

An Intelligent Automation Control On Electrical Equipments Using Internet Of Things

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ABSTRACT

Lighting systems, particularly within the public sector, are still designed as per the previous standards of reliability and that they don't usually take advantage of latest technological developments. Nowadays energy crisis in India is a critical issue. Enormous electric energy is consumed by the Home Automation System. This system proposes a highly intelligent automatic control system of Home Automation. The control is implemented through a network of sensors to collect the relevant information related to the management and maintenance of the system, transferring the information via wireless using the ZigBee protocol&IoT. The information is transferred point by point using ZigBee transmitters and receivers and is sent to a control terminal used to check the state of the home. The power consumption detail is sent to the system database. It alerts the user, if the power consumption exceeds a particular level. Design of new intelligent home automation control system does not only achieve energy-saving but also extend the life of lighting equipment. Moreover, it is controllable, ease of maintenance. At the same time, it is helpful to highlight the festive and other characteristics, and ultimately make the home equipment network an intelligent one.

Index n Terms: Internet of Things, Light Dependent Resistor(LDR), Passive Infrared Sensor(PIR).

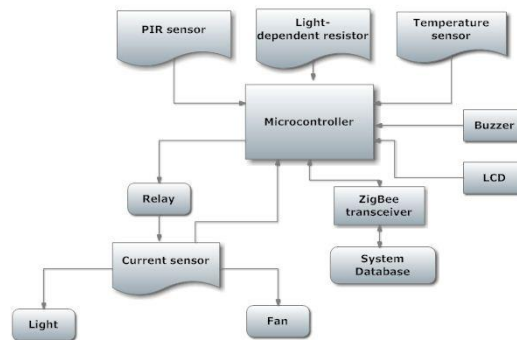
I. INTRODUCTION

The main objectives of the thesis are ,it presents our system which is able to integrate the latest technologies, in order to describe an advanced and intelligent management and control system of the street lighting. The sensors in the entire system check the status of the home. If there is any person in the home, it is known by the microwave PIR sensor. The temperature sensor reads the temperature of the room .If person present in the home and the also the temperature is high the fan gets triggered on. To detect if it's day or night, LDR sensor is used. If the person present in the home and also it is night, the light gets triggered on. If there is no person in the home none gets triggered on. The sensors signals are send to the microcontroller. The microcontroller controls the relay. The relay controls the light and fan switch. To alert the person about the power consumption limit, there is an option to enter the limit in the system database. The information about the power consumption is read by the use of current sensor. The information is transferred to the system database using ZigBee transceiver.

II. NEED OF SYSTEM

In proposed system, the system develops an intelligent Home automation control system. To develop this system the system uses Internet of things (IoT).Intelligent home automation control system uses the ZigBee-based wireless devices. The ZigBee-based wireless devices can enable more efficient street-light system management. It can switch lights reasonably, regulates voltage according to degrees of shine and runs in lower voltage in night. ZigBee is a wireless communication technology. It is designed to be more affordable than other WPANs in terms of costs and energy consumption. In this proposed method the network is built to transfer information from ZigBee to database. All electrical equipment like fan, light, microwave are controlled by this network. In case of failure of one equipment, the chosen transmission distance between thepoints ensures that the signal can reach the next equipment without breaking the chain.

III. SYSTEM ARCHITECTURE



Dependency:

Dependency is the semantic relationship where the change in one thing causes the change in semantic relationship in other thing.

The Intelligent system has the dependency among the various components. It has the dependency between:

- LDR input
- PIR Sensor input
- Temperature Sensor
- Arduino Uno microcontroller Output
- Relay
- Zigbee Technology

A. Pir Sensor

PIR are referred as, "Passive Infra Red", "Pyroelectric", or "IR motion" sensors. PIR sensors allows to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. If a person enters a room, the motion is sensed it is read as high signal, otherwise if there is no person the signal is taken as low signal

B. Ldr Sensor

A photo resistor or Light-Dependent Resistor (LDR) or **photocell** is a light-controlled variable resistor. The resistance of a photo resistor decreases with increasing incident light intensity. When a person enters a room, depending on the light intensity the relays gets on and off. For example if the room is of low intensity light, there is necessity of light in the room, it takes the input as high signal, the light glows automatically. If there is sufficient amount amount of light available in the room there is no need of light it will take the input as low signal

C. Temperature Sensor:

Temperature sensor devices are tools specially designed to measure the hotness or coolness of an object. When a person enters a room, depending on the temperature of the room the relays gets on and off. For example if the room is of high temperature if there is necessity of fan in the room, it takes the input as high signal, the fan automatically triggers on. If the temperature is low there is no need of fan it will take the input as low signal.

