



Islington college

(इस्लिङ्टन कलेज)

Module Code & Module Title
CS5053NI/CC5068NI– Cloud Computing & IoT

<<Home Automation>>

Assessment Type
10% Proposal Report

Semester
2023 Spring/Autumn

Group members

| London Met ID | Student Name |
|---------------|--------------------------|
| 22067570 | Krish Bhattarai |
| 22067551 | Nikhil Raj Singh |
| 22067556 | Krishna Bhasink Shrestha |

Assignment Due Date: 2023-12-18
Assignment Submission Date: 2023-12-18
Submitted to: Mr. Sugat Man Shakya
Word Count: 1091

I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero will be awarded.

Acknowledgement

We would like to express our sincere gratitude to our module leader and teacher Mr. Sugat Man Shakya sir, Shishir Subedi sir, Ayush Bhakta Pradhanang sir, for giving us an opportunity to work on this project. With the help of our teachers, seniors and through thorough research, this project has helped improve our understanding of various topics tied to IOT.

Abstract

In modern era, smart devices have become a part of our everyday life. Internet of Things (IoT) devices and Artificial Intelligence (AI) has changed how people perceive and engage with technology. An example of AI enabled system powered by IoT devices is smart home. From adjusting the lights to controlling the security system of the house, a smart home setup can make people's lives easier and more convenient.

Table of Contents

| | |
|---|----|
| Acknowledgement | 2 |
| Abstract | 2 |
| 1. Introduction | 1 |
| 1.1 Current Scenario | 1 |
| 1.2 Problem Statement and Project as a solution | 2 |
| 2. Aims and Objectives | 3 |
| Aim | 3 |
| Objectives | 3 |
| 3. Background | 4 |
| 3.1 Expected Outcomes and Deliverables | 4 |
| 3.2 Requirement Analysis | 5 |
| 4. Individual Contribution Plan | 9 |
| 5. Conclusion | 10 |
| 6. References and Bibliography | 11 |

Table of Figures

| | |
|--|---|
| Figure 1: Flow diagram of home automtion. | 4 |
| Figure 2: Arduino UNO..... | 5 |
| Figure 3: PIR Sensor..... | 5 |
| Figure 4: Servo Motor..... | 6 |
| Figure 5: LDR sensor. | 6 |
| Figure 6: Bread Board. | 7 |
| Figure 7: LED Bulb..... | 8 |
| Figure 8: BC 547 Transistor. | 8 |

Table of Tables

| | |
|---|---|
| Table 1: Individual Contribution plan. | 9 |
|---|---|

1. Introduction

Internet of things (IoT) devices are physical things that consists of hardware components such as actuators, sensors, appliances that can transmit data over the internet. These devices can be a day-to-day home automation device to tools used in industries. IOT devices can be controlled and monitored with devices that are connected in the network (Oracle, 2023).

The integration of Internet of things (IoT) in a home automation setup allows smart appliances and devices to connect to the internet and can be controlled using a phone, tablet, or a laptop. It offers opportunities to enhance security, convenience, and energy efficiency.

1.1 Current Scenario

Home Automation, smart devices can offer Enhanced convenience and Energy efficiency. These days, voice assistants such as Amazon Alexa are being implemented in home automation (Statista, 2022).

Lighting control is an aspect of home automation that most people who are just getting into smart home automation start with. It is more convenient and can be energy efficient (Woetzel, 2018).

Interoperability is important for home automation. Smart home platform such as Google Home Kit, Amazon Home kit enables users to centralized control meaning users can manage multiple devices through single interface (Gartner, 2020).

Advantages of this project include:

- Convenience
- Energy Efficiency
- Cost Saving

1.2 Problem Statement and Project as a solution

Problem Statement:

In modern living, energy wastage and inefficient home management have been a widespread issue. The traditional setups lead to inconvenience and higher utility cost due to the lack of automation that is required for optimal resource utilization.

Project Solution:

Our Home Automation project is a prototype which features an automatic door and a smart LED light that is automatically controlled using sensors. A home automation setup provides optimal resource utilization which helps reduce higher utility costs. It is not only convenient, but it also helps reduce energy consumption by offering a solution for streamlined home living.

2. Aims and Objectives

Aim

The aim of this IOT project is to create a home automation system that uses sensors to turn the lights on when its dark and turn the lights off when there's light present in the room.

Objectives

- **Automation:** Use automation tools to simplify and improve the usability of routine tasks for your users.
- **Scalability:** Create a system that consumers can readily add more smart devices to by making it easy to extend.
- **User-Friendly Interface:** Offer a simple interface that makes keeping an eye on electronic devices in your home easy.

