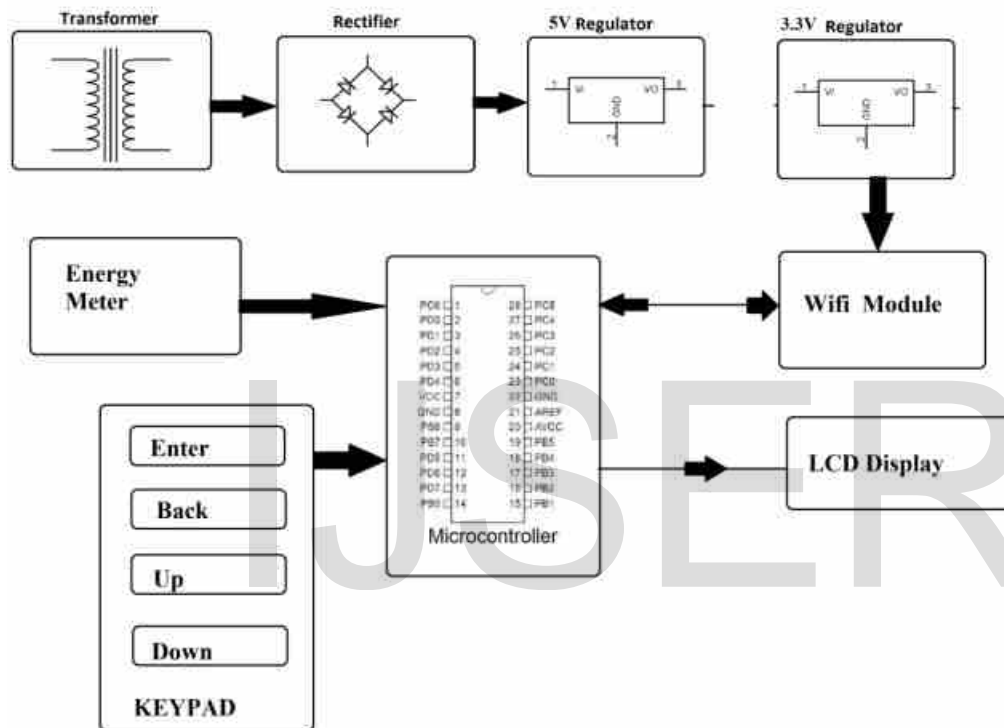
## 2. Energy Meter Monitoring Over IOT

Monitoring and keeping tracking of your electricity consumption for verification is a tedious task today since you need to go to meter reading room and take down readings. Well it is important to know if you are charged accordingly so the need is quite certain.

Well we automate the system by allowing users to monitor energy meter readings over the internet. Our proposed system uses energy meter with microcontroller system to monitor energy usage using a meter.

The meter is used to monitor units consumed and transmit the units as well as cost charged over the internet using Wi-Fi connection. This allows user to easily check the energy usage along with the cost charged online using a simple web application. Thus the energy meter monitoring system allows user to effectively monitor electricity meter readings and check the billing online with ease.

## Block Diagram:



## Hardware Specifications

- Energy Meter
- Lamp
- ATmega328P AVR MC- Buy ATmega328P Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- LCD's – Buy LCD Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

## Software Specifications:

- Arduino Compiler
- MC Programming Language: C
- IOTGecko

## Reference

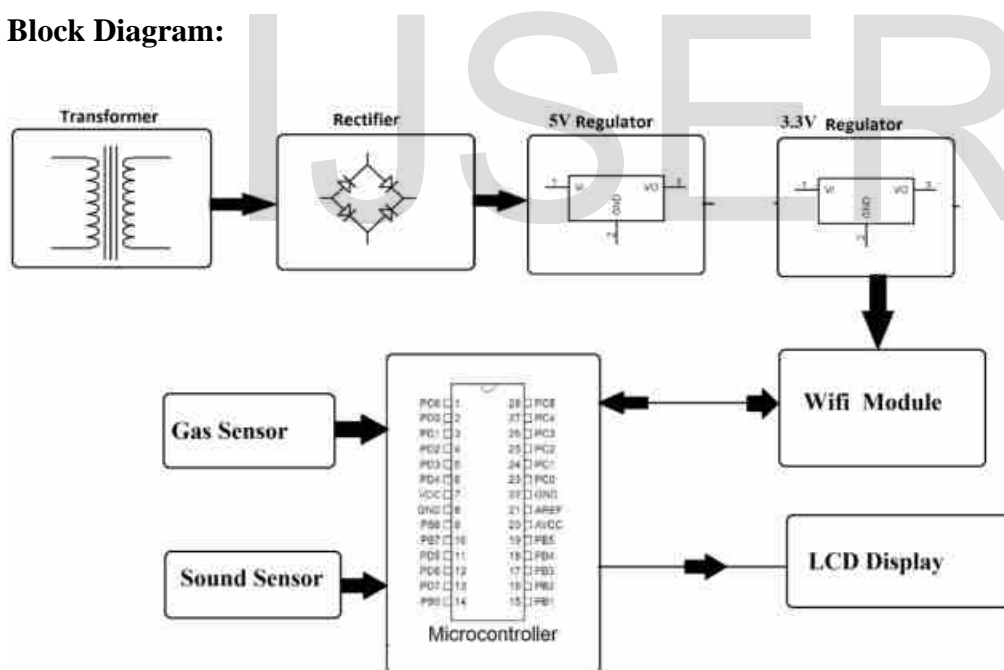
- <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7300834&queryText=meter%20iot&newsearch=true>
- <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6804465&queryText=meter%20iot&newsearch=true>



### 3. IOT Air & Sound Pollution Monitoring System

Air and sound pollution is a growing issue these days. It is necessary to monitor air quality and keep it under control for a better future and healthy living for all. Here we propose an air quality as well as sound pollution monitoring system that allows us to monitor and check live air quality as well as sound pollution in a particular areas through IOT. System uses air sensors to sense presence of harmful gases/compounds in the air and constantly transmit this data to microcontroller. Also system keeps measuring sound level and reports it to the online server over IOT. The sensors interact with microcontroller which processes this data and transmits it over internet. This allows authorities to monitor air pollution in different areas and take action against it. Also authorities can keep a watch on the noise pollution near schools, hospitals and no honking areas, and if system detects air quality and noise issues it alerts authorities so they can take measures to control the issue.

**Block Diagram:**



## Hardware Specifications

- ATmega328P AVR MC- Buy ATmega328P Online
- MQ 135 Sensor – Buy Air Quality Pollution Sensor Online
- Mic Sensor -Buy Sound Sensor Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

## Software Specifications:

- Arduino Compiler
- MC Programming Language: C

## Reference

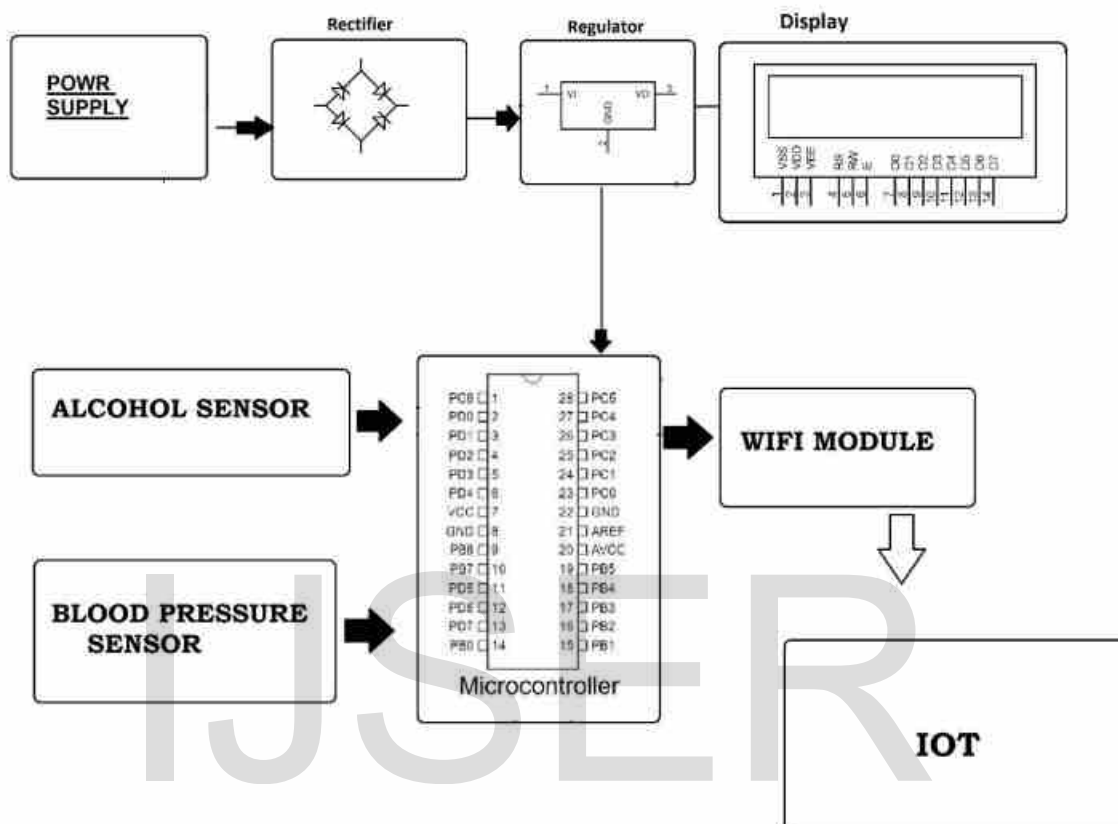
- <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7361361&queryText=iot%20pollution&newsearch=true>

## 4. IOT Alcohol & Health Monitoring System

Factories, Offices, Hospitals, Military and other such industries need to monitor their staff/personnel follow all work ethics that include, not coming to premises under the influence of alcohol or under bad health conditions. This ensures proper work ethics are followed. So our proposed system allows for alcohol & health monitoring plus reporting system that monitors this and reports it to concerned personnel remotely over internet. Our system consists of an IOT based circuit system that uses a microcontroller based circuit system. The system has alcohol as well as blood pressure monitoring sensors to check for alcohol consumption as well as inappropriate blood pressure monitoring. This ensures no occurrences of accidents due to alcohol influence or bad health conditions.

IJSER

## Block Diagram :



## Hardware Specifications

- ATmega328P AVR MC- Buy ATmega328P Online
- Blood Pressure Sensor
- MQ 3 Alcohol Ethanol Sensor – Buy MQ3 Sensor Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online

- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

**Software Specifications :**

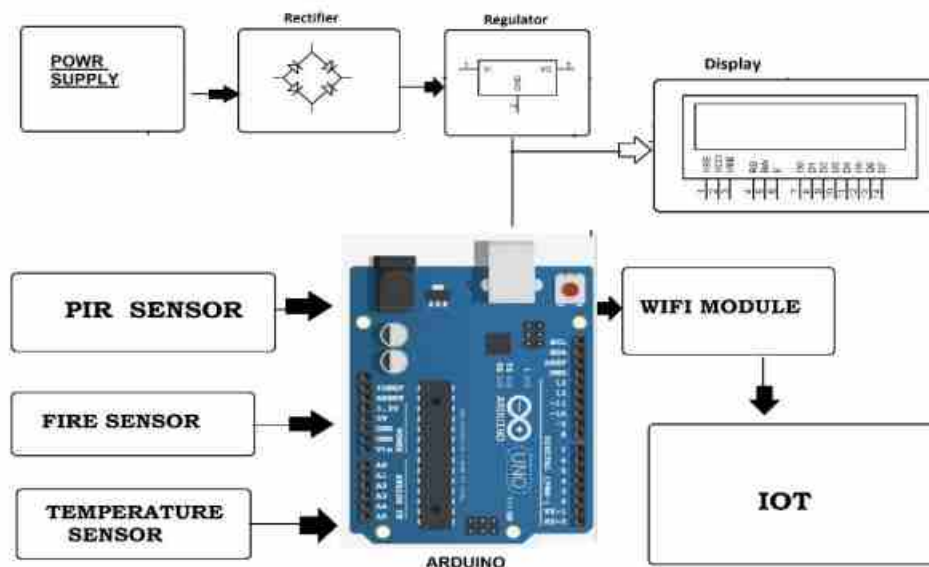
- Arduino Compiler
- MC Programming Language: C

IJSER

## 5. IOT Based Fire Department Alerting System

Fires are one of the most widespread cause of deaths by accident. Instant alerting to the fire department is necessary to ensure immediate action. Every minute can save many lives in such situations. So here we propose an IOT based automatic fire department alerting system that instantly and automatically alerts the fire department and informs about the situation so that immediate action can be taken. The system uses Fire sensor along with PIR sensor to efficiently detect fires and alert fire department over IOT. We use an arduino uno in order to check if a sensor is triggered. Then it reconfirms if it really is a fire outbreak using temperature sensors in order to confirm of fire outbreak. The system now uses a wifi connection to access IOT server and transmit data about this incident over internet. We here use IOTGecko platform to develop the web based IOT interface. As soon as IOTGecko system receives the sensor data it checks the device id data was sent from and displays device id(which will be named after area/flat id). The system now displays the fire incident with alarm buzzer in the fire department over internet so that the fire department personnel are alerted about the incident to take necessary action.

