Robotics Laboratory Automation

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Abstract- *This paper presents Our Proposed system which is to make a Robotics Laboratory Smart and Automated. Automation needs to be practiced for reducing the human effort for completing a task. IOT is a chief technology through which we are able to produce diverse beneficial net applications Basically, IOT is a managed network in which all physical objects (Sensors) are connected to the internet through network devices and exchanges data over the cloud. A simple definition for automation is the ability to do tasks automatically. Common tasks include turning off lights when no one is in the room, automating air condition systems that can sense and memorize temperature settings and appliances that help you save your Electrical energy.*

Keywords- Our Robotics Laboratory, Passive Infrared Sensors Sensor, Smart Fan, Smart Curtains, Stepper motor

I. INTRODUCTION

Although Technology helps us in every aspect for making our life more reliable, comfortable and enjoyable. Besides this, if Technology which also saves Energy will be similar to cherry on top of the cake. We have designed a similar Kind of system which will not only add value but will also save Electrical Energy. Our Proposed system is to make our Robotics Laboratory Smart and Automated. The Proposed system will make the following Modules Automated.

1. Smart Light (By checking the Human Presence/Motion with the help of PIR Sensor)
2. Smart Fan (With the Help of a Temperature sensor the Fan will operate according to the temperature of Lab).
3. Welcome Gesture and Oral explanation given at the stations with the help of Speaker and Ultrasonic sensor controlled by Arduino.
4. Smart Curtains: Automatic Movement of Window curtains.

By connecting these modules to the cloud, the data will be shared over the cloud which makes it IOT enabled system. This system will not only Add Value to the Lab But will also save Electricity when not in use automatically.

II. LITERATURE REVIEW

I-Learning IOT: An Intelligent Self Learning System for Home Automation Using IOT In this paper, the author has explained Different wireless technologies that support remote data transfer, control, and sensing such as RFID, Wi-Fi, Bluetooth, at various levels in the home. Internet of things is nothing but physical items talking to each other, machine-to-machine communications, that's going to change everything which also includes ourselves. IOT is the next evolution or generation of the Internet, it's like taking a huge leap in its ability to collect, analyze, and distribute data. We Got the Idea of a Smart Gesture from this particular proposed work which we have modified and used in our system.

Low-Cost Implementation of Smart Home Automation In this Paper Author has explained how IOT helps in Home Automation. They have used wireless technology to control home appliances with the help of Android smartphones. The Android smartphone supports WIFI connectivity, Bluetooth, and wireless data over a cellular network and offers Graphical User Interface (GUI) based touch screen operated The Android application designed using MIT app2 here is giving the two provisions to the user either use Application with graphical/ UI buttons or voice commands to control the home appliances by the means of wireless communication.

After studying a research paper based on the IOT network Home Automation we came across how the IOT works with each other. IOT is a group of connected networks where there is communication between sensor to sensor and data is shared to the cloud via network group. In this Paper the Author has used various IOT devices such as WIFI, Bluetooth which are wireless IOT devices used for Wireless communication among the Networked Group.

III. METHODOLOGY

Our Proposed system is mainly focused on the Automation of Our Robotics Laboratory with the help of IOT. The Laboratory contains 8 Lights, 4 Fans, and 2 Windows. The proposed system is to automate these 2 Fans, 8 lights, and 2 Window curtains using the Sensors. The proposed model is working in a manner such as

1. Whenever a person opens the Laboratory Doors the headlight (Top of the Door) with be switched on automatically until the door is open. Now there are two cases as follows when the door is closed. Case1: If the person is standing near the door vicinity the Light will be staying in ON state. Case2: If the person is absent in the door vicinity the sensors will sense and turn the Headlights OFF automatically. Now if the person is present and another location in the Laboratory so the Lights at that point will be turned on automatically. This part of Automation is proposed with the Help of a Passive Infrared Sensor, Door Sensor, and Microcontroller such as Arduino UNO.

2. There is a total of 4 Fans in the Laboratory. Automation of Fans is done using the combination of two sensors such as Passive Infrared Sensor and Temperature Sensor. The Fans in auto mode will be working only when the two conditions are True Such as 1: If there is a person Present in the Room.2: The temperature of the room is more than 25 degrees Celsius.

3. There are in total 8 Robotics Stations in the Laboratory. Each Station has its different Prospects.
   Whenever a Person standing in the vicinity of a particular station, our system will Sense and will Start Explaining to him about the Station. The presence will be checked with the Help of an Ultrasonic Sensor and a Speaker will be used for the Explanation Part controlled by Arduino UNO.

4. In-Total there are 2 Windows. Hence the Window Curtains will be controlled by a Stepper motor where a person can handle them with the help of a Mobile Application.

5. Whenever a Person Enters the Laboratory, he/she will be greeted with a Welcome Gesture with the Help of an Ultrasonic Sensor placed upright down and a speaker controlled via Arduino UNO

IV. CONCLUSION

In this paper, we proposed automation of robotics laboratory using IOT. We have used passive infrared sensor (for light automation) YOURBOT xh-w3001 (for automatic temperature based fan controlling), Ultrasonic sensor and speaker controlled via Arduino UNO (for greeting and oral explanation about the robotic stations), Stepper motor (for controlling window curtains). The proposed system not only reduces human effort but it also saves electrical energy by sensing the absence of use of laboratory and turning off the electrical appliances automatically. In future robotics laboratory can be connected with the other laboratories present in institution so that the laboratories will communicate with each other and does the expected job.

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