D. Microcontroller

The Arduino Uno is used as microcontroller based on the ATmega328P. The main function of the microcontroller it receives the signal from the PIR Sensor, LDR sensor, temperature sensor and process them and finally send the information to the database

E. Relay

According to the signal received from microcontroller the relay operates. If the signal received as a high signal the relay gets on. If the signal received as a low signal the relay remains off.

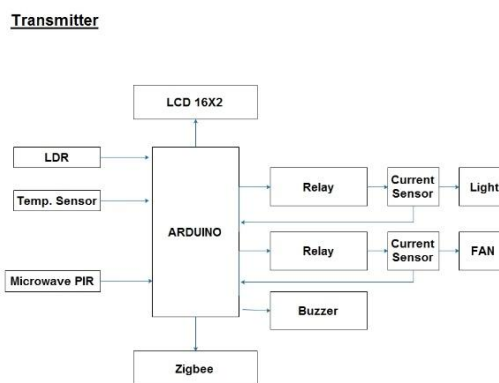
F. Zigbee Technology

The power consumption details are measured using current sensor and their details are transferred using zigbee technology. ZigBee is a technology of data transfer in wireless networks. It has low energy consumption and is designed for multi-channel control systems, alarm systems, and lighting control.

G. System Database

Power consumption details are recorded and stored in the system database. The details like electrical equipments on and off time is recorded, the energy utilized and cost is also stored in the database. It will alert the user if the power consumption is beyond a certain threshold level.

IV. BLOCK DIAGRAM FOR TRANSMITTER AND RECEIVER



V. RESULTS AND DISCUSSION

Thus an intelligent home automation has been designed to control the electrical equipments. The logic for the relay operation has been discussed below.

Logic For The Relay Operations

PIR	LDR	TEMPERATURE SENSOR	RELAY	
			LIGHT	FAN
0	0	0	OFF	OFF
1	0	0	OFF	OFF
1	1	0	ON	OFF
1	0	1	OFF	ON
1	1	1	ON	ON

Case1:

The above logic explains where there is no person arrival at the room, the microcontroller takes the input as low signal. The relay will be in off condition.

Case2:

If there is a person arrival, the microcontroller will receive the signal as high. When there is sufficient light and temperature is low, the microcontroller will receive the signal as low, the relay will be in off condition.

Case3:

If there is a person arrival, the microcontroller will receive the signal as high. When there is low intensity of light in the room, then the microcontroller will receive the signal as high, the relay of the light will be in on condition. If the temperature is low, there is no need of fan, the microcontroller will receive the input as the signal as low, the relay of fan will be in off condition.

Case4:

If there is a person arrival the microcontroller will receive the signal as high. when is there sufficient light and the microcontroller will receive the signal as low, relay of the light will be in off condition. If the temperature is high and if it is above the threshold level there is need of fan. the microcontroller will receive the input as high signal, the relay of fan will be in on condition.

Case5:

If there is a person arrival the microcontroller will receive the signal as high. when is there no sufficient light the the microcontroller will receive the signal as high, relay of the light will be in on condition. If the temperature is high and if it is above the threshold level there is need of fan. the microcontroller will receive the input as high signal, the relay of fan will be in on condition.

VI. CONCLUSION

In this thesis work, the system designed an intelligent home automation control system by using street light energy-saving control technology. The result shown that it is helpful to control home electrical equipments and ultimately make home network, intelligent, humanity and art and it can achieve energy-saving power. In the work both the transmitter part and receiver part has been implemented. By implementing this project it extends the service life of lighting equipment and it is controllable and is ease of maintenance. It is also helpful to highlight the festive and other characteristics. By implementing this project the unwanted wastage of power consumption can be reduced and also manual work is reduced

Appendix

DEVICES	LIMITS
Passive InfraRed sensor	1.7 V-3.3 V
Temperature sensor	0.7V-2.8V
Light Dependent Resistor	1.7V-3.6V

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