**Block Diagram:**



## Hardware Specifications

- Arduino Uno R3 – Buy Arduino Uno R3 Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- PIR Sensor Module – Buy PIR Sensor Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

## Software Specifications:

- Arduino Compiler
- MC Programming Language: C

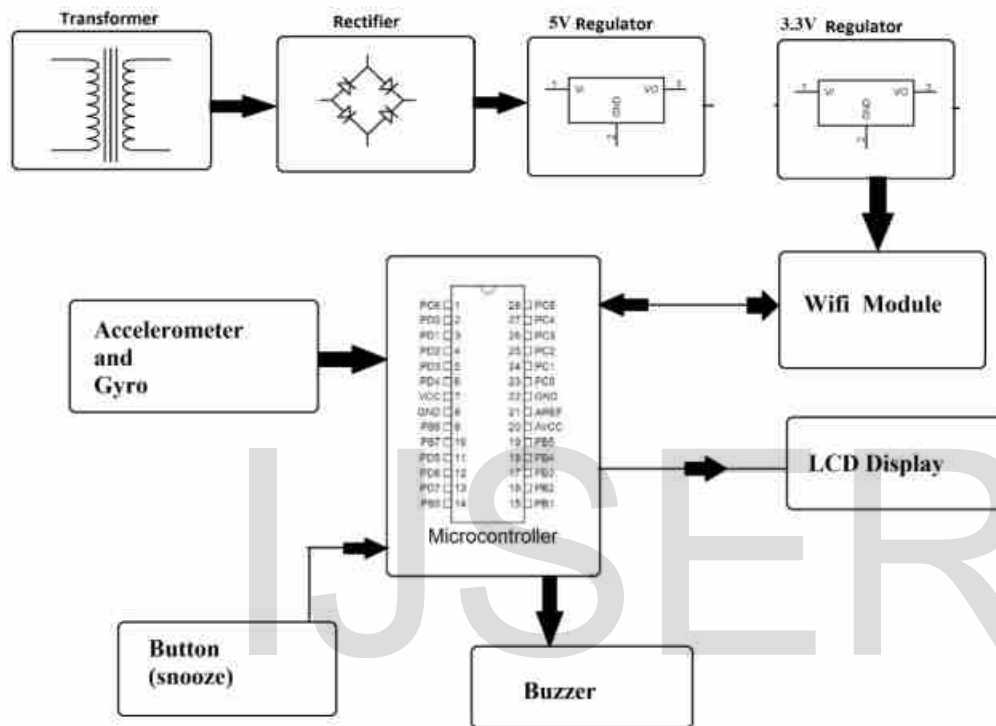
## 6. IOT Based Person/Wheelchair Fall Detection

When it comes to old age, it becomes necessary to monitor our old ones for their health and safety. Due to weakness and weak joints they have a great risk of falling down. Now it is important to know if an old age person has fallen so that he/she can be helped on time. Also people on wheelchair need to be checked for fall detection. For this purpose we propose a smart fall detection system. The system uses accelerometer and gyro sensor to detect person movements, It can be mounted on persons hand or wheelchair for detection. The sensor is connected to a microcontroller in order to constantly transmit the acceleration data. Now the system keeps monitoring for fall detection and abrupt movement changes in person. A sudden abrupt change with jerk in the system is treated as a fall. Now in case the person did not fall and alarm was false, the system allows to snooze the alert if person presses snooze button in 5 seconds. If person does not press the snooze, system detects person has fallen and automatically triggers alert through Wi-Fi connection to alert the loved ones of the person about the situation instantly.

IJSER



## Block Diagram:



## Hardware Specifications

- Accelerometer & Gyro – Buy MPU6050 Sensor Online
- ATmega328P AVR MC- Buy ATmega328P Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- LCD's – Buy LCD Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

## Software Specifications:

- Arduino Compiler
- MC Programming Language: C
- IOTGecko

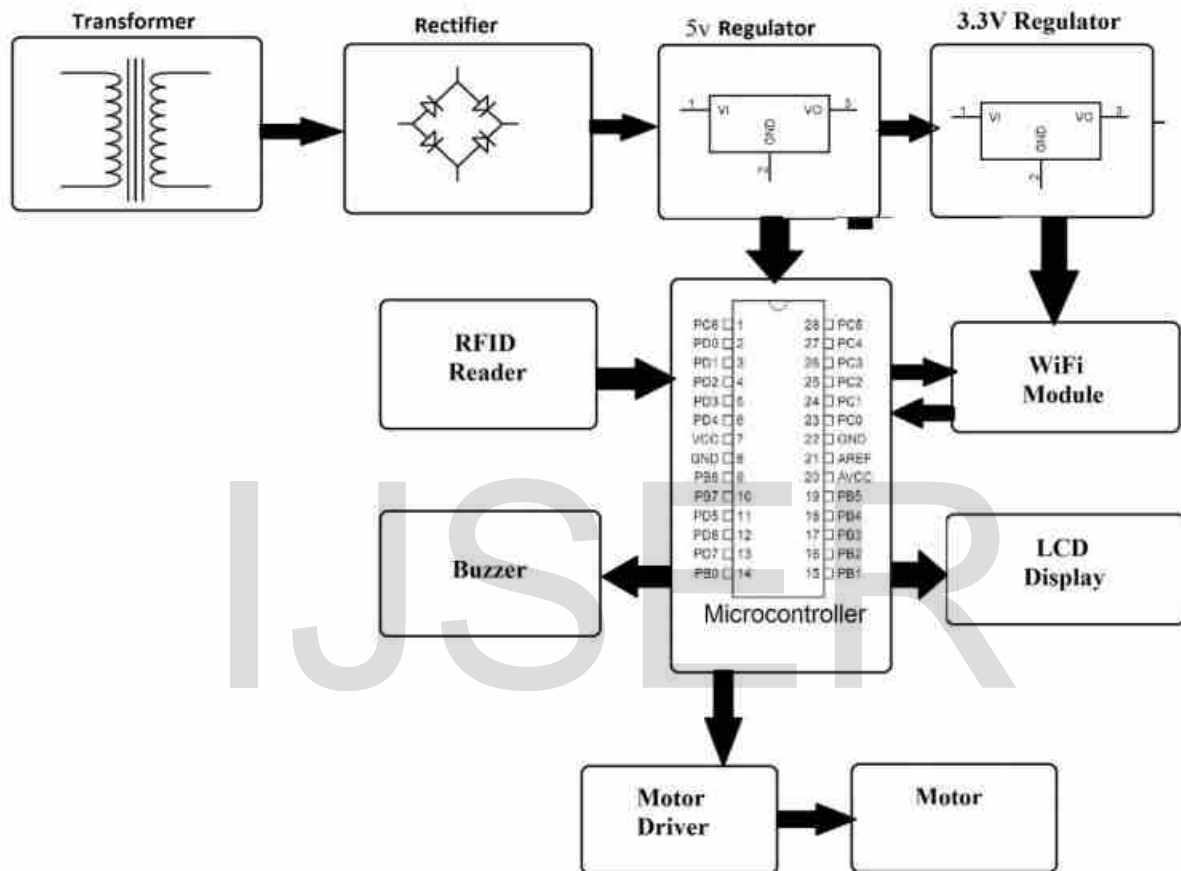
## Reference

- <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7479018&queryText=iot%20elderly&newsearch=true>

## **7. IOT Based Toll Booth Manager System**

Managing multiple toll booths is a very complicated task. We here propose a smart card based toll booth system that is monitored over IOT. The Internet server maintains all the data of user accounts and also their balance. All vehicle owners would possess an RFID based card that stores their account number. Our system at toll booths will monitor the cards scanned when a car arrives at the toll booth. The system now connects to the online server to check if the card is valid and if valid what is the balance. If user balance is sufficient, the user balance is deducted online and web system sends signal back to the card scanner system that the user has been billed. On receiving this signal the system operates a motor to open the toll gate for that car. The system is controlled by a microcontroller to achieve this purpose. The microcontroller uses Wi-Fi connection to connect to the internet through which system interacts with web server to perform the online verification process. Also system allows to store data of all the vehicles passed at particular time intervals for later reference and surveillance. This system thus automates the entire toll booth collection and monitoring process with ease using RFID plus IOT based system.

## Block Diagram:



## Hardware Specifications

- ATmega328P AVR MC- Buy ATmega328P Online
- RFID Module & Cards – Buy RFID Module Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Buzzer- Buy Buzzer Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

## Software Specifications:

- Arduino Compiler
- MC Programming Language: C
- IOTGecko

## Reference

- <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7525700&queryText=iot%20toll&newsearch=true>

## 8. IOT Car Parking System

Car parking is a major issues in modern congested cities of today. There simply are too many vehicles on the road and not enough parking space. This has led to the need for efficient parking management systems. Thus we demonstrate the use of IOT based parking management system that allows for efficient parking space utilization using IOT technology. To demonstrate the concept we use IR sensors for sensing parking slot occupancy along with a dc motors to simulate as gate opener motors. We now use a wifi modem for internet connectivity and an AVR microcontroller for operating the system. We use IOTGecko for online connectivity and IOT management GUI design. The system detects if parking slots are occupied using IR sensors. Also it uses IR technology to sense if a vehicle has arrived on gate for automated gate opening. The system reads the number of parking slots available and updates data with the cloud server to allow for checking parking slot availability online. This allows users to check for available parking spaces online from anywhere and avail hassle free parking. Thus the system solves the parking issue for cities and get users an efficient IOT based parking management system.

### Hardware Specifications

- 7x IR sensors
- DC motors
- Atmega Microcontroller
- LCD Display
- Power Supply
- Wifi Modem
- IC's
- Resistors
- Capacitors
- LED's
- Diodes

### **Software Specifications**

- Arduino Compiler
- MC Programming Language: C
- IOTGecko

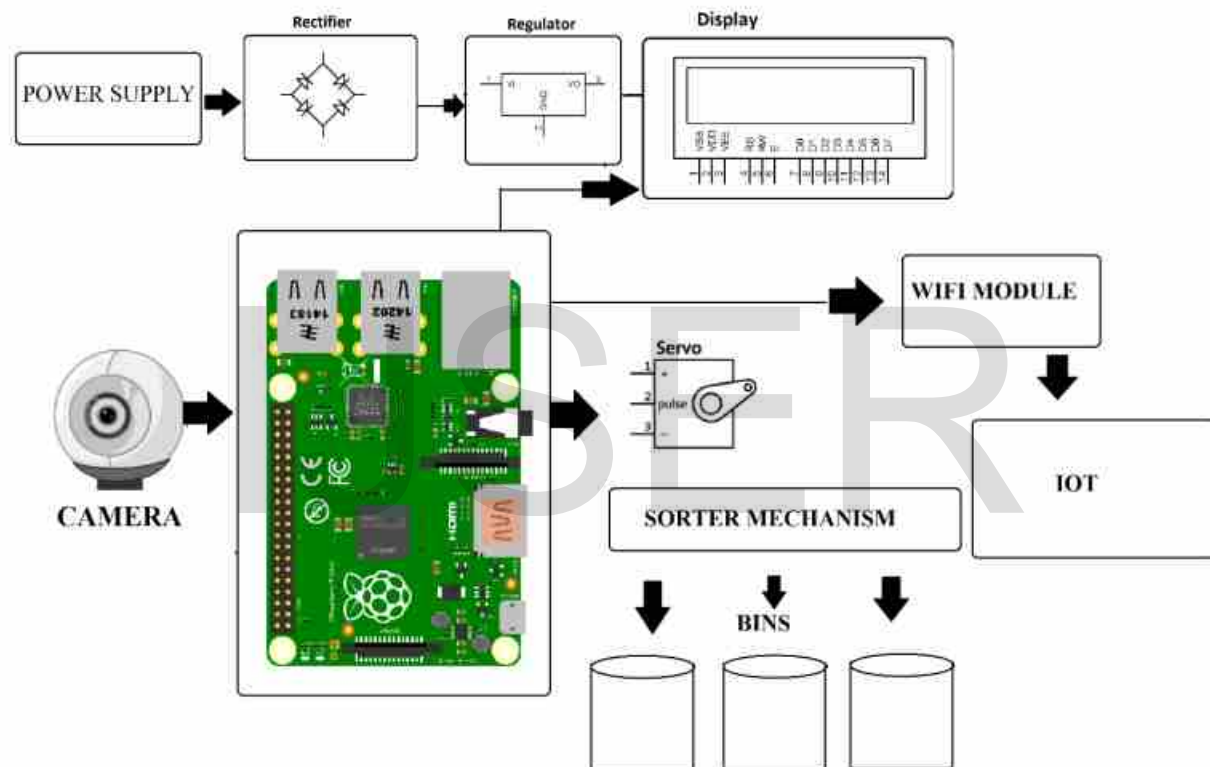
IJSER

## 9. IOT Color Based Product Sorting Machine

Color Based Object Sorting has a wide usage in fruit sorting as well as candy sorting industries. This system puts forward a mechanism to detect color and sort items through image processing. Once identified a mechanism is used to sort the candies into particular bins baskets. We here demonstrate this mechanism using a camera with electronic circuitry along with sorting mechanism using 3 bins. The system uses raspberry pi connected to a controller circuit to achieve this task. The controller circuit consists of a camera attached to it that detects color of a small object in front of it. A motor is used to feed an object to the camera chamber. As soon as the color is detected a signal is sent to the sorter mechanism which uses a motor to position the sorting tube towards respective section. A feeder is then used to push the object towards the tubs so that it gets sorted and next object is pulled in by the feeder. The action details are sent to the IOT server using iotgecko platform to keep track of the number of objects sorted in each section. Thus we achieve a completely automated IOT based sorting system.



## Block Diagram:



## Hardware Specifications

- Raspberry Pi 3 – Buy Raspberry Pi 3 Online
- Camera
- Servo Motor – Buy Servo Motors Online
- LCD's – Buy LCD Online

- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online
- Connector Shaft
- Bed Frame
- Tubes
- Screws & Joints
- Supporting Frame

### **Software Specifications:**

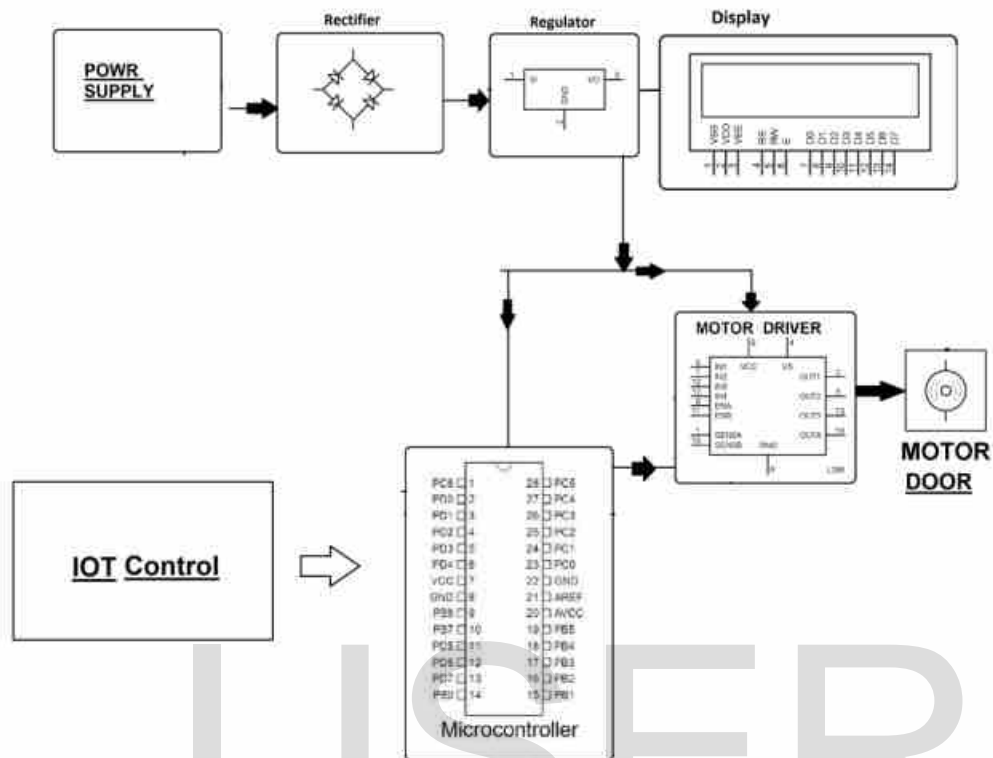
- Programming Language: Python
- IOTGecko

IJSER

## 10. IOT Electronic Door Opener

There has been a need of controlling Electronic doors remotely for automation and security purposes. This project tries to fulfill the same using the IoT technology implementation over the electronic door lock making it a super advanced door opener cum locking system. The objective of achieving automation and security is simultaneously achieved using web connectivity of the project with IoT Gecko website. IOT Based Electronic Door Opener Project is controlled by ATmega family microcontroller. The project communicates over internet using WiFi module. We use a demo model of door as shown in the video. On the IOTGecko website once the authorized person logs in he/she gets a direct access of the door to open or close it, no matter how far the door is physically from him/her. When a command of opening the door is received from the web interface the controller instructs the relevant drivers to start the motor of the door in a particular direction till the door fully opens and then stop. Likewise, when the system receives the command to close the door the controller instructs the drivers of the motor rotate in counter direction till the door fully closes. In this way the automatization and security is achieved using this project which gives access of the door authorized person even though they are physically present at some remote location from the door.

