

IoT Based Smart City Result

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Abstract : Today we see the garbage waste bins are overflowing and all garbage is split out from dust bins, which results into unhygienic condition, illness and bad smell for all people near that area. Hence, we are designing the system based on arduino for monitoring garbage from particular area to avoid pollution, unhygienic condition, bad smell, etc. The dustbins are interfaced with microcontroller based system having ultrasonic sensor showing the current status of garbage on android device. When garbage reaches the level of sensor, then that indication will be given to the microcontroller unit and microcontroller sends signal to the authorities through Wi-Fi. So continuous monitoring of garbage bins will keep the environment clean.

This method is basically an enhancement of sun solar tracking system. In this advance method of Solar tracking system, gear motor is used for the rotation of solar panels according to sun light direction that is from east to west. With the help of real-time clock and microcontroller, Solar tracking system turn off automatically in night-time. In this paper we have discussed sun solar tracking system. In sun solar tracking system both hardware and software is used to developed a complete project.

IndexTerms –Ultrasonic Sensor, Fire Detector, Solar Plate.

I. INTRODUCTION

Energy is the prime factor for the development of a nation. An enormous amount of energy is extracted, distributed, converted and consumed in the global society daily. 85% of energy production is dependent on fossil fuels. The resources of the fossil fuels are limited and their use results in global warming due to emission of greenhouse gases. To provide a sustainable power production and safe world to the future generation, there is a growing demand for energy from renewable sources like solar, wind, geothermal and ocean tidal wave. The sun is the prime source of energy, directly or indirectly, which is also the fuel for most renewable systems. Among all renewable systems, photovoltaic system is the one which has a great chance to replace the conventional energy resources. Solar panel directly converts solar radiation into electrical energy. Solar panel is mainly made from semiconductor materials. Si used as the major component of solar panels, which is maximum 24.5% efficient. Unless high efficient solar panels are invented, the only way to enhance the performance of a solar panel is to increase the intensity of light falling on it. Solar trackers are the most appropriate and proven technology to increase the efficiency of solar panels through keeping the panels aligned with the sun's position. Solar trackers get popularized around the world in recent days to harness solar energy in most efficient way. This is far more cost effective solution than purchasing additional solar panels. In this paper the design methodology of a microcontroller based simple and easily programmed automatic solar tracker is presented. A prototype of automatic solar tracker ensures feasibility of this design methodology.

Internet and its applications have become an integral part of today's human lifestyle. It has become an essential tool in every aspect. Due to the tremendous demand and necessity, researchers went beyond connecting just computers into the web. These researches led to the birth of a sensational gizmo, Internet of Things (IoT). Communication over the internet has grown from user - user interaction to device – device interactions these days. The IoT concepts were proposed years back but still it's in the initial stage of commercial deployment. Home automation industry and transportation industries are seeing rapid growth with IoT. Yet not many articles have been published in this field of study. This paper aims in structuring a state of the art review on IoT. The technology, history and applications have been discussed briefly along with various statistics. Since most of the process is done through the internet we must have an active high speed internet connection. The technology can be simply explained as a connection between humans computers-things. All the equipment's we use in our day to day life can be controlled and monitored using the IoT. A

majority of process is done with the help of sensors in IoT. Sensors are deployed everywhere and these sensors convert raw physical data into digital signals and transmits them to its control center. By this way we can monitor environment changes remotely from any part of the world via internet. These systems architecture would be based on context of operations and processes in real-time scenarios.

II. GARBAGE MONITORING SYSTEM

2.1 PROPOSED SYSTEM

The implemented design of the system is used to monitor garbage level of dustbins. The main aim of the paper is to effectively perform the internet data acquisition process and using the AVR accurately. This system monitors the garbage bins to detect the garbage level and compare it with the garbage bins depth and informs the level of total garbage collected in the garbage bins to the monitoring person at the different place. The one of the main aim of this system is to stop overflow of garbage in dustbins which can be achieved by managing the time of garbage collection. For this the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth.

This project could be a lead taken towards clean environment. ATmega16A microcontroller is used in this monitoring system. A 16*2 LCD is used at the dustbins to display the garbage levels. Ultrasonic sensors HC-SR04 are used to detect the garbage level of dustbins in different regions. Fire sensors are used in the system to detect the fire in dustbin if any. The power is provided from battery which is charge through solar system.