3. Background

3.1 Expected Outcomes and Deliverables

In this proposal, we propose the development of an innovative smart home prototype, envisioning a living environment that seamlessly integrates advanced technologies to optimize daily activities. Our anticipated outcomes centre on efficiency, and convenience. The prototype aims to automate and centralize control over home systems, minimizing manual interventions and enhancing operational efficiency across lighting, locking system. Picture a home where every step is met with seamless intelligence. Our smart lock system does not just secure your space; it recognizes your movement, unlocking effortlessly as you approach. Meanwhile, the smart lighting system, aligned to your environment, automatically brightens when darkness sets in. This dynamic duo of a smart lock reacting to movement and lights responding to darkness ensures a secure, well-lit home tailored to your every move, making your living space not just smart but anticipatory and welcoming.

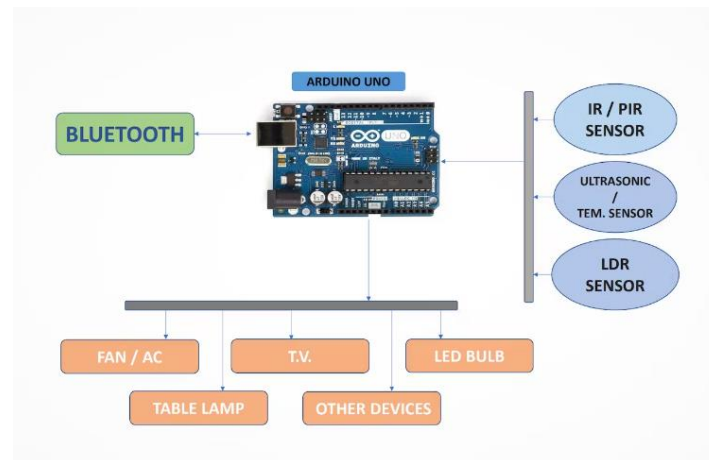


Figure 1: Flow diagram of home automation.

3.2 Requirement Analysis

1. Arduino Uno

The greatest board for learning electronics and coding is the Arduino UNO. The UNO is the most durable board that anyone can begin experimenting with if it is their first time modifying the platform. Among the whole Arduino family, the UNO is the board that is used and documented the most (Arduino.cc, 2023).



Figure 2: Arduino UNO.

2. PIR Sensor

PIR sensors are complex sensors because their input and output are affected by several different factors (ada, 2023).



Figure 3: PIR Sensor.

3. Servo Motor

Servo motor can rotate extremely precisely. The control circuit for this kind of motor offers feedback on the motor shaft's present position, enabling servo motors to rotate extremely precisely. Utilizing a servo motor allows you to spin an object at precise angles or distances (Apoorve, 2015).

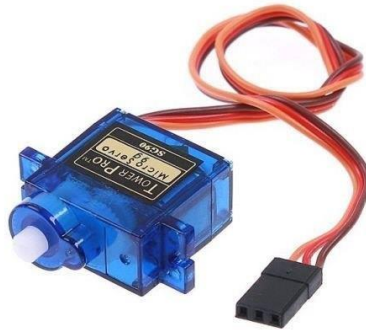


Figure 4: Servo Motor.

4. LDR

A unique kind of resistor known as an LDR (Light Dependent Resistor) operates based on the photoconductivity principle, which asserts that resistance varies with light intensity. When the intensity of the light increases, so does its resistance (electronicsforu, 2023).

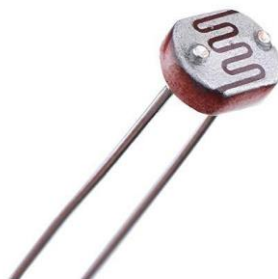


Figure 5: LDR sensor.

5. Bread Board

A breadboard is a piece of board used for circuit construction or prototyping. It allows users to build circuits without soldering by arranging parts and connections on the board. Connections are handled by the holes in the breadboard, which electrically link components or wires within the board while also firmly grasping them where you place them (circuitbread, 2019).

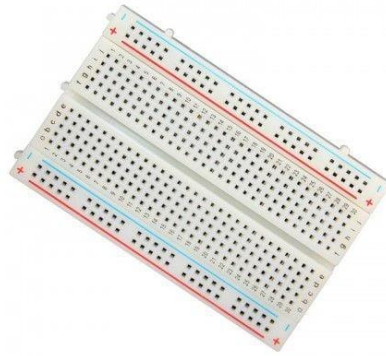


Figure 6: Bread Board.

6. LED Bulb

LED (Light-emitting diodes) are used in light bulbs and lamps to create light. Since LED technology is "solid-state", the components that produce light are contained within a solid substance. Solid-state lighting is far less prone to malfunction because of vibration or stress (Bulbs.com, 2023).

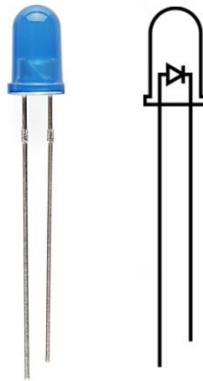


Figure 7: LED Bulb.

7. BC 547 Transistor.

Transistors can be used as an active component for switches and amplifiers in conjunction with other electronic parts including resistors, coils, and capacitors. This kind of NPN transistor has three terminals: an emitter, a base, or control, and a collector (Legazpi, 2023).