## Block Diagram



## Hardware Specifications

- ATmega328P AVR MC- Buy ATmega328P Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- Mini Motorized Door
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

### **Software Specifications**

- Arduino Compiler
- MC Programming Language: C
- IOTGecko

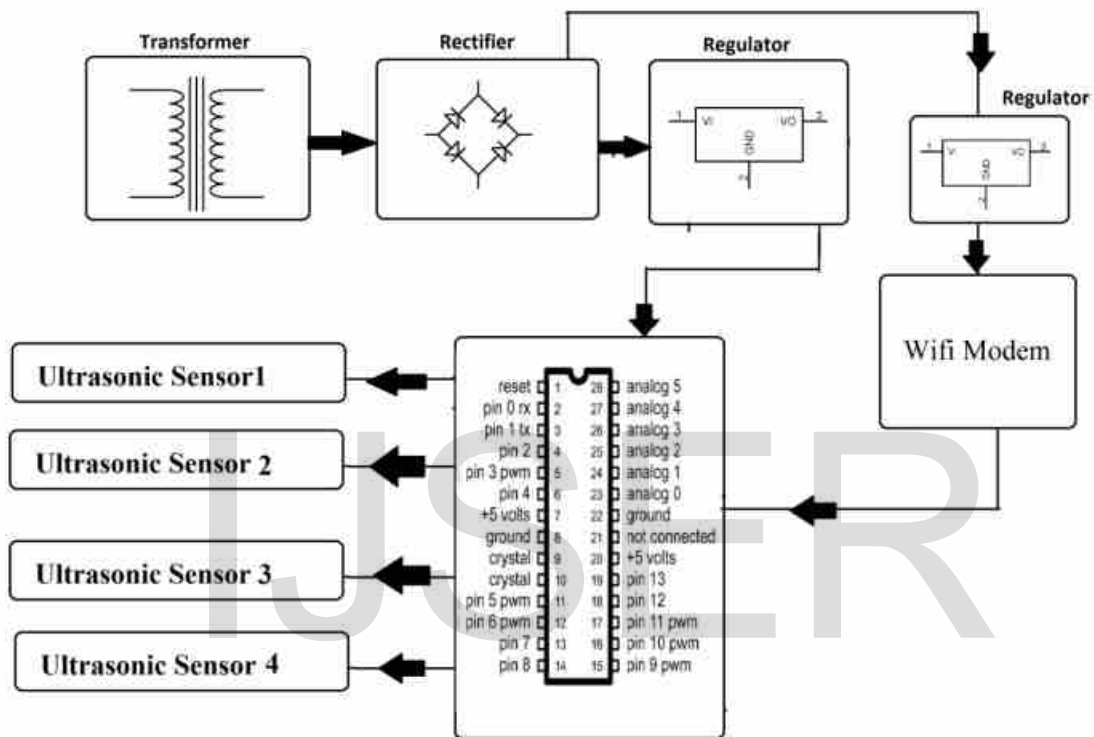
IJSER

## 11. IOT Garbage Monitoring System

This project IOT Garbage Monitoring system is a very innovative system which will help to keep the cities clean. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins via a web page. For this the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. The system makes use of AVR family microcontroller, LCD screen, Wi-Fi modem for sending data and a buzzer. The system is powered by a 12V transformer. The LCD screen is used to display the status of the level of garbage collected in the bins.

Whereas a web page is built to show the status to the user monitoring it. The web page gives a graphical view of the garbage bins and highlights the garbage collected in color in order to show the level of garbage collected. The LCD screen shows the status of the garbage level. The system puts on the buzzer when the level of garbage collected crosses the set limit. Thus this system helps to keep the city clean by informing about the garbage levels of the bins by providing graphical image of the bins via a web page.

## Block Diagram:



### **Hardware Specifications**

- ATmega328P AVR MC- Buy ATmega328P Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- HC-SR04 Ultrasonic – Buy Ultrasonic Sensor Online
- LCD's – Buy LCD Online
- Buzzer- Buy Buzzer Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

### **Software Specifications**

- Arduino compiler
- IOTGecko
- MC Programming Language: Embedded C

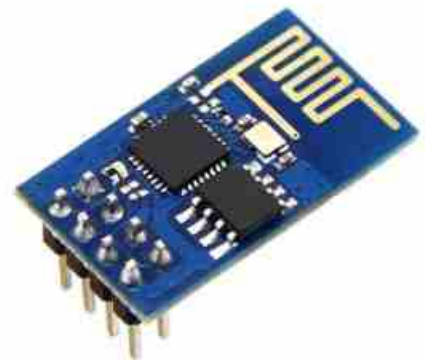


### WIFI Modem:

- The ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware. The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.
- This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts.
- There is an almost limitless fountain of information available for the ESP8266, all of which has been provided by amazing community support. In the Documents section below you will find many resources to aid you in using the ESP8266, even instructions on how to transforming this module into an IOT (Internet of Things) solution!
- Note: The ESP8266 Module is not capable of 5-3V logic shifting and will require an external Logic Level Converter. Please do not power it directly from your 5V dev board.

### Features:

- 802.11 b/g/n
- Wi-Fi Direct (P2P), soft-AP
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLLs, regulators, DCXO and power management units
- +19.5dBm output power in 802.11b mode
- Power down leakage current of <10uA
- 1MB Flash Memory
- Integrated low power 32-bit CPU could be used as application processor
- SDIO 1.1 / 2.0, SPI, UART
- STBC, 1×1 MIMO, 2×1 MIMO
- A-MPDU & A-MSDU aggregation & 0.4ms guard interval
- Wake up and transmit packets in < 2ms
- Standby power consumption of < 1.0mW (DTIM3)



## Reference

- <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7264372&newsearch=true&queryText=iot%20garbage>

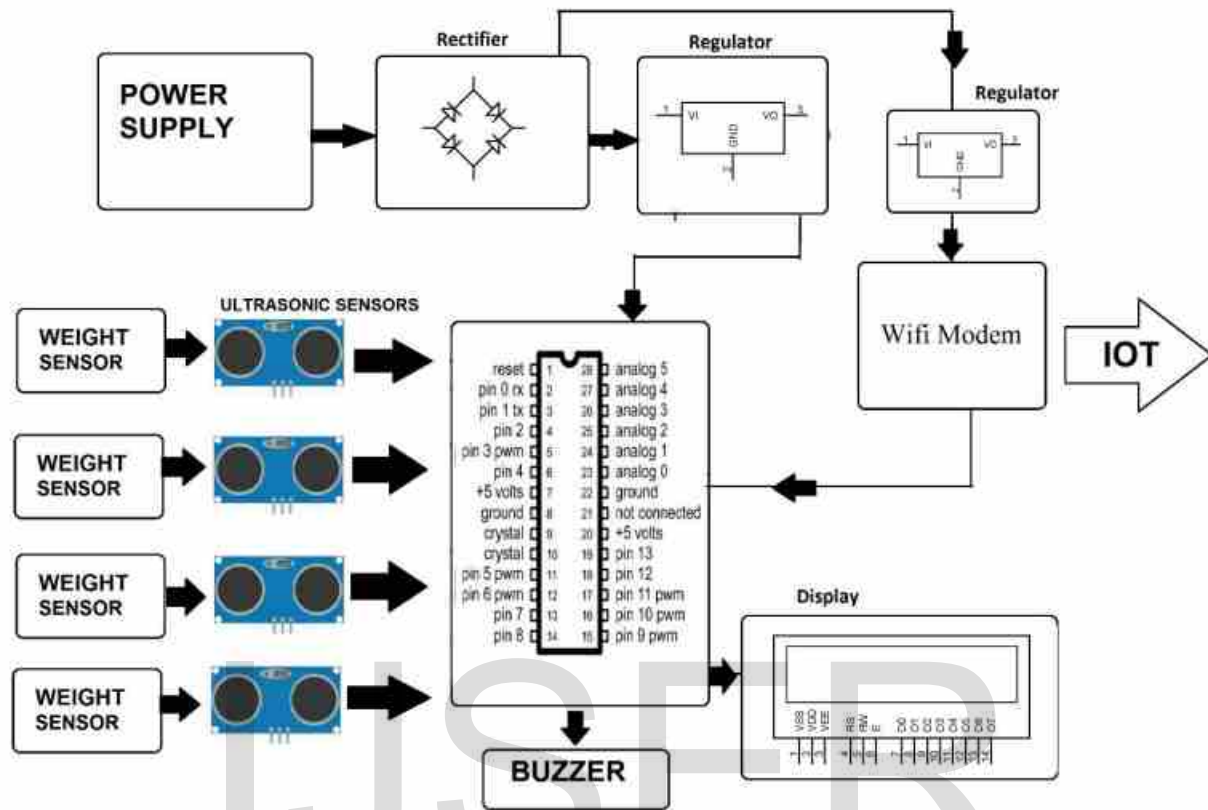
IJSER

## 12. IOT Garbage Monitoring With Weight Sensing

Keeping the city clean has been always an ongoing task which needs laborious efforts of people working on ground level emptying the garbage bins whenever they are full. The event of garbage bin getting full is not strictly dependent on a time pattern, instead it sometimes becomes rapidly full or sometimes requires more than normal time to become full. IOT Garbage Monitoring with Weight Sensing project is an innovative step towards making this process more smooth and efficient.

This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins via a web page. For this the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. In addition, we also have weight sensors attached below the garbage bins. Thus the system sends over the internet the level of fill of the garbage bins as well as the weight of the fill of the garbage bins. The advantage of this combo sensing is that the garbage bin lifting weight can also be known by the authorities. If the garbage bin is not filled up, but still the weight of fill has reached the limit of what the garbage lifting vehicles can pick up, the vehicles can be immediately driven towards that bin for evacuation. The system makes use of AVR family microcontroller, LCD screen, Wifi modem for sending data and a buzzer. The system is powered by a 12V transformer. The LCD screen is used to display the status of the level and weight of garbage collected in the bins. Whereas a web page is built to show the status to the user monitoring it. The web page gives a graphical view of the garbage bins and highlights the garbage collected in colour in order to show the level of garbage collected. Also the weight of the individual bins will get displayed along with the level of the garbage bin. The LCD screen shows the status of the garbage level. The system puts on the buzzer when the level of garbage collected crosses the set limit. Thus this system helps to keep the city clean by informing about the garbage levels of the bins by providing graphical image of the bins via IOT Gecko web development platform.

## Block Diagram :



## Hardware Specifications

- ATmega328P AVR MC- Buy ATmega328P Online
- HC-SR04 Ultrasonic – Buy Ultrasonic Sensor Online
- Weight Sensor – Buy Weight Sensor Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- Buzzer- Buy Buzzer Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online

- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

### **Software Specifications**

- Arduino Compiler
- MC Programming Language: C
- IOT Platform: IOT Gecko

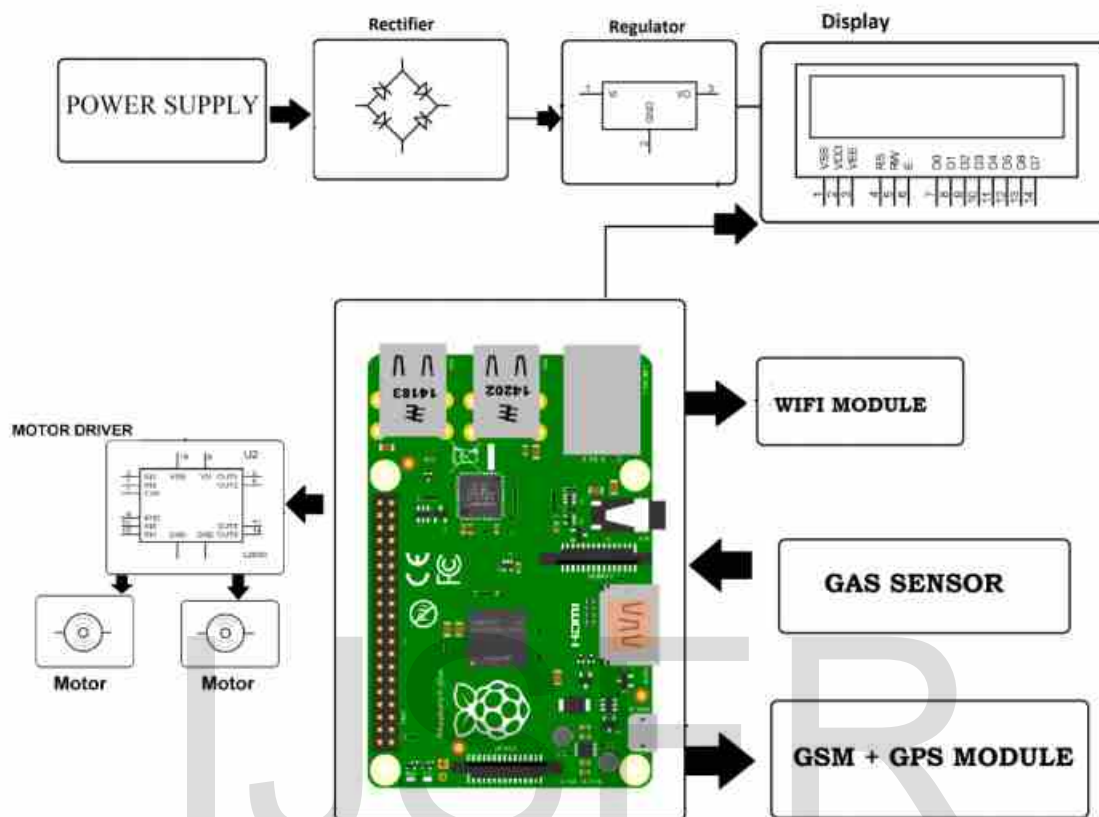
IJSER

## 13. IOT Gas Pipe Leakage Detector Insect Robot

Gas pipes play very important roles for cities, industries and thus in growing economies. So gas leakages lead to losses as well as are a threat because they can also lead to fire accidents. Placing sensors at each section of pipe is very costly. So here we propose an innovative robot that clings on to the outer surface of the gas pipe and moves with the pipe to check for leakages. The robot consists of gas sensor that is used to detect gas leakages. As the robot keeps moving along the metal pipe it keeps monitoring for any gas leakage, On detection it uses an interface gps sensor to transmit location of th leakage detected over to the IOT login system, Here we use IOTgecko to receive and display the gas leakage alert and location over IOT. Thus we have a fully automated insect like robot that moves with the gas pipe and detects gas leakages instantly at a low budget.

