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Version Number:

Team Members :

Team No:

Module: Model Based System Engineering

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**Document History**

Content: -

Topic: - Home Automation.

1. Introduction.
2. Block Diagram.

* Explanation.

1. Requirements.

* High level Requirements.
* Low level Requirements.

Home Automation: -

**INTRODUCTION**

* An internet-based home automation system focuses on controlling home electronic devices whether you are inside or outside your home.
* Home automation gives an individual the ability to control things remotely or automatically around the home.
* A home appliance is a device or instrument designed to perform a specific function, especially an electrical device, such as a refrigerator for household use.
* The words appliance and devices are used interchangeably.
* Automation is today’s fact, where things are being controlled automatically, usually the basic tasks of turning on/off certain devices and beyond, either remotely or in proximity.
* The concept of remote management of household devices over the internet from anywhere, any time in the world today can be a reality.
* Assume a system where from the office desk, the user could view the status of the devices and decides to take control to turn on the cooling system, say the air conditioner, and switches on or off some of the lights etc.
* The recent developments in technology which permit the use of radio frequency technology such as Bluetooth, have enabled different devices to have capabilities of communicating with each other.
* Bluetooth is a new technology, which has at its center the goal of eliminating wired connections between computers.
* Instead of connecting with wires, every appliance has small transmitters/receivers. The radio frequency used (2.4 GHz) is so high that the range of transmission will be small (about 30 feet).
* This is important because the range is so small, that it can be used in apartments without much interference to your neighbors or from them.
* These are a few reasons that make Bluetooth technology ideal for home automation.
* With this in mind, I propose to design an internet-based home automation system for remote control of home appliances.

Graphical user interface, application

Description automatically generated

Explanation: -

1. Temperature Sensor: -

* Temperature sensors measure the atmospheric temperature and send the data to home automation system (Microcontroller).
* Home automation system which controls the heating, ventilation, and air conditioning (HV AC).

1. PIR Sensor: -

* A PIR Sensor is utilized to identify the infrared radiation from the warm object.
* As it comprises of sensor which start changes in their temperature (because of occurrence infrared radiation) into electric flag called PYRO ELECTRIC SENSORS.
* It produces an electric charge when infrared light strikes a gem.
* Like this, PIR Sensor recognize an encompassing attribute (Person) moving around roughly just inside 10m from the PIR Sensor.

1. Gas Sensor: -

* Gas sensor is a device which sense the presence of various gases within an area, usually as part of a safety system.
* This type of devices is used to detect a gas leak and interface with a microcontroller so a process can be automatically shut down.
* A gas sensor can also sound an alarm to operators in the area where the leak is occurring, giving them the opportunity to leave the area.

1. Light Sensor: -

* **Light intensity data can help you to automate your lighting system to switch it on or off.**
* **Switching off light automatically with your home automation system, where light intensity is high enough to see, will save energy.**
* **You can also create your own luminance data table and use it to automate your application to regulate when to switch lights on or off.**

1. **Relay: -**

* Relays are **a fundamental device for switching an electrical circuit on or off**, much like a toggle switch or a limit switch.
* But a relay is operated based on an electrical control signal obtained from Sensors as opposed to a toggle switch that is operated by a microcontroller, or by equipment contact.

1. **Bluetooth model: -**

* This module enables you to wireless transmit & receive serial data.
* It is a drop-in replacement for wired serial connections allowing transparent two-way data communication.
* You can simply use it for serial port replacement to establish connection between MCU.

Requirements: -

High level requirements: -

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| --- | --- |
| RID | Description |
| HLR\_1 | To detect the Light intensity in the area and control it. |
| HLR\_2 | To detect the atmospheric temperature in the area and control it. |
| HLR\_3 | To detect any gas leak of toxic gases around area. |
| HLR\_4 | To detect the motion of the object or peoples in the area. |
| HLR\_5 | Remotely control the home automation from Mobile phone. |

Low level requirements: -

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| --- | --- |
| RID | Description |
| LLR\_1 | Light Sensor |
| LLR\_2 | Temperature Sensor |
| LLR\_3 | Gas Sensor |
| LLR\_4 | PIR Sensor |
| LLR\_5 | Bluetooth Model |
| LLR\_6 | LCD Display |

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