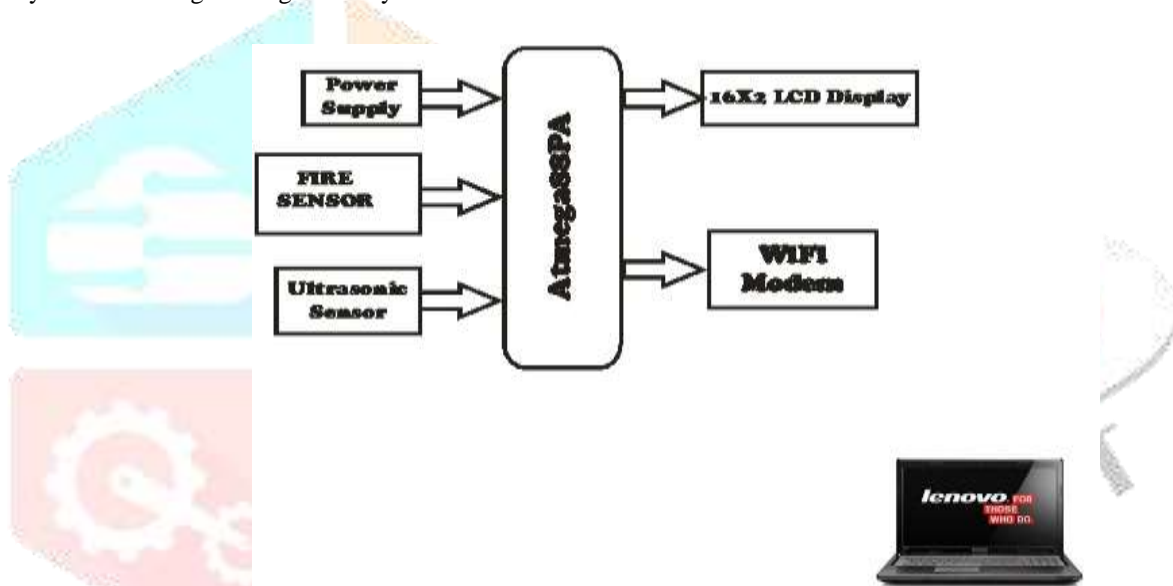


Fig. Block Diagram of Garbage Monitoring System.

2.2 BLOCK DIAGRAM DESCRIPTION

The block diagram of the proposed work “IOT Based Garbage Monitoring System” is as shown in the figure above. This system consists of various sensors for the monitoring purpose. The system consists of a microcontroller, which is the main block of the system and acts as brain of the system. The power supply unit is used to provide the required power supply to the circuit components in this system. This power supply unit provides regulated 5v power supply to the microcontroller and other circuit components.

An ATMEGA88PA microcontroller is used and programmed to perform desired operation of the system. This microcontroller is used to control all the circuit components in the system. This microcontroller acts as a brain of the system. In this system we have used an ultrasonic sensor is used to check the level of the wastage or garbage in the dustbin. This ultrasonic sensor is mounted on the top of the dustbin.

The hardware of the system also consists of a fire sensor as shown in the block diagram above. This fire sensor is used to detect the fire in the dustbin or garbage due to any reason. This sensor is also interfaced with the microcontroller to provide the signal to it. This fire sensor sends signal to the controller as soon as it detects the fire due to any reason. The system consists of a LCD display used to display the level of the garbage in the dustbin and also will display the fire detected if fire is detected in the dustbin. The system consists of a Wi-Fi modem to transmit all the data over the internet to monitor the dustbin from anywhere.

III. SOLAR TRACKING SYSTEM

Energy is the prime factor for the development of a nation. An enormous amount of energy is extracted, distributed, converted and consumed in the global society daily. 85% of energy production is dependent on fossil fuels. The resources of the fossil fuels are limited and their use results in global warming due to emission of greenhouse gases. To provide a sustainable power production and safe world to the future generation, there is a growing demand for energy from renewable sources like solar, wind, geothermal and ocean tidal wave. The sun is the prime source of energy, directly or indirectly, which is also the fuel for most renewable systems. Among all renewable systems, photovoltaic system is the one which has a great chance to replace the conventional energy resources. Solar panel directly converts solar radiation into electrical energy. Solar panel is mainly made from semiconductor materials. Si used as the major component of solar panels, which is maximum 24.5% efficient. Unless high efficient solar panels are invented, the only way to enhance the performance of a solar panel is to increase the intensity of light falling on it. Solar trackers are the most appropriate and proven technology to increase the efficiency of solar panels through keeping the panels aligned with the sun's position. Solar trackers get popularized around the world in recent days to harness solar energy in most efficient way. This is far more cost effective solution than purchasing additional solar panels. In this paper the design methodology of a microcontroller based simple and easily programmed automatic solar tracker is presented. A prototype of automatic solar tracker ensures feasibility of this design methodology.