IJSER

## Block Diagram:



## Hardware Specifications

- Raspberry Pi 3 – Buy Raspberry Pi 3 Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- MQ-6 LPG CNG Gas Sensor – Buy MQ6 Combustible Gas Sensor Online
- SIM 800 GSM Module – Buy SIM 800 Online
- Neo6mv2 GPS Module – Buy GPS Module Online
- Buzzer- Buy Buzzer Online
- DC Motor – Buy DC Motors Online
- Motor Driver IC – Buy IC's Online
- Vtg Regulator IC – Buy IC's Online
- IC Socket – Buy IC Sockets Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online

- Push Button – Buy Buttons & Switches Online

**Software Specifications :**

- Python compiler
- Programming Language: Python

IJSER

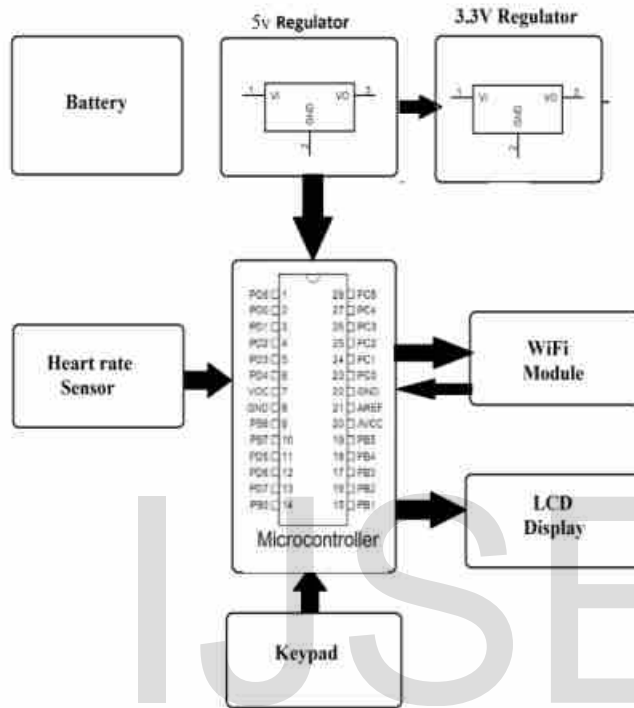


## **14. IOT Heart Attack Detection & Heart Rate Monitor**

These days we have an increased number of heart diseases including increased risk of heart attacks. Our proposed system uses sensors that allow to detect heart rate of a person using heartbeat sensing even if the person is at home. The sensor is then interfaced to a microcontroller that allows checking heart rate readings and transmitting them over internet. The user may set the high as well as low levels of heart beat limit. After setting these limits, the system starts monitoring and as soon as patient heart beat goes above a certain limit, the system sends an alert to the controller which then transmits this over the internet and alerts the doctors as well as concerned users. Also the system alerts for lower heartbeats. Whenever the user logs on for monitoring, the system also displays the live heart rate of the patient. Thus concerned ones may monitor heart rate as well get an alert of heart attack to the patient immediately from anywhere and the person can be saved on time.

IJSER

## Block Diagram:



### Hardware Specifications

- ATmega328P AVR MC- Buy ATmega328P Online
- Heartbeat Sensor – Buy Heartbeat Sensor Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

### Software Specifications:

- Arduino Compiler
- MC Programming Language: C
- IOTGecko

### Reference

- [http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7454565&news\\_earch=true&queryText=iot%20health](http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7454565&news_earch=true&queryText=iot%20health)
- [http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7454565&news\\_earch=true&queryText=iot%20health](http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7454565&news_earch=true&queryText=iot%20health)

## 15. IOT Irrigation Monitoring & Controller System

### Abstract:

Farmers usually work on large portions of land to grow different types of crops. It is not always possible for one person to be able to keep track of the entire farmland all the time. Sometimes it may happen that a given patch of land receives more water leading to water-logging, or it might receive far less or no water at all leading to dry soil. In either of the cases, the crops can get damaged and farmer may suffer losses.

So in order to solve this problem, we propose an “IoT Irrigation Monitoring and Control Project”. This is a very useful project wherein, the user can monitor and control the supply of water from a remote location. This system makes use of a concept called IOT (Internet of Things). So for our project, we connect our system to the internet using a Wi-Fi module. We use an Arduino Uno board to send the control signals and to connect to our desired website.

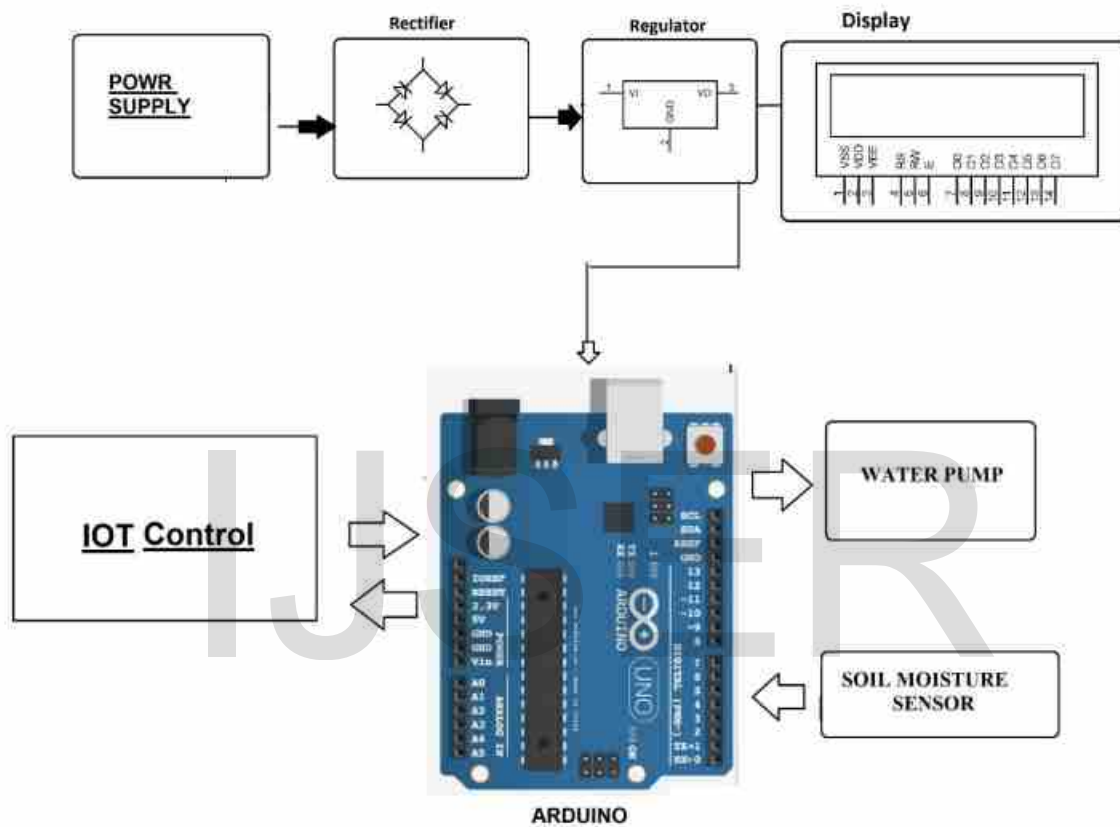
**On the website, two things are displayed:**

**a) Motor status b) Moisture level**

The circuit keeps checking the moisture content of the soil by means of a moisture sensor, and updates the “Moisture level” on the website. The user can then check the current moisture level from a remote location and control the water supply. For this, the user only has to toggle the “Motor status” from ‘ON-OFF’ or ‘OFF-ON’; and the “water pump” will be ‘turned ON’ or ‘turned OFF’ accordingly. Thus the ‘soil-moisture’ gets monitored and the ‘water supply’ can be controlled just by the toggling the “Motor status”. So the user doesn’t have to worry about his crops or plants getting damaged due to ‘water-logging’ or ‘drought’.

This system can also be useful for people having small gardens, while it may not be possible for a person to be continuously present at his/her garden but one can use this project to keep a track of ‘soil-moisture’ and ensure proper water supply even from a distance.

## Block Diagram:



## Hardware Specifications

- Arduino Uno R3 – Buy Arduino Uno R3 Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- Water Sensor Module – Buy Water Sensor Online
- Relay – Buy Relays Online
- Relay Driver IC – Buy IC's Online
- Vtg Regulator IC – Buy IC's Online
- IC Socket – Buy IC Sockets Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

## Software Specifications

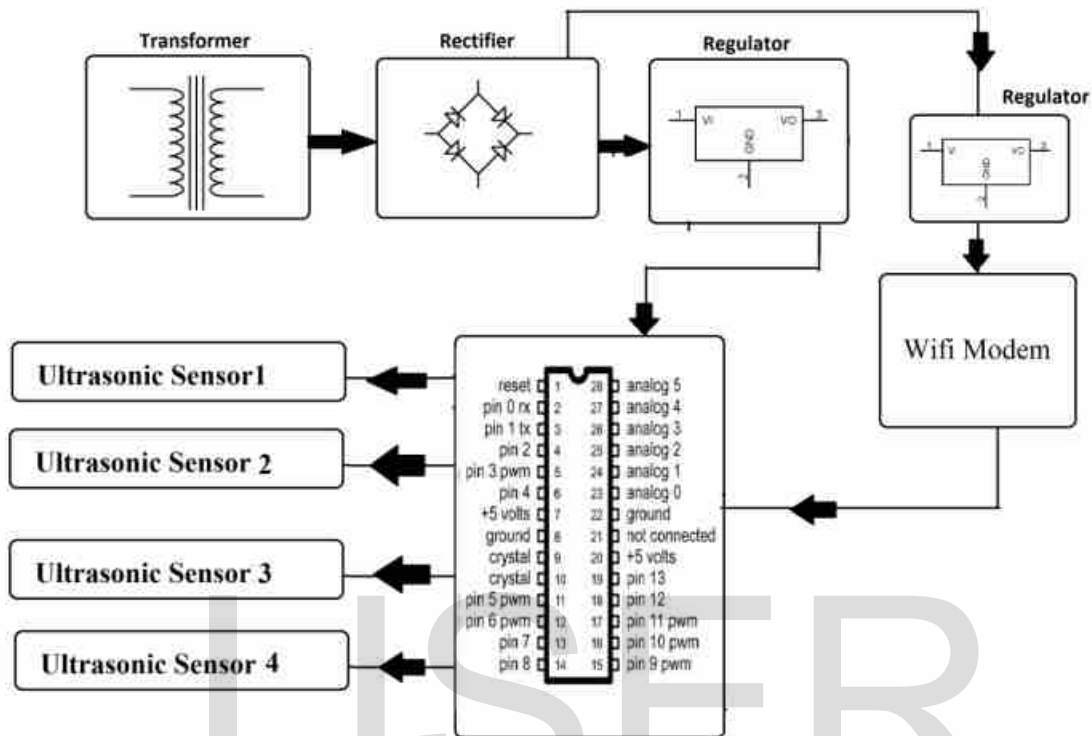
- Arduino Compiler
- MC Programming Language: C
- IOT Gecko

## 16. IOT Liquid Level Monitoring System

This project IOT Liquid Level Monitoring system is a very innovative system which will inform the users about the level of liquid and will prevent it from overflowing. To demonstrate this the system makes use of 4 containers. For this the system uses ultrasonic sensors placed over the containers to detect the liquid level and compare it with the container's depth. The system makes use of AVR family microcontroller, LCD screen, Wi-Fi modem for sending data and a buzzer. The system is powered by a 12V transformer.

The LCD screen is used to display the status of the level of liquid in the containers. Whereas a web page is built to show the status to the user monitoring it. The web page gives a graphical view of the containers and highlights the liquid level in color in order to show the level of liquid. The LCD screen shows the status of the liquid level. The system puts on the buzzer when the level of liquid collected crosses the set limit. Thus this system helps to prevent the wastage of water by informing about the liquid levels of the containers by providing graphical image of the containers via a web page.

## Block Diagram:





## Hardware Specifications

- [ATmega328P AVR MC- Buy ATmega328P Online](#)
- [ESP8266 Wifi Module – Buy Wifi Module Online](#)
- [HC-SR04 Ultrasonic – Buy Ultrasonic Sensor Online](#)
- [LCD's – Buy LCD Online](#)
- [Buzzer- Buy Buzzer Online](#)
- [Crystal Oscillator – Buy Crystal Oscillators Online](#)
- [Resistors – Buy Resistors Online](#)
- [Capacitors – Buy Capacitors Online](#)
- [Transistors – Buy Transistors Online](#)
- [Cables & Connectors – Buy Cables & Connectors Online](#)
- [Diodes – Buy Diodes Online](#)
- [PCB – Buy PCB & Breadboards Online](#)
- [LED's – Buy LED Online](#)
- [Transformer/Adapter – Buy Transformers & Adapters Online](#)
- [Push Button – Buy Buttons & Switches Online](#)

## Software Specifications

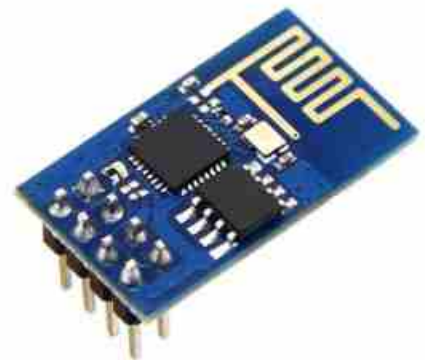
- Arduino Compiler
- MC Programming Language: Embedded C
- IOTGecko

### **WIFI Modem:**

- The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware. The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.
- This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts.
- There is an almost limitless fountain of information available for the ESP8266, all of which has been provided by amazing community support. In the Documents section below you will find many resources to aid you in using the ESP8266, even instructions on how to transforming this module into an IOT (Internet of Things) solution!
- Note: The ESP8266 Module is not capable of 5-3V logic shifting and will require an external Logic Level Converter. Please do not power it directly from your 5V dev board.

