

Industrial Internship Report on

“Human Detection Robot”

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Executive Summary

This report presents the details of the Industrial Internship facilitated by Upskill Campus and The IoT Academy in collaboration with UniConverge Technologies Pvt. Ltd (UCT). The assigned project was “Human Detection Robot”, developed using an Arduino UNO, a human detection sensor (PIR sensor), battery supply, buzzer, and jumper wires. The objective was to design a simple robot that can detect the presence of humans in its surroundings and alert the system using a buzzer.

During the 4-week internship, I designed and implemented the hardware and software for this robot. The PIR sensor was used to detect human motion, the Arduino UNO processed the sensor data, and the buzzer gave an alert. The system was powered by a rechargeable battery.

This internship gave me practical exposure to embedded systems design, robotics, and sensor interfacing. It was