Figure 8: BC 547 Transistor.

4. Individual Contribution Plan

As there are comparatively few members in our team, the individual contribution plan is crucial. It is created to allocate tasks to the members of the group to make the coursework manageable.

| Name | Task |
|--------------------------|---|
| Krish Bhattarai | <ul style="list-style-type: none"> • In writing the Introduction and Current Scenario for this proposal. • Creating Automatic Door Sensor using Servo Motor. • Research. • Report and Documentation. • Responsibility of the components. |
| Nikhil Raj Singh | <ul style="list-style-type: none"> • In writing Aims and Objectives and Requirement Analysis for this proposal. • Creating Automatic Light using LDR. • Checking Wiring • Research. • Prototype Arrangement. |
| Krishna Bhasink Shrestha | <ul style="list-style-type: none"> • In writing Expected outcomes and deliverables for this proposal. • Coding and reviewing. • Testing and debugging. • Research. • Documentation. |

Table 1: Individual Contribution plan.

5. Conclusion

In the modern day, smart home automation is gaining popularity because of convenience and energy saving in the long run. The old-fashioned setup requires optimal resource utilization while leading to inconvenience because of lack of automation. Therefore, the following proposal is proposed as an IOT project for Home Automation. It features a smart LED light and an Automatic Door. It promises optimal resource utilization and enhanced convenience on a daily basis.

6. References and Bibliography

ada, L., 2023. *How PIRs Work*. [Online]

Available at: <https://learn.adafruit.com/pir-passive-infrared-proximity-motion-sensor/how-pirs-work>

Apoorve, 2015. *What is a Servo Motor?*. [Online]

Available at: <https://circuitdigest.com/article/servo-motor-working-and-basics>

Arduino.cc, 2023. *Arduino.cc*. [Online]

Available at: <https://docs.arduino.cc/hardware/uno-rev3>

Bulbs.com, 2023. *Get to know your light bulbs with our comprehensive type guides..* [Online]

Available at: <https://www.bulbs.com/learning/led.aspx>

circuitbread, 2019. *What is a Breadboard?*. [Online]

Available at: <https://www.circuitbread.com/ee-faq/what-is-a-breadboard>

electronicsforu, 2023. *What Is Light Dependent Resistor (LDR)?*. [Online]

Available at: <https://www.electronicsforu.com/technology-trends/learn-electronics/ldr-light-dependent-resistors-basics>

Farlex, 2023. *what is a wire*. [Online]

Available at: <https://www.thefreedictionary.com/Metal+wire>

Gartner, 2020. *artner Top 10 Strategic Technology Trends For 2020*. [Online]

Available at: <https://www.gartner.com/smarterwithgartner/gartner-top-10-strategic-technology-trends-for-2020>

[Accessed 2 December 2023].

HEMMINGS, M., 2018. *What is a Jumper Wire?*. [Online]

Available at: <https://blog.sparkfuneducation.com/what-is-jumper-wire>

jotrin.com, 2023. *What is a 1k Resistor?*. [Online]

Available at: <https://www.jotrin.com/technology/details/what-is-a-1k-resistor-1k-ohm-resistor-color-code>

Legazpi, G. A., 2023. *What Is a BC547 Transistor?*. [Online]
Available at: https://www.easytechjunkie.com/what-is-a-bc547-transistor.htm#google_vignette

Microbattery, 2023. *What Are 9V Batteries?*. [Online]
Available at: <https://www.microbattery.com/blog/post/battery-bios:-everything-you-need-to-know-about-the-9v-battery/>

Oracle, 2023. *What is the Internet of Things (IoT)?*. [Online]
Available at: [https://www.oracle.com/internet-of-things/what-is-iot/#:~:text=The%20Internet%20of%20Things%20\(IoT\)%20describes%20the%20network%20of%20physical, and%20systems%20over%20the%20internet.](https://www.oracle.com/internet-of-things/what-is-iot/#:~:text=The%20Internet%20of%20Things%20(IoT)%20describes%20the%20network%20of%20physical, and%20systems%20over%20the%20internet.)

[Accessed 2 December 2023].

proto supplies, 2023. *Resistor 47K Ohm 5% 1/4W*. [Online]
Available at: <https://protosupplies.com/product/resistor-47k-5/>

Statista, 2022. *Number of connected devices worldwide by vertical 2020 and 2030..* [Online]
Available at: <https://www.statista.com/statistics/1095042/adaro-energy-gross-profit/>
[Accessed 2 December 2023].

Woetzel, J. R. J. B. B. L. K. S. S. S. G. M. J. L. J. C. A. a. V., 2018. *Smart cities: Digital solutions for a more livable future..* [Online]
Available at: <https://www.mckinsey.com/capabilities/operations/our-insights/smart-cities-digital-solutions-for-a-more-livable-future>
[Accessed 2 December 2023].