### **Features:**

- 802.11 b/g/n
- Wi-Fi Direct (P2P), soft-AP
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLLs, regulators, DCXO and power management units
- +19.5dBm output power in 802.11b mode
- Power down leakage current of <10uA
- 1MB Flash Memory
- Integrated low power 32-bit CPU could be used as application processor
- SDIO 1.1 / 2.0, SPI, UART
- STBC, 1×1 MIMO, 2×1 MIMO
- A-MPDU & A-MSDU aggregation & 0.4ms guard interval
- Wake up and transmit packets in < 2ms
- Standby power consumption of < 1.0mW (DTIM3)



## Reference

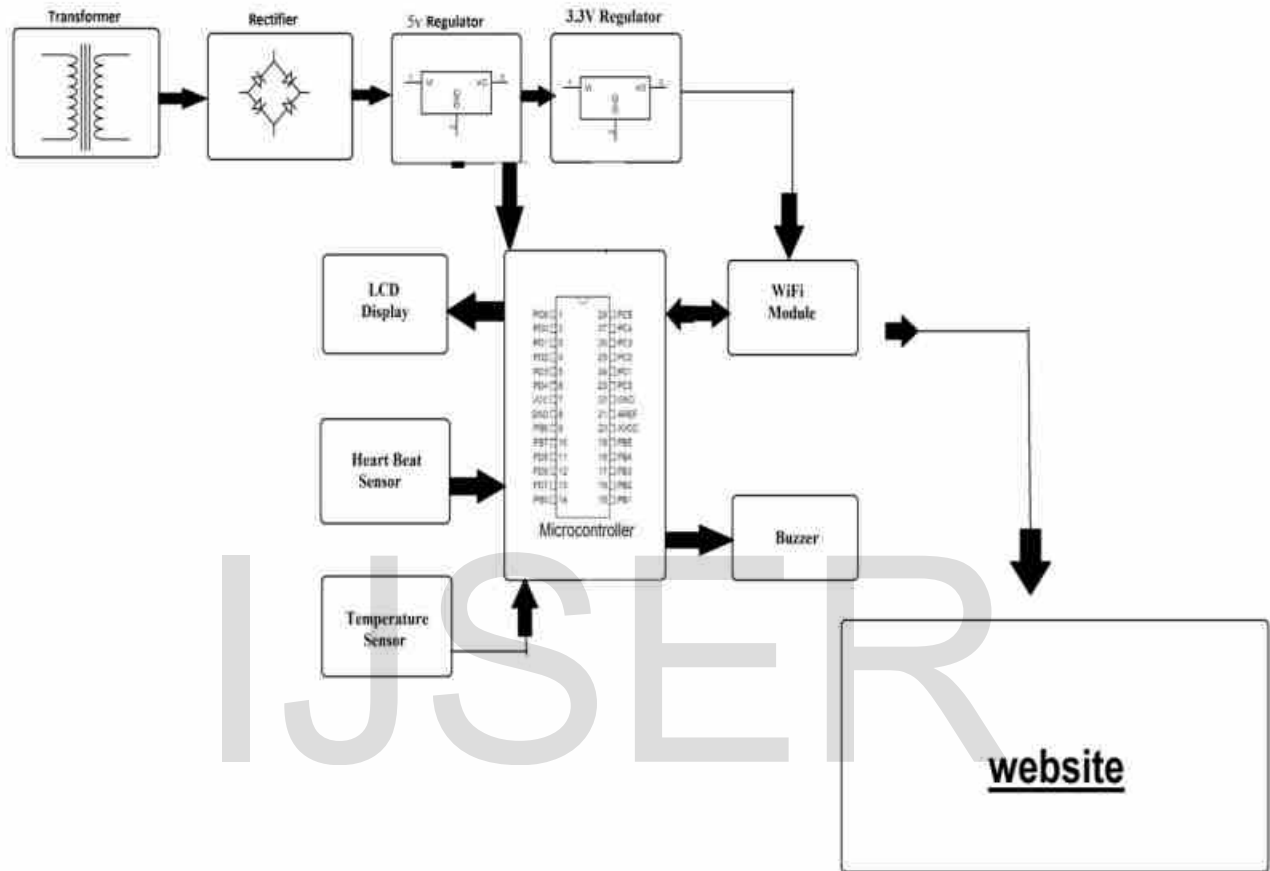
- <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=5620816&queryText=liquid%20level%20ultrasonic&newsearch=true>

IJSER

## 17. IOT Patient Health Monitoring Project

Monitoring your beloved ones becomes a difficult task in the modern day life. Keeping track of the health status of the patient at home is a difficult task. Especially old aged patients should be periodically monitored and their loved ones need to be informed about their health status from time to time while at work. So we propose an innovative system that automated this task with ease. Our system puts forward a smart patient health tracking system that uses Sensors to track patient health and uses internet to inform their loved ones in case of any issues. Our system uses temperature as well as heartbeat sensing to keep track of patient health. The sensors are connected to a microcontroller to track the status which is in turn interfaced to an LCD display as well as Wi-Fi connection in order to transmit alerts. If system detects any abrupt changes in patient heartbeat or body temperature, the system automatically alerts the user about the patient's status over IOT and also shows details of heartbeat and temperature of patient live over the internet. Thus IOT based patient health tracking system effectively uses internet to monitor patient health stats and save lives on time

## Block Diagram:



## Hardware Specifications

- ATmega328P AVR MC- Buy ATmega328P Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- Heartbeat Sensor – Buy Heartbeat Sensor Online
- Temperature Sensor – Buy Temp Sensor Online
- LCD's – Buy LCD Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

## Software Specifications:

- Arduino Compiler
- MC Programming Language: C
- IOTGecko

## Reference

- [http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7454565&news\\_earch=true&queryText=iot%20health](http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7454565&news_earch=true&queryText=iot%20health)
- [http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7043542&news\\_earch=true&queryText=iot%20health](http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7043542&news_earch=true&queryText=iot%20health)

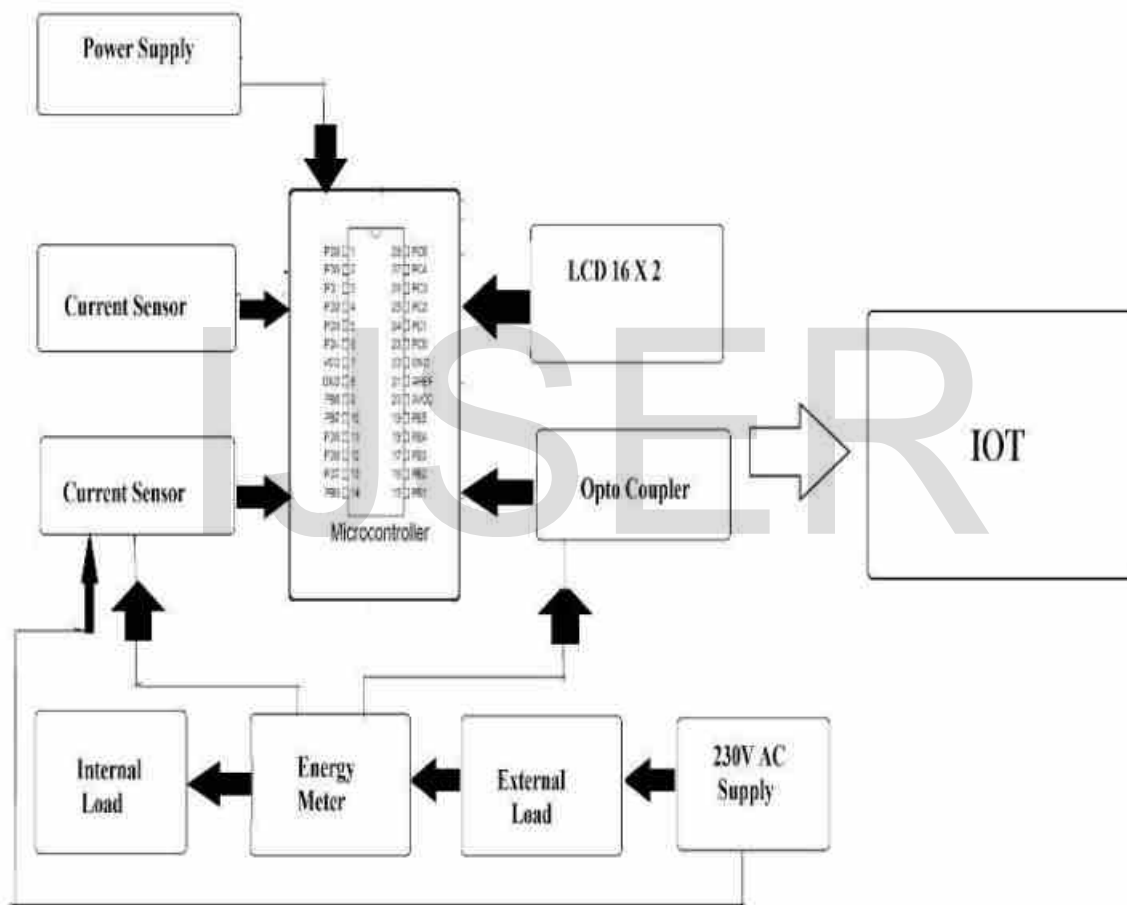
## 18. IOT Smart Energy Grid

Energy generation companies supply electricity to all the households via intermediate controlled power transmission hubs known as Electricity Grid. Sometimes problems arise due to failure of the electricity grid leading to black out of an entire area which was getting supply from that particular grid. This project aims to solve this problem using IOT as the means of communication and also tackling various other issues which a smart system can deal with to avoid unnecessary losses to the Energy producers.

IOT Smart Energy Grid is based on ATmega family controller which controls the various activities of the system. The system communicates over internet by using Wi-Fi technology. A bulb is used in this project to demonstrate as a valid consumer and a bulb to demonstrate an invalid consumer. The foremost thing that this project facilitates is re-connection of transmission line to active grid. If an Energy Grid becomes faulty and there is an another Energy Grid, the system switches the Transmission Lines towards this Grid thus facilitating uninterrupted electricity supply to that particular region whose Energy Grid went OFF. And this information of which Grid is active is updated over IOTGecko webpage where the authorities can login and can view the updates. Apart from monitoring the Grid this project has advances capabilities of monitoring energy consumption and even detect theft of electricity. The amount of electricity consumed and the estimated cost of the usage gets updated on the IOTGecko webpage along with the Energy Grid information. Theft conditions are simulated in the system using two switches. Switching one each time will simulate a theft condition and also will notify the authorities over the IOT interface. In this way the Smart Energy Grid

project makes sure that the electricity supply is continuous and helps in maintaining a updated record of consumption and theft information which is quite a valuable information for the energy producing companies.

### Block Diagram:





## Hardware Specifications

- ATmega328P AVR MC- Buy ATmega328P Online
- Current Sensor
- Energy Meter
- ESP8266 Wifi Module – Buy Wifi Module Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online
- Load (Lamps)

## Software Specifications

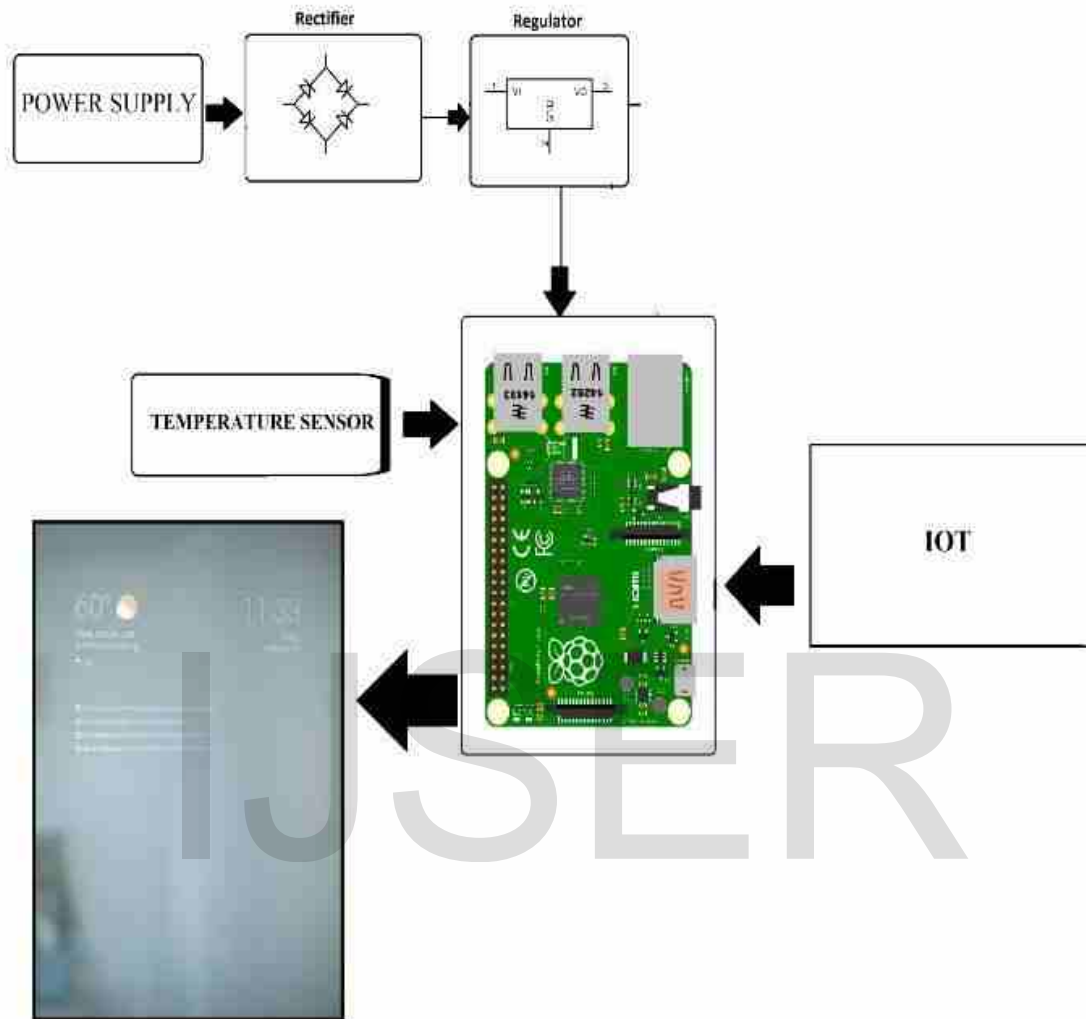
- IOTGecko
- Arduino Compiler
- MC Programming Language: C

## 19. IOT Smart Mirror with News & Temperature

Smart mirrors are the mirrors of the future. A part of the connected world where we would be able to see news, temperature, weather and more just while looking and grooming in front of mirrors. Our proposed system allows to build such mirrors that allow for mirrors to receive news online and display it on the mirror screen along with other details including current temperature of the room for a futuristic and modern lifestyle. Our system uses a raspberry pi based processor board along with display and IOT based circuitry and temperature sensor interfaced together. We use a precisely modelled panel to construct the outer frame. Then we use specialized glass with a back frame to encase the system.

The frame cavity is now fitted with precisely positioned mounts for the display housing to be fitted in the mirror. This is necessary to achieve the desired effect. Now we use raspberry pi to connect with internet using IOT circuit through the use of a wifi module. This allows us to receive data through the IOT platform. We use IOTGecko in order to connect our system to the internet and get news feeds. The temperature interfaced on the circuit is used to display temperature and display it on the mirror fitted display. Thus we demonstrate a futuristic IOT smart mirror with news and temperature display.

### **Block Diagram:**



### **Hardware Specifications**

- Raspberry Pi
- Temperature Sensor
- Wifi Module
- Display Panel
- Resistors
- Capacitors
- Diodes
- Adapter
- Mirror frame
- Mirror Panels
- Supporting Frame
- Mounts
- Joints & Screws

### **Software Specifications**

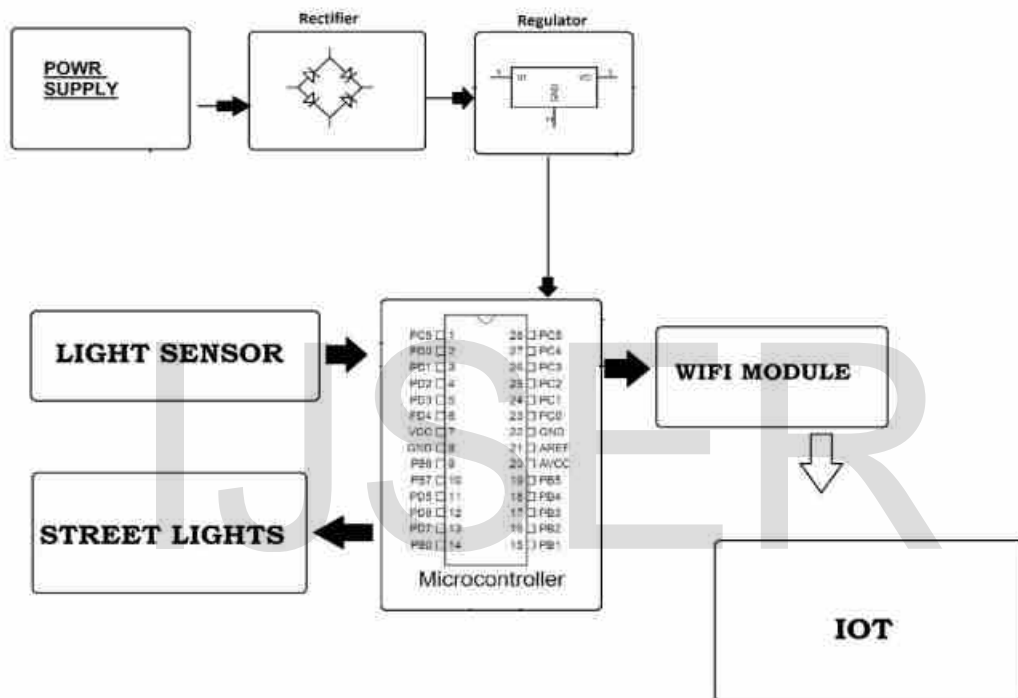
- Python 3 compiler
- Programming Language: Python
- IOTGecko

IJSER

## 20. IOT Streetlight Controller System

Here we propose an IOT based street light monitoring and controlling system to ensure, low power consumption, consumption monitoring, instant faulty light detection and light dimming as per external lighting conditions. Our proposed system consists of smart street lights that have external light sensing that automatically turns on at desired intensity based on amount of lighting needed. The system also allows the controller/monitoring person to check estimate power consumptions as per current intensity of light as well as predict monthly power consumption. Also each of the unit has load sensing functionality that allows it to detect if the light has a fault. It then automatically flags that light is faulty and this data is sent over to the IOT monitoring system so that action can be taken to fix it. We here use IOTGecko iot development platform for the online system using the iotgecko api to transmit data and display online.

## Block Diagram :



## Hardware Specifications

- ATmega328P AVR MC- Buy ATmega328P Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- Current Sensor
- LDR Sensor 5MM Photoresistor – Buy LDR Sensor Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

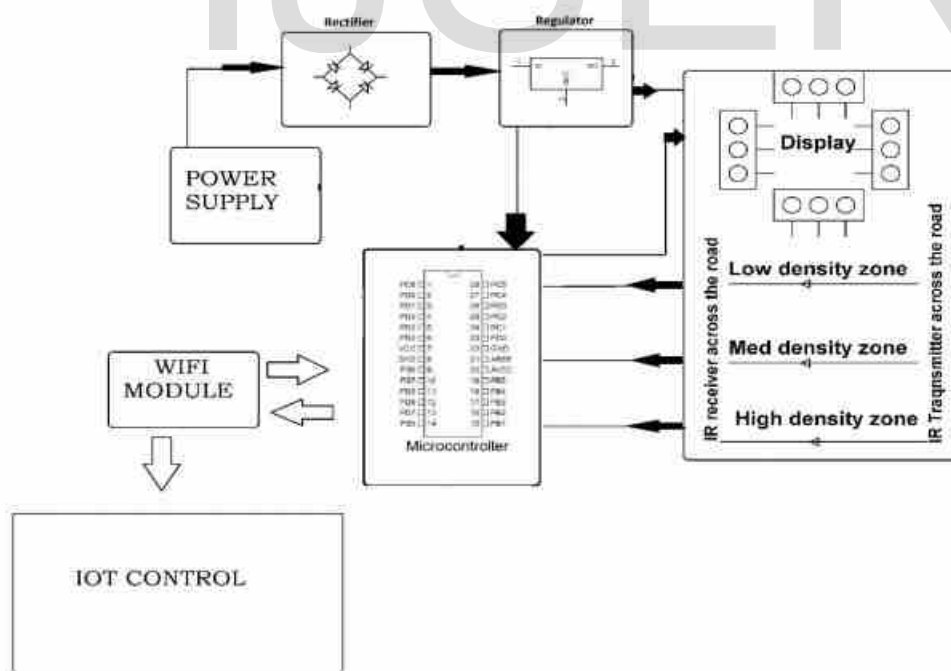
## Software Specifications :

- Arduino Compiler
- Programming Language: C

## 21. IOT Traffic Signal Monitoring & Controller System

Here we propose an IOT based automated traffic signal monitoring as well as controller system that automates complete traffic signaling system automation and also allows for manual override over internet. The system uses arduino based circuit system to monitor traffic signal densities and transmits this data online over internet to the controllers. We use IOTGecko in order to develop the online GUI based system to monitor the traffic densities. The system shows current densities to help monitor traffic conditions on roads. Also the system provides an option to the controllers to override any signal and make it green in case of any ambulance or important vehicles to pass through while keeping other signals red. This puts forth a traffic signal monitoring and controller system that can be operated remotely over the internet from anywhere with manual override ability.

**Block Diagram:**





### **Hardware Specifications**

- ATmega328P AVR MC- Buy ATmega328P Online
- I R Transmitter Receiver – Buy IR Sensors Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

### **Software Specifications :**

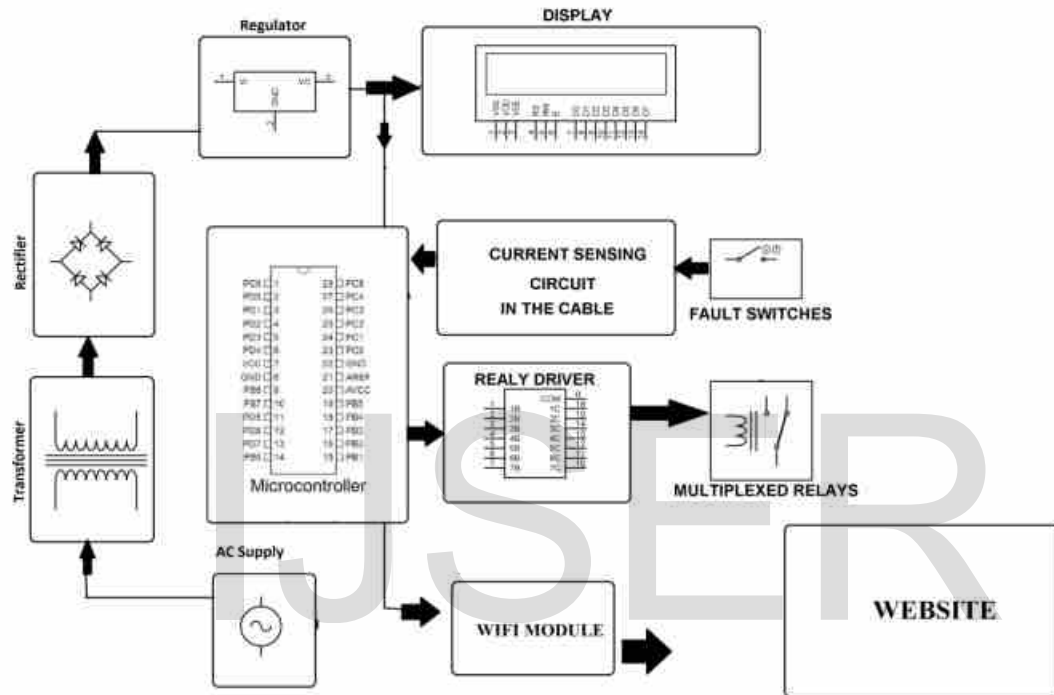
- Arduino Compiler
- MC Programming Language: C

IJSER

## 22. IOT Underground Cable Fault Detector Project

Underground cables are prone to a wide variety of faults due to underground conditions, wear and tear, rodents etc. Also detecting fault source is difficult and entire line is to be dug in order to check entire line and fix faults. So here we propose an cable fault detection over IOT that detects the exact fault position over iot that makes repairing work very easy. The repairmen know exactly which part has fault and only that area is to be dug to detect the fault source. This saves a lot of time, money and efforts and also allows to service underground cables faster. We use IOT technology that allows the authorities to monitor and check faults over internet. The system detects fault with the help of potential divider network laid across the cable. Whenever a fault gets created at a point shorting two lines together, a specific voltage gets generated as per the resistors network combination. This voltage is sensed by the microcontroller and is updated to the user. The information conveyed to the user is the distance to which that voltage corresponds to. The microcontroller retrieves the fault line data and displays over LCD display, also it transfers this data over internet to display online. We use IOTGecko to develop the online system that links with the system to display the cable faults online.

## Block Diagram :



### **Hardware Specifications**

- ATmega328P AVR MC- Buy ATmega328P Online
- Lamp
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

### **Software Specifications :**

- Keil Compiler
- MC Programming Language: C

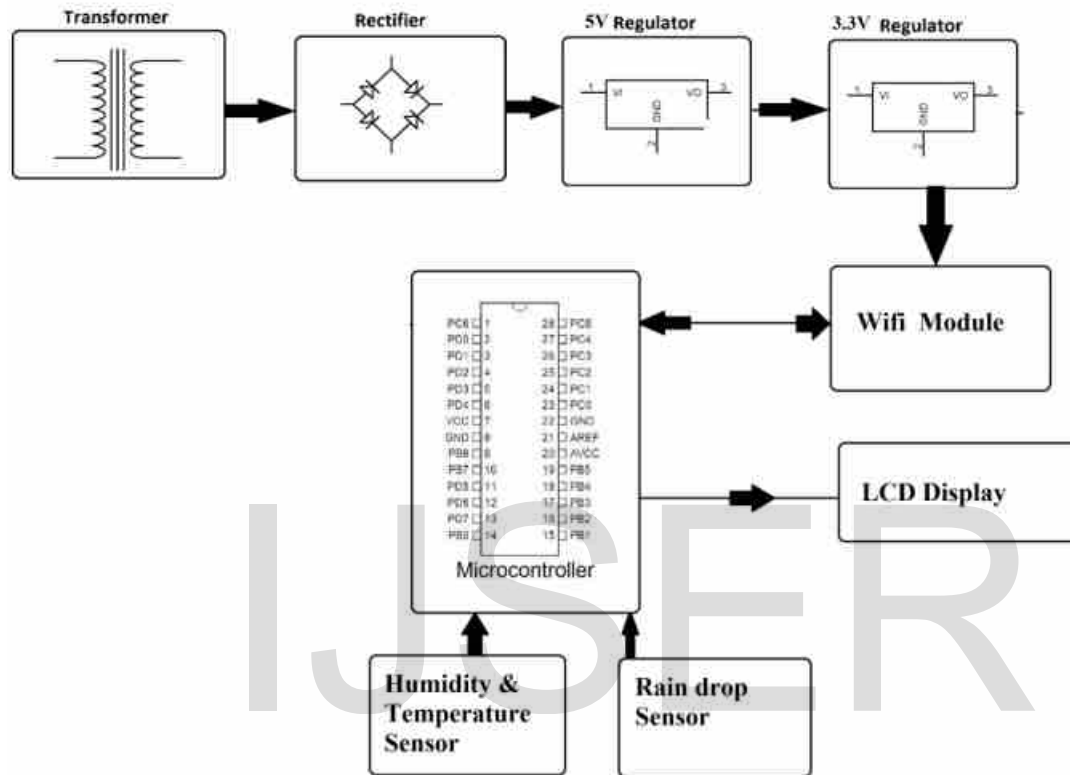
## 23. IOT Weather Reporting System

Here we propose a smart weather reporting system over the internet. Our proposed system allows for weather parameter reporting over the internet. It allows the people to directly check the weather stats online without the need of a weather forecasting agency.

System uses temperature, humidity as well as rain sensor to monitor weather and provide live reporting of the weather statistics.

The system constantly monitors temperature using temperature sensor, humidity using humidity sensor and also for rain. The system constantly transmits this data to the microcontroller, which now processes this data and keeps on transmitting it to the online web server over a Wi-Fi connection. This data is live updated to be viewed on the online server system. Also system allows user to set alerts for particular instances, the system provides alerts to user if the weather parameters cross those values. Thus the IOT based weather reporting system provides an efficient internet based weather reporting system for users.

## Block Diagram:



## Hardware Specifications

- ATmega328P AVR MC- Buy ATmega328P Online
- DHT11 Digital Temperature Humidity Sensor – Buy DHT11 Sensor Online

Rain Drop Sensor -Buy Rain Drop Sensor Online

- ESP8266 Wifi Module – Buy Wifi Module Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

## Software Specifications:

- Arduino Compiler
- MC Programming Language: C
- IOTGecko

## 24. Smart Dustbin with IOT Notifications

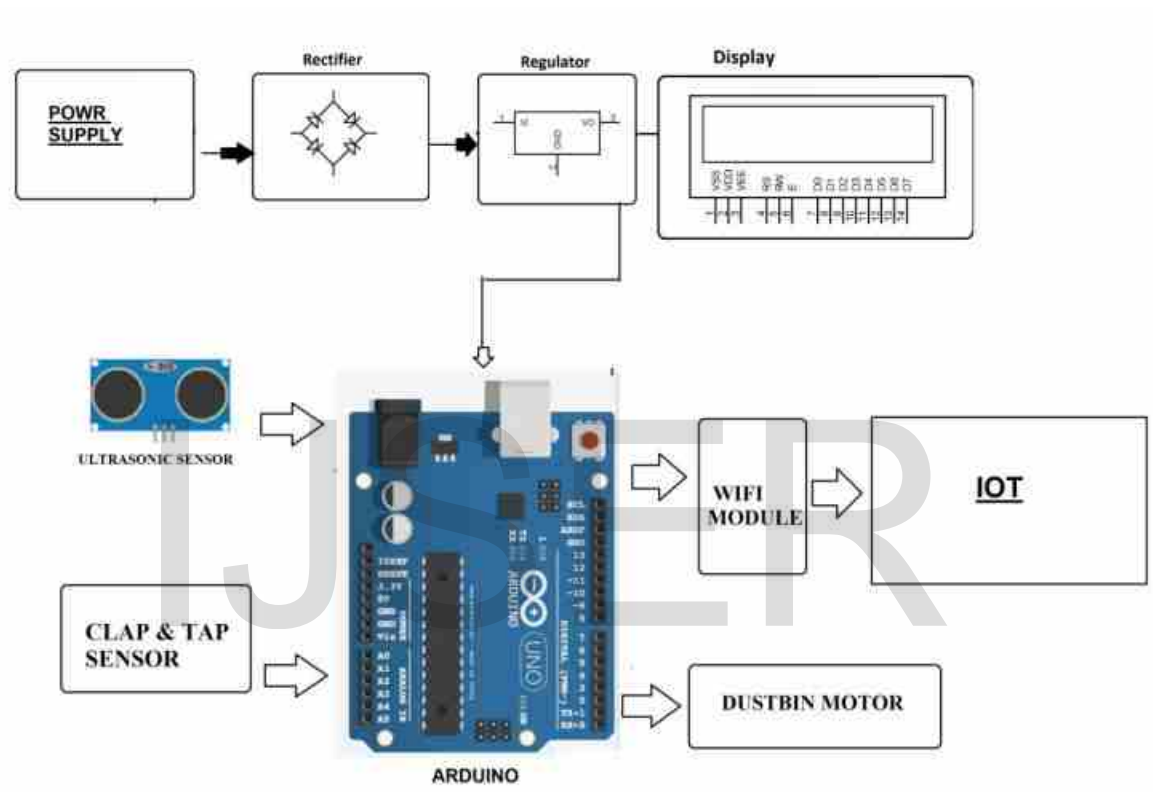
With increase in population we have an increase in the garbage around urban areas. Here we propose a smart dustbin that operates automatically to help solve this issue using IOT and sensor based circuitry. Usual dustbins require to be opened by pressing foot against its lever and then throwing garbage. Also a person needs to keep track when it is full so that it can be emptied and does not overflow. Here we propose a smart dustbin that does all this by itself. Our system consists of a sensor in order to detect human clap signal and on a clap of foot tap it opens automatically without anyone needing to press its lever.

The dustbin opens automatically when it receives the signal and closes its hatch. Also the dustbin consists of a level sensing ultrasonic sensor that constantly measures the level of garbage in the bin and automatically detects if it is about to fill up. The dustbin now consists of a smart circuitry that transmits this information over the web to signal the main garbage collector of the facility to empty the particular garbage bin. We use IOTgecko to develop the online web part for the iot system.

This bin is of a vast usage in offices, homes and even in public places for garbage management. Thus we get a fully automated smart dustbin that allows for automated garbage cleaning.



## Block Diagram:



### **Hardware Specifications**

- Arduino Uno R3 – Buy Arduino Uno R3 Online
- HC-SR04 Ultrasonic – Buy Ultrasonic Sensor Online
- Mic Sensor -Buy Sound Sensor Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Push Button – Buy Buttons & Switches Online
- Bin Frame
- Mounts & Joints
- Supporting Frame

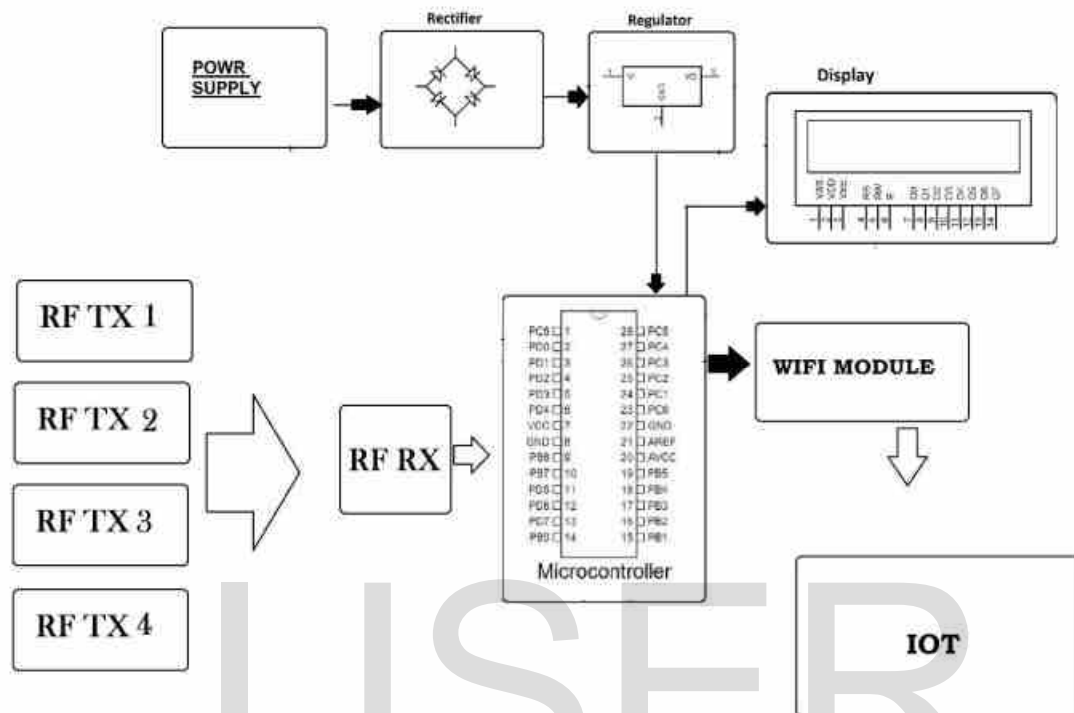
### **Software Specifications**

- Arduino Compiler
- Programming Language: C
- IOTGecko

## 25. IOT Asset tracking System

The GPS systems are today's most well-known location tracking systems. Well these systems are not capable of pinpointing exact locations or locations of an entity within a building or on a particular floor or room. So here we propose a smart asset tracking system that allows to track location of objects, goods, personnel within a building or any facility. Our proposed system makes use of RF technology along with IOT to achieve this system. The system has the capability to pinpoint the location of any entity to exact room it is currently located in. The system uses mini RF circuits to be used as tracking devices. We use tracking microcontroller based circuits to track those RF circuits. The tracker circuits are battery powered circuits to be mounted on objects/entities. The monitoring circuits are to be placed in individual rooms. Now as soon as any tracker objects enter any room the tracker circuits come in 2-3 meters range of the monitoring circuit for that room. The monitoring system now transmits the location of that tracker circuit to the online system. We here use IOTGecko to handle the IOT tracking part. The transmitted data is now displayed by IOTGecko to pinpoint which room a particular object/entity is located in.

### Block Diagram:



### Hardware Specifications

- ATmega328P AVR MC- Buy ATmega328P Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- RF Tx Rx – Buy RF Tx Rx Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

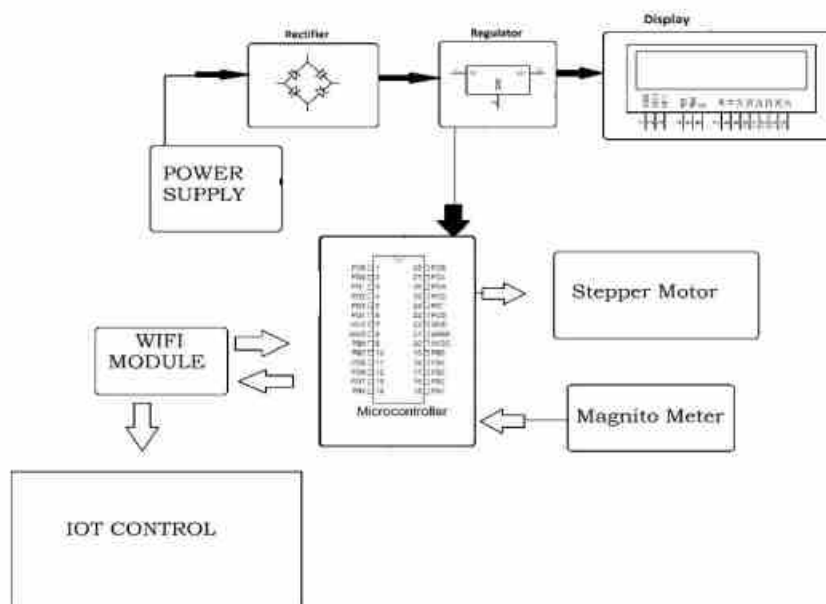
### Software Specifications

- Python compiler
- Programming Language: Python
- IOTGecko

## 26. IOT Based Antenna Positioning System

All wireless communication systems work on antennas for reception of signals. Proper positioning of antennas is necessary according to satellites/transmitters to achieve effective wireless communication. So here we propose an IOT based antenna positioning system that allows for remotely positioning of antennas based over IOT. Here we use sensor based system with motor on each antenna using antenna to check its facing direction that is transmitted over IOT. If the direction of a satellite or transmitting station changes over time, the antenna direction must also be changed accordingly. The receiving antennas may be placed far apart from each other across the globe. So our system allows for antenna positioning over very long distances. The antenna positions are visible over internet to controlling operator on the IOT GUI. We here use IOT Gecko to develop the antenna monitoring GUI system. Our system allows for monitoring antenna direction as well as transmitting new coordinates to position the antenna and motor appropriately positions the antenna accordingly.

### Block Diagram:



### **Hardware Specifications**

- ATmega328P AVR MC- Buy ATmega328P Online
- Magnetic Compass Sensor
- ESP8266 Wifi Module – Buy Wifi Module Online
- Stepper Motor – Buy Stepper Motors Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

### **Software Specifications:**

- Arduino Compiler
- Programming Language: C

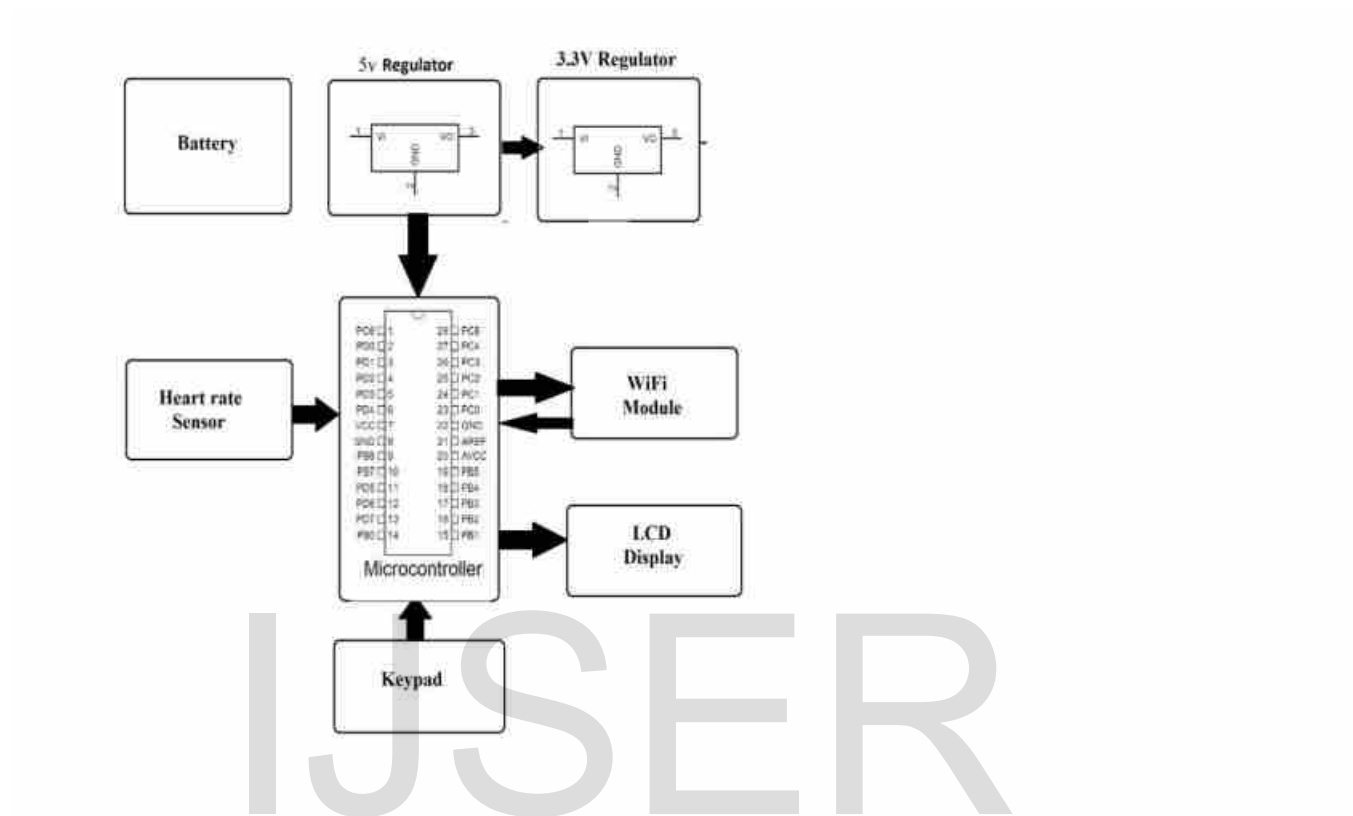
IJSER

## **27. IOT Heart Attack Detection & Heart Rate Monitor**

These days we have an increased number of heart diseases including increased risk of heart attacks. Our proposed system uses sensors that allow to detect heart rate of a person using heartbeat sensing even if the person is at home. The sensor is then interfaced to a microcontroller that allows checking heart rate readings and transmitting them over internet. The user may set the high as well as low levels of heart beat limit. After setting these limits, the system starts monitoring and as soon as patient heart beat goes above a certain limit, the system sends an alert to the controller which then transmits this over the internet and alerts the doctors as well as concerned users. Also the system alerts for lower heartbeats. Whenever the user logs on for monitoring, the system also displays the live heart rate of the patient. Thus concerned ones may monitor heart rate as well get an alert of heart attack to the patient immediately from anywhere and the person can be saved on time.

IJSER

### Block Diagram:





### **Hardware Specifications**

- ATmega328P AVR MC- Buy ATmega328P Online
- Heartbeat Sensor – Buy Heartbeat Sensor Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

### **Software Specifications:**

- Arduino Compiler
- MC Programming Language: C
- IOTGecko

### **Reference**

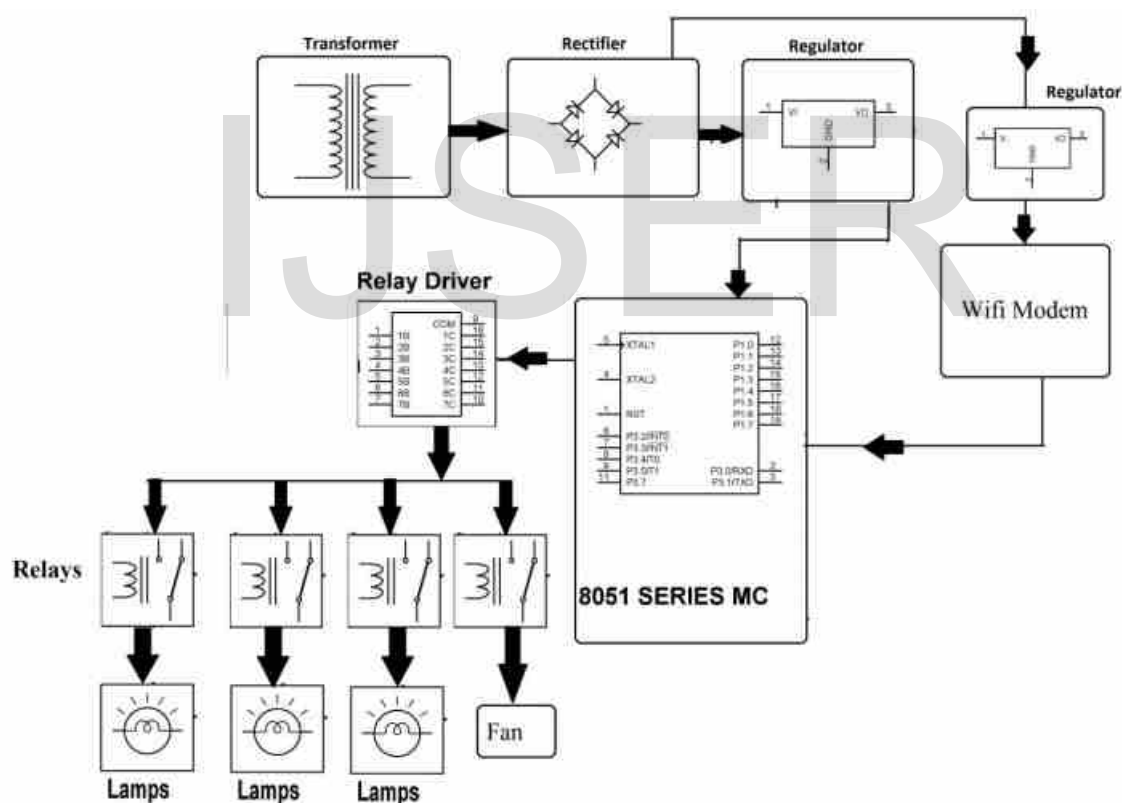
- <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7454565&newssearch=true&queryText=iot%20health>
- <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7454565&newssearch=true&queryText=iot%20health>

## 28. IOT Home Automation

IOT or internet of things is an upcoming technology that allows us to control hardware devices through the internet. Here we propose to use IOT in order to control home appliances, thus automating modern homes through the internet. This system uses three loads to demonstrate as house lighting and a fan. Our user friendly interface allows a user to easily control these home appliances through the internet. For this system we use an AVR family microcontroller.

This microcontroller is interfaced with a WIFI modem to get user commands over the internet. Also we have an LCD display to display system status. Relays are used to switch loads. The entire system is powered by a 12 V transformer. After receiving user commands over the internet, microcontroller processes these instructions to operate these loads accordingly and display the system status on an LCD display. Thus this system allows for efficient home automation over the internet.

### Block Diagram:



### Hardware Specifications

- 8051 series Microcontroller
- Wifi Modem
- Diodes
- Transformer
- Relays
- Voltage Regulator

- Crystal
- Lamps
- LED
- Relay Driver IC

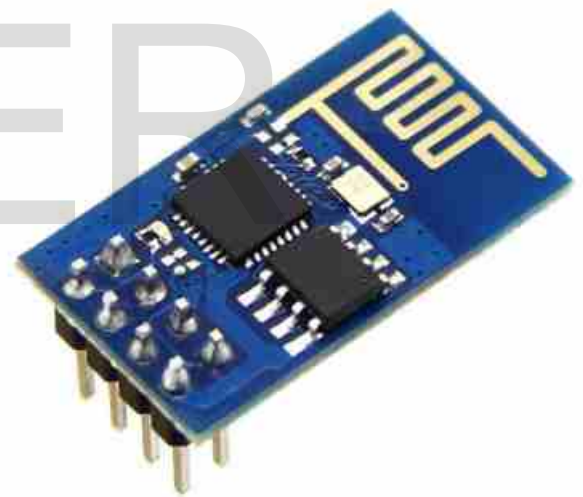
### **Software Specifications**

- Keil  $\mu$  Vision IDE
- MC Programming Language: Embedded C

### **WIFI Modem:**

The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware. The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts.



There is an almost limitless fountain of information available for the ESP8266, all of which has been provided by amazing community support. In the Documents section below you will find many resources to aid you in using the ESP8266, even instructions on how to transforming this module into an IoT (Internet of Things) solution!

Note: The ESP8266 Module is not capable of 5-3V logic shifting and will require an external Logic Level Converter. Please do not power it directly from your 5V dev board.

## Features:

802.11 b/g/n  
Wi-Fi Direct (P2P), soft-AP  
Integrated TCP/IP protocol stack  
Integrated TR switch, balun, LNA, power amplifier and matching network  
Integrated PLLs, regulators, DCXO and power management units  
+19.5dBm output power in 802.11b mode  
Power down leakage current of <10uA  
1MB Flash Memory  
Integrated low power 32-bit CPU could be used as application processor  
SDIO 1.1 / 2.0, SPI, UART  
STBC, 1×1 MIMO, 2×1 MIMO  
A-MPDU & A-MSDU aggregation & 0.4ms guard interval  
Wake up and transmit packets in < 2ms  
Standby power consumption of < 1.0mW (DTIM3)

## Reference

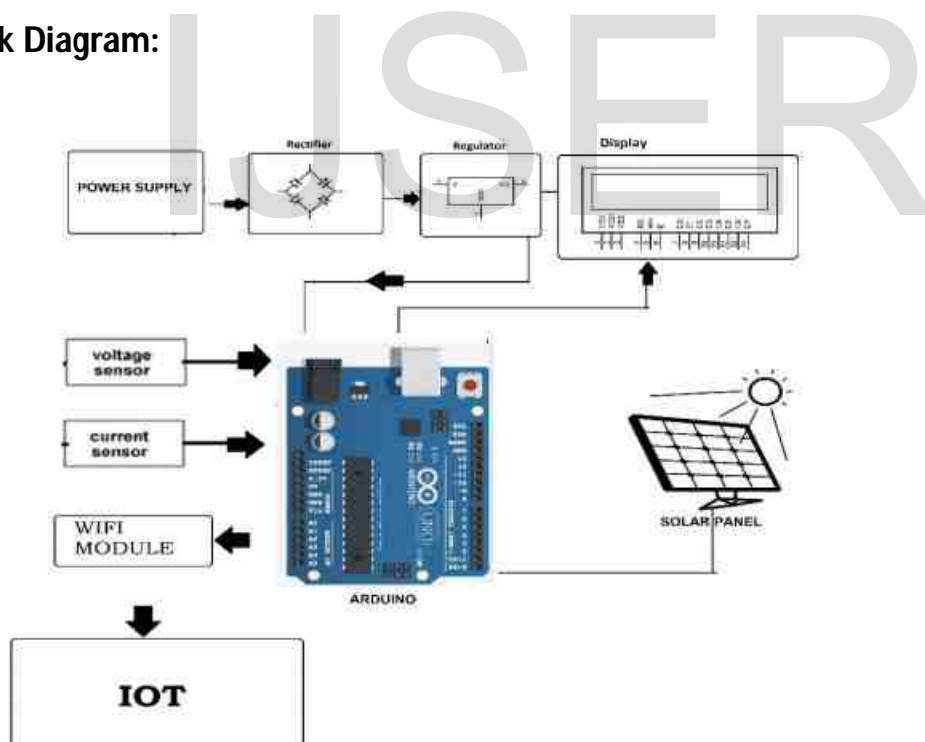
- <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7322825&queryText=iot%20home%20automation&newsearch=true>
- <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7342646&queryText=iot%20home%20automation&newsearch=true>

IJSER

## 29. IOT Solar Power Monitoring System

Solar power plants need to be monitored for optimum power output. This helps retrieve efficient power output from power plants while monitoring for faulty solar panels, connections, and dust accumulated on panels lowering output and other such issues affecting solar performance. So here we propose an automated IOT based solar power monitoring system that allows for automated solar power monitoring from anywhere over the internet. We use Arduino based system to monitor a 10Watt solar panel parameters. Our system constantly monitors the solar panel and transmits the power output to IOT system over the internet. Here we use IOT Gecko to transmit solar power parameters over the internet to IOT Gecko server. It now displays these parameters to the user using an effective GUI and also alerts user when the output falls below specific limits. This makes remotely monitoring of solar plants very easy and ensure best power output.

### Block Diagram:



### **Hardware Specifications**

- Arduino Uno R3 – Buy Arduino Uno R3 Online
- Solar Panel
- ESP8266 Wifi Module – Buy Wifi Module Online
- Voltage Sensor
- Current Sensor
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

### **Software Specifications:**

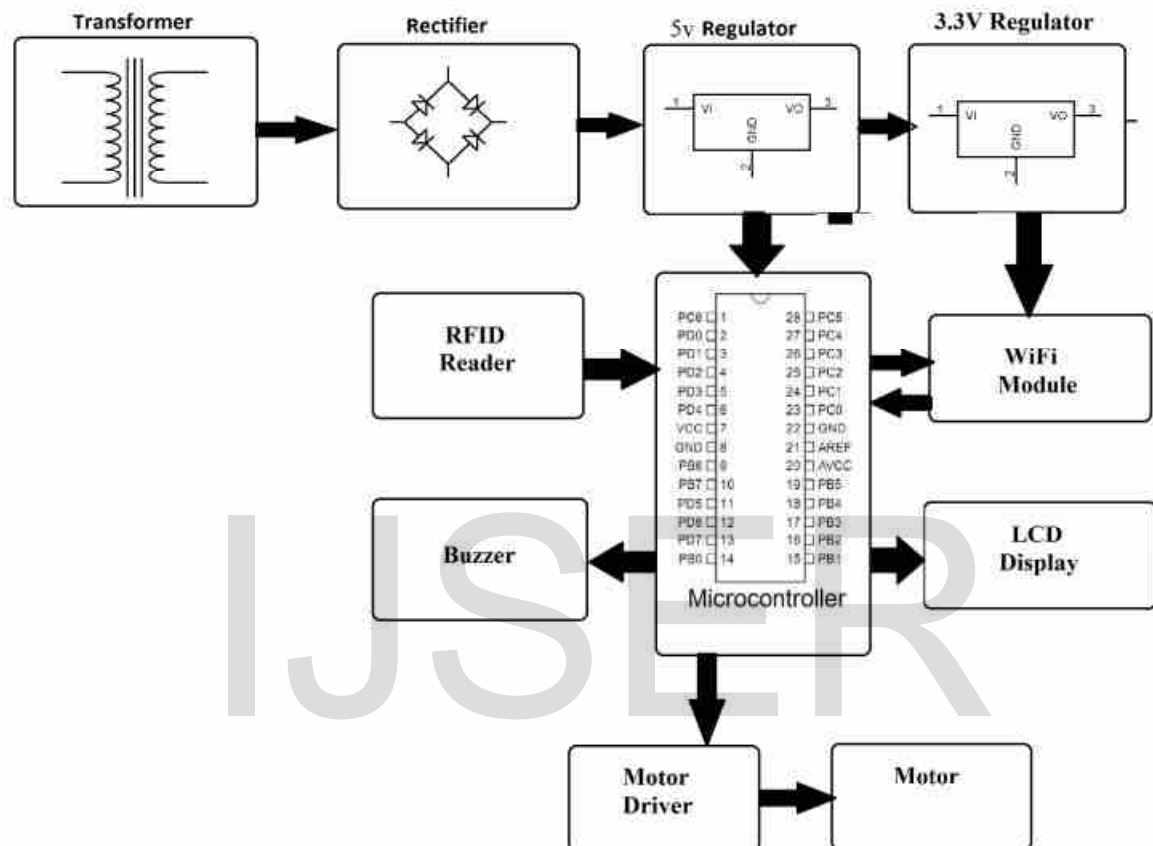
- Arduino Compiler
- Programming Language: C

IJSER

## 30. IOT Based Toll Booth Manager System

Managing multiple toll booths is a very complicated task. We here propose a smart card based toll booth system that is monitored over IOT. The Internet server maintains all the data of user accounts and also their balance. All vehicle owners would possess an RFID based card that stores their account number. Our system at toll booths will monitor the cards scanned when a car arrives at the toll booth. The system now connects to the online server to check if the card is valid and if valid what is the balance. If user balance is sufficient, the user balance is deducted online and web system sends signal back to the card scanner system that the user has been billed. On receiving this signal the system operates a motor to open the toll gate for that car. The system is controlled by a microcontroller to achieve this purpose. The microcontroller uses Wi-Fi connection to connect to the internet through which system interacts with web server to perform the online verification process. Also system allows to store data of all the vehicles passed at particular time intervals for later reference and surveillance. This system thus automates the entire toll booth collection and monitoring process with ease using RFID plus IOT based system.

## Block Diagram:





### **Hardware Specifications**

- ATmega328P AVR MC- Buy ATmega328P Online
- RFID Module & Cards – Buy RFID Module Online
- ESP8266 Wifi Module – Buy Wifi Module Online
- LCD's – Buy LCD Online
- Crystal Oscillator – Buy Crystal Oscillators Online
- Buzzer- Buy Buzzer Online
- Resistors – Buy Resistors Online
- Capacitors – Buy Capacitors Online
- Transistors – Buy Transistors Online
- Cables & Connectors – Buy Cables & Connectors Online
- Diodes – Buy Diodes Online
- PCB – Buy PCB & Breadboards Online
- LED's – Buy LED Online
- Transformer/Adapter – Buy Transformers & Adapters Online
- Push Button – Buy Buttons & Switches Online

### **Software Specifications:**

- Arduino Compiler
- MC Programming Language: C
- IOTGecko

### **Reference**

- <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7525700&queryText=iot%20toll&newsearch=true>