



Solar Powered Bluetooth Based Home Automation using Arduino

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ABSTRACT:

Technology means easiness towards any work, there has been everything becoming automated day by day. Advancement in automation technology, the life of a user or every other person goes on simpler day by day in every manner. Because of the ease in automated systems everyone prefers automated systems rather than manual operated systems. IOT stands for internet of things. This research paper has two main parts first is the solar panel on the roof and the motion detection light switching system in the room. The solar panel is controlled using a stepper motor which is controlled by a microcontroller. Solar panel will always face the sun at a perpendicular angle to absorb maximum energy. From here a signal can pass to the room light switching system to turn on or off the light by the amount of solar radiation present outside, or by tracking the stepper motor angle, i.e. give signal when the angle goes above some degree. The second part consist of PIR (passive infrared) sensor which detects motion in a room are controlled by rArduino, when it detects human presence it will turn on the light of the room when it stops detecting motion i.e. The human is asleep not moving or no human presence in the room it will turn off the light after a threshold time limit. 1]

Keywords: IOT, Home automation, Arduino, Bluetooth Module, Relays, Sensors, Solar panels.

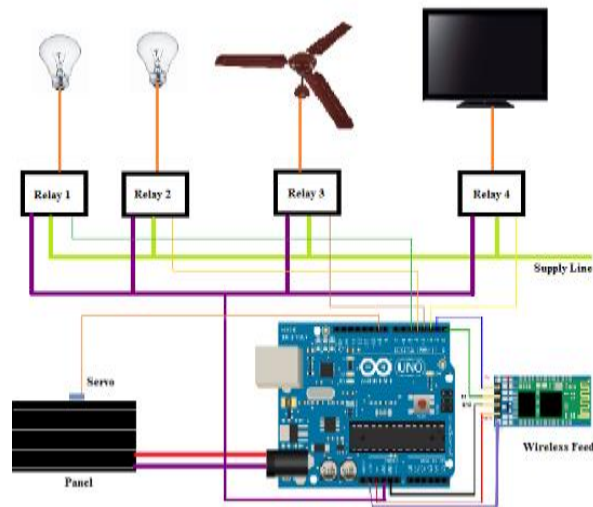
Introduction:

Solar power is arguably the cleanest, most reliable form of renewable energy available, and it can be used in several forms to help power our home or business. Solar-powered photovoltaic (PV) panels convert the sun's rays into electricity. This electricity can then be used to supply as renewable energy to our home or business.[2] The modern homes and their appliances are controlled through Bluetooth. The user send commands through input which will be obtained by the Bluetooth module. The Microcontroller has an interface with this module. Wireless Smart Home and Home automation are the dual aspects of this paper. Owner can make arrangements such as switching ON various appliances inside the house, which are connected and controlled by the microcontroller. User will be at full comfort zone as there is no need of manual controlling of appliances; it is like changing to the favorite T.V. channel with the help of TV remote. Thus using the same set of sensors the problems of home security can be solve.[3]

From a Security Engineer's Point of View 1. Unlike in companies, one can't enforce policies or security procedures that affect the convenience of people at home or their guests. 2. People are careless about even simple security policies. 3. Home may consist of people of different age groups e.g. Senior citizens which are not cable of understanding the technical aspect of the security system is more vulnerable to social engineering. 4. An attacker who hacks a home automation network can cause a wide range of damage, including theft, vandalism, emotional harm, permanent damage to electronic devices, loss of reputation, financial damages, blackmail, environmental damages, physical harm to a home's inhabitants, granting unauthorised access to anyone. 5. The mixed ownership of devices at home and guests with varying technical knowledge and different intentions compounds security issues at home.[5]

System Description :Its main function is to convert direct current into alternating current generated by a solar generator. It allows monitoring of the system so that the people who operate the system can see how the system works. If you are considering a solar panel system for your home, one of the key decisions you make is what type of inverter to install. The inverter converts the direct current (DC) power generated by the solar panels into usable alternating current (AC) electricity. After the solar panel, the inverter is the most important device in the solar power system. In this work, two Arduino Integrated Development Environment (IDE) software and a Bluetooth terminal application are used. This section describes Arduino programming and Android application development. The microcontroller is programmed in C using the Arduino IDE. Android apps are developed using Java and appear as GUIs in mobile phones. The Arduino programming code is executed using the Arduino IDE compiler. The code is injected into the hardware using a USB cable. Android applications are used to connect between devices and home appliances. In this article, we demonstrated the design and implementation of a wireless, flexible, and low-cost solution for home automation. The system is secure for any user to access. Users need to get a pairing password for Arduino BT and mobile phone to access home appliances. This adds protection against unauthorized users. This system can be used as a test bed for all devices that require on-off applications without any internet connection.[6]

Circuit Diagram



Advantages:

- It is a robust and easy to use system.
- There is no need for extra training of that person who is using it.
- All the control would be in your hands by using this home automation system.
- This project can provide the facility of monitoring all the appliances with in the communication range through Bluetooth.
- By using this system the users can check the status of the appliances at whatever time of the day
- Manual control is also given in this project so the unskilled person can easily change the status.

Applications

- Campus display system in colleges and university for displaying day to day information continuously.
- It is also used in organisation, railway stations, offices, etc.
- In crime prevention: display board put on road will display tip on the public security, accident prevention.
- Advertisement : shopping malls
- In metropolitan cities for managing traffic.
- Bluetooth system offers flexibility to display flash news or announcement.[9]

Conclusion :

As to save the energy cost we used renewable energy source. In this system two things are important and i.e. energy consumption and energy generation. The energy consumption includes the energy use of home equipments based on Wi-Fi and Wi-Fi send this collected data to home server. Energy generation is based on solar panel. Renewable energy gateway (REG) is suitable for both the consumption and generation. Hence by taking both consumption and generation, the home server optimizes home energy use. Wi-Fi technology provide home security and its cost is more effective as compared to previously existing system. Hence we can conclude that the required objectives of renewable energy based home automation system using IOT have been achieved. Finally, the proposed system is better from the scalability and flexibility point of view than the previously existing home automation system[10].

Future Work:

We always say that precaution is better than cure so we used renewable energy source to save the energy cost in this system. We are going to design Renewable Energy Based Home Automation System Using WiFi. As this is college level project, so we used Wi-Fi only for local network. In future we are going use WiFi globally, so that we can control our home equipments from throughout the world.[10]

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