Solar is a nonconventional source of energy, considering this we have developed solar panels so that we can fulfill our electricity need. But due to revolution of the earth, solar source i.e. sun does not face the panel continuously hence less electricity is produced. The energy panel should face the SUN till it is present in a day. The problem above can be solved by our system by tracking the solar energy.

Solar panel has been used increasingly in recent years to convert solar energy to electrical energy. The solar panel can be used either as a stand-alone system or as a large solar system that is connected to the electricity grids. The earth receives 84 Terawatts of power and our world consumes about 12 Terawatts of power per day. We are trying to consume more energy from the sun using solar panel. In order to maximize the conversion from solar to electrical energy, the solar panels have to be positioned perpendicular to the sun. Thus the tracking of the sun's location and positioning of the solar panel are important. The goal of this project is to design an automatic tracking system, which can locate position of the sun. The tracking system will move the solar panel so that it is positioned perpendicular to the sun for maximum energy conversion at all time. Photoresistors will be used as sensors in this system. The system will consist of light sensing system, microcontroller, gear motor system, and a solar panel. Our system will output up to 40% more energy than solar panels without tracking systems.

3.1 BLOCK DIAGRAM DESCRIPTION

The block diagram above shows system architecture it consist of a LDR sensor senses max solar power which is being given to the Microcontroller through the ADC which digitizes the LDR output. Microcontroller used in this system is a ATMEGA16A microcontroller having in-built ADC. Controller then takes the decision according to the algorithm and tilts the panel towards the direction of the max energy given by LDR with the help of DC Motor. The Motor is used to rotate the LDR to sense the max solar power. This motor is interfaced through relays with the microcontroller.

