

**REVOLUTIONIZING  
ENERGY CONSERVATION  
USING IOT**

# INTRODUCTION

- In today's world, where energy consumption is at an all-time high, it is imperative that we find new ways to conserve energy and reduce our carbon footprint. This is where video processing technology and smart automation systems come into play.
- Video processing technology allows us to analyze and understand how energy is being used in a room, while smart automation systems enable us to control and optimize energy consumption in real-time. By combining these technologies, we can achieve significant energy savings without sacrificing comfort or convenience.



# OBJECTIVES

- Our goal is to create a smart system that can accurately track when people are in a room and adjust energy use accordingly. By doing this, we want to save energy, lower costs, and help the environment. We also want to make sure this system works well in different places like offices, stores, and homes.



# PROBLEM STATEMENT

- In a world where energy usage is high and needs to be reduced, we face a challenge in finding smart ways to save energy while still being comfortable. Current methods for saving energy aren't precise enough and can be improved. We aim to solve this by using advanced technologies like video analysis and smart automation.



# LITERATURE SURVEY

S.NO	TITLE OF THE PAPER	NAME OF THE JOURNAL	AUTHORS	CONTRIBUTION	RESULTS
1.	<b>Smart Home Control by using Raspberry Pi &amp; Arduino UNO</b>	<b>International Journal of Advanced Research in Computer and Communication Engineering</b>	Hamid Hussain Hadwan,  Y. P. Reddy	The paper introduces an affordable and adaptable home control and monitoring system employing Raspberry Pi and Arduino Microcontroller. The system employs an Android-based smartphone app or server computer for remote control via IP connectivity. It employs smart switch devices and an access point for seamless appliance control. The key hardware includes Raspberry Pi, Arduino, nRF24L0+ Wireless Transceiver, and Relay Modules. Notably, the system employs Python programming on Raspberry Pi, and a wireless module adapter for Arduino-nRF24L0+ communication. The contribution lies in providing a cost-effective solution for home automation through an easily accessible smartphone interface, wireless connectivity, and programmable components.	The user's application program operates on the microcontroller platform, simplifying the wireless sensor network system development. The paper demonstrates the practicality of the system through detailed design and measurement outcomes. Future enhancements could encompass integrating diverse sensing methods, expanding the web interface for improved data handling, and utilizing additional storage servers for efficient data management and synchronization.



# PAPER - 2

S.NO	TITLE OF THE PAPER	NAME OF THE JOURNAL	AUTHORS	CONTRIBUTION	RESULTS
2.	AUTOMATION ON LIGHT AND FAN BASED ON HUMAN DETECTION USING AI & IOT	BioGecko	Mr. S. Balaji S. Mohammad Afrid V. Nethaji S. Nithishkumar	<p>The paper presents a novel integration of Artificial Intelligence (AI) and Internet of Things (IoT) technology to automate lighting and fan systems based on human presence detection. Key contributions include:</p> <p><b>Enhanced Automation:</b> The system combines sensors and AI algorithms to detect human presence in rooms and autonomously adjust lighting and fan settings based on occupant preferences or pre-set configurations.</p> <p><b>AI-Powered Optimization:</b> Utilizing AI algorithms, the system learns occupant behavior and preferences over time, allowing it to continually optimize the environment for comfort and energy efficiency.</p> <p><b>Remote Monitoring and Control:</b> The integration of IoT technology enables remote system monitoring and control through connected devices, enhancing user convenience and accessibility.</p> <p><b>Energy Efficiency:</b> By tailoring lighting and fan usage to actual occupancy and preferences, the solution has the potential to significantly improve energy efficiency in home environments.</p>	<p>The paper introduces an innovative system that combines AI and IoT for automating lighting and fan systems based on human presence detection. It offers enhanced comfort, energy efficiency, and remote control capabilities. Notably, the system employs advanced machine learning algorithms to detect human presence, distinguishing it from conventional motion-based systems. The integration of AI and IoT showcases a forward-looking approach to home automation.</p>

# PAPER - 3

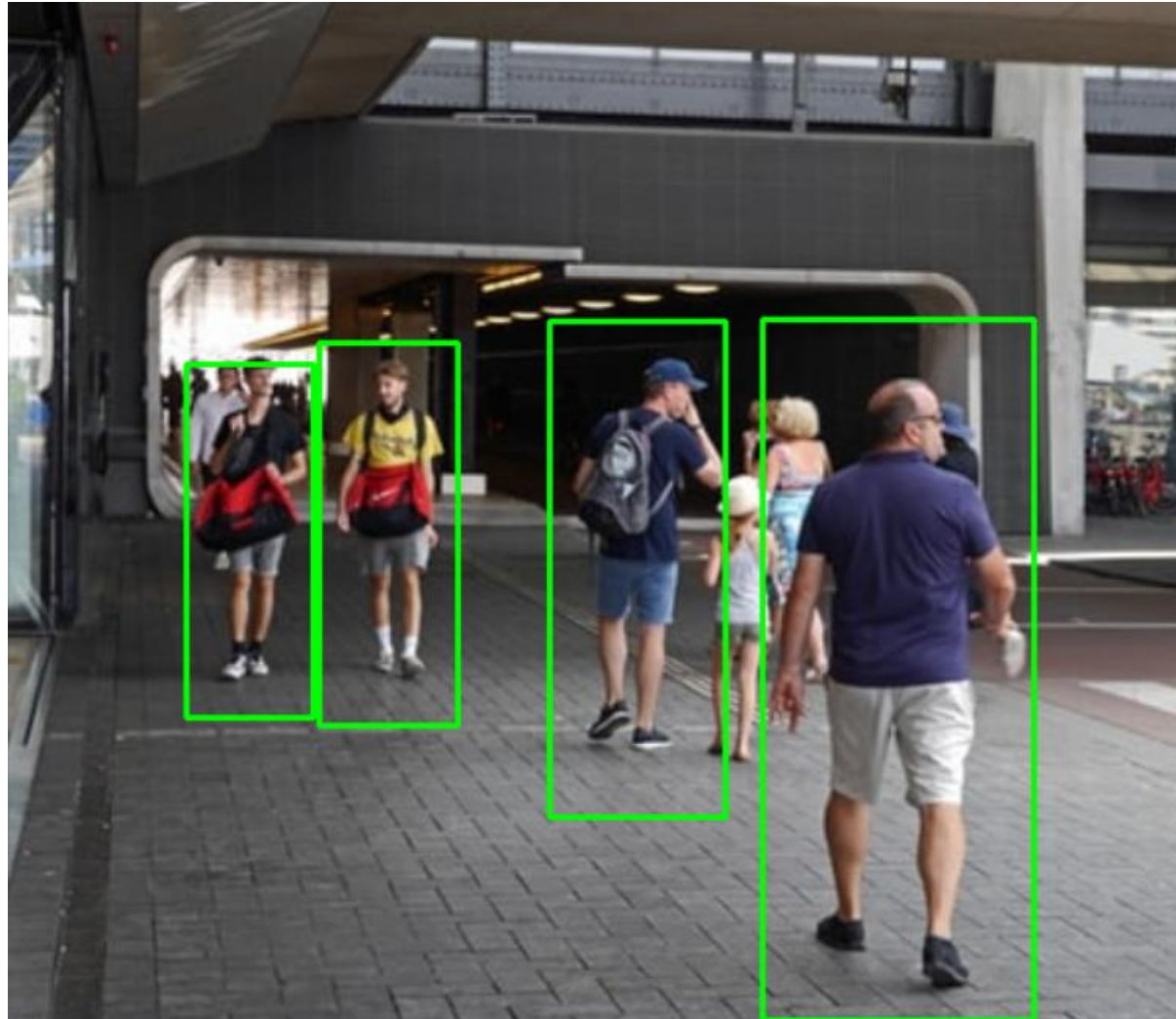
S.NO	TITLE OF THE PAPER	NAME OF THE JOURNAL	AUTHORS	CONTRIBUTION	RESULTS
3.	<b>An IoT-Based Smart Home Automation System</b>	<b>Politehnica University of Timisoara</b>	Cristina Stolojescu-Crisan  Calin Crisan  Bogdan-Petru Butunoi	The paper addresses the growing trend of home automation by proposing qToggle, a system that simplifies daily life through the integration of sensors and actuators. qToggle's key contributions include a robust API for seamless communication, user-friendly smartphone control, device compatibility, and a foundation for future expansion and add-ons, all aimed at creating a more automated and convenient living experience.	The paper introduces qToggle, a home automation system that connects sensors, actuators, and data sources for streamlined automation. It utilizes a user-friendly smartphone app and primarily leverages ESP8266/ESP8285 chips and Raspberry Pi boards, offering a flexible and interconnected living environment.

# IMAGE PROCESSING PART

- Human detection Algorithm
- Open CV
- Binary code Generation Logic
- Camera : To locate the human being using image processing



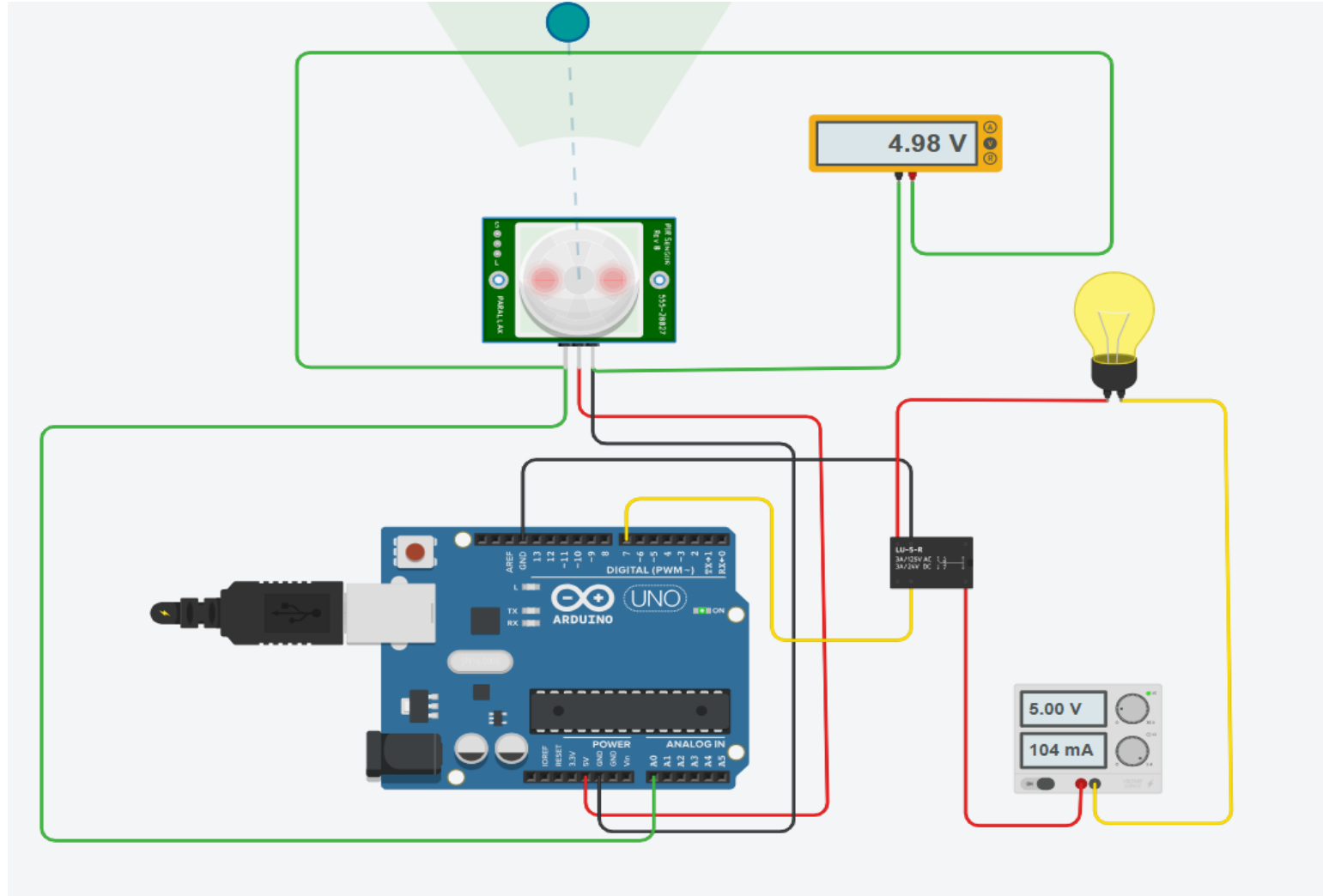
# HUMAN DETECTION USING IMAGE PROCESSING



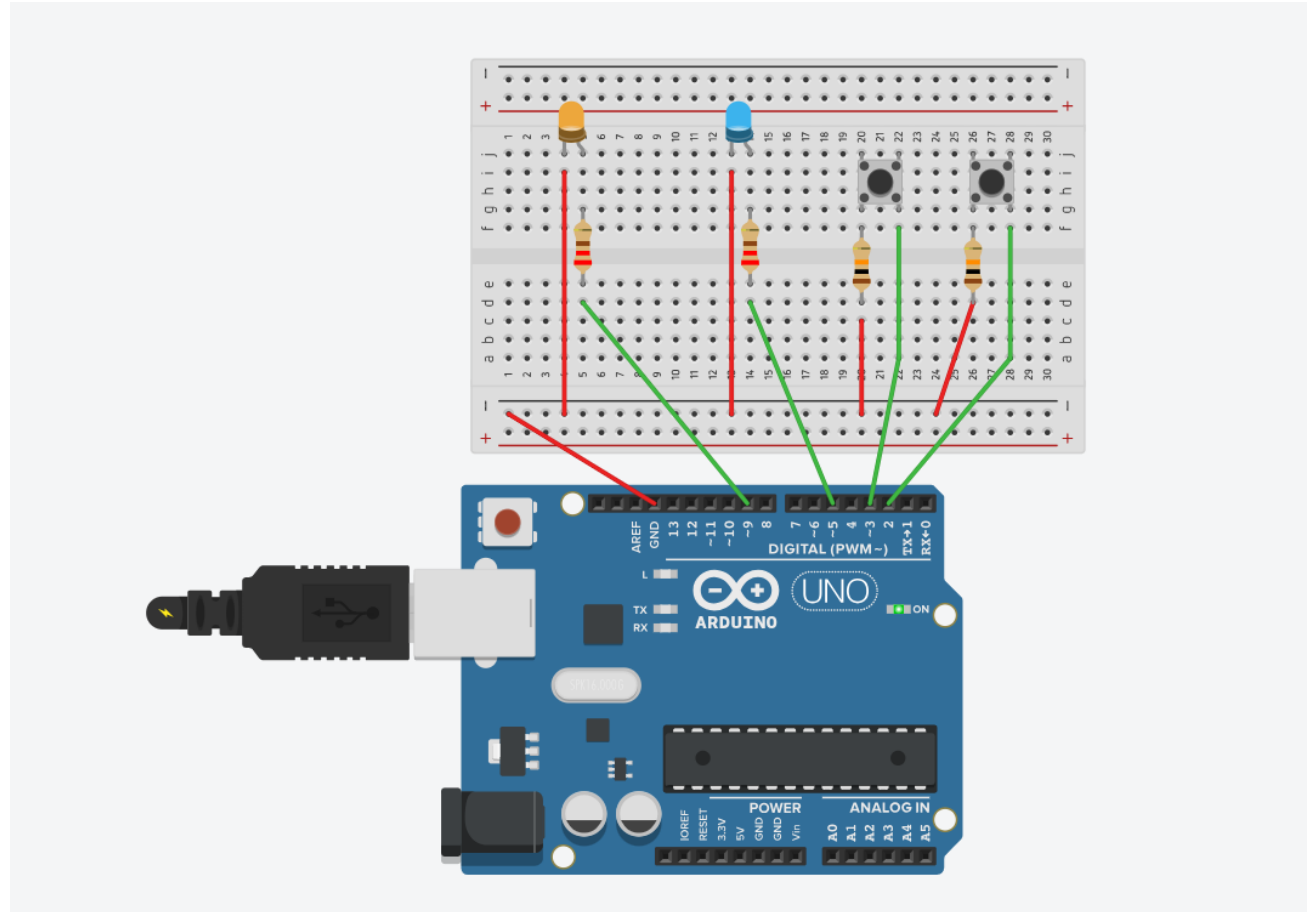
# IOT PART

- Arduino uno R3
- Motion Sensors: Additional motion detection for energy-efficient control
- Relay Switch : To vary the input to the bulbs

# DETECTING HUMAN PRESENCE USING PIR



# CONTROLLING LIGHTS USING BUTTON INPUT



# CONCLUSION

- In conclusion, our implementation of the home automation system demonstrates the potential for creating an intelligent and responsive environment within residential spaces. Through the integration of image processing and the use of Passive Infrared (PIR) sensors, we have successfully achieved the detection of human presence with a high degree of accuracy. Additionally, the control of lighting systems via button inputs provides a tangible example of real-time home automation.
- The synergy between these components showcases the adaptability and versatility of the system. It lays the foundation for future enhancements and advancements, offering convenience, energy efficiency, and security to homeowners. The partial implementation serves as a proof of concept, highlighting the feasibility and practicality of our approach.