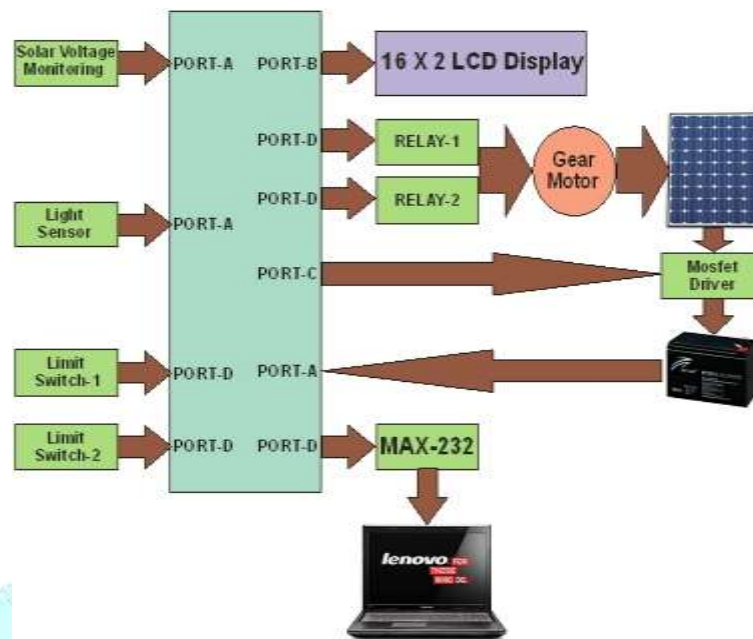


Fig. Block Diagram of Solar Tracking

IV. RESULTS

4.1 ONLINE READINGS TAKEN

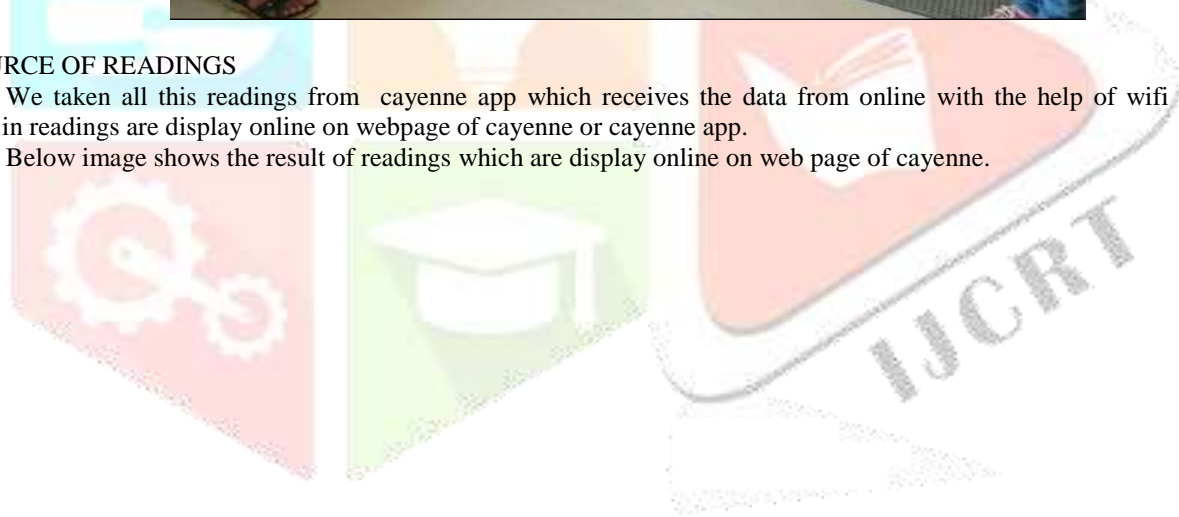
Parameter	Minimum	Maximum	Readings We Taken
Solar Voltage	0	NA	9.81V
Battery Voltage	0	15V	12.30V
Wind Voltage	0	NA	2.44V
Garbage Level	0%	100%	92%
Fire	NA	NA	No Fire

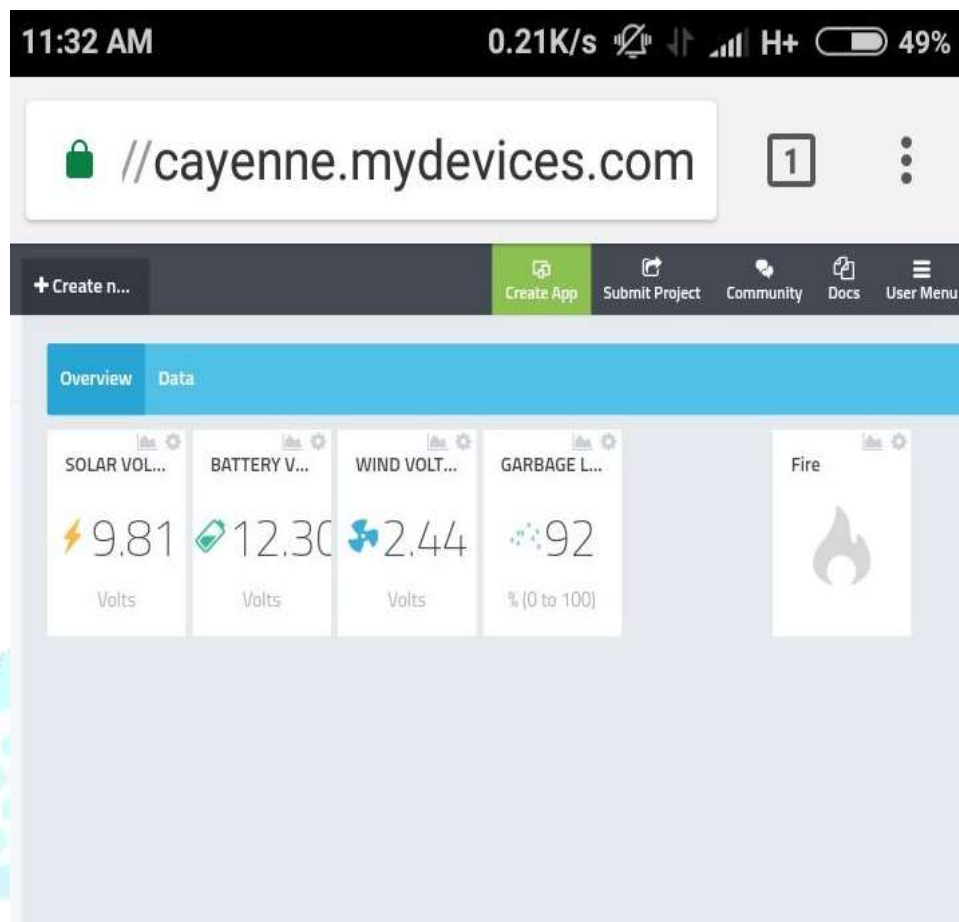


4.2 SOURCE OF READINGS

We taken all this readings from cayenne app which receives the data from online with the help of wifi module and all changes in readings are display online on webpage of cayenne or cayenne app.

Below image shows the result of readings which are display online on web page of cayenne.





Acknowledgment

We take this opportunity to express our heartfelt gratitude towards the department of electrical RCPIT, shirpur that gave us as an opportunity for presentation of our paper on project in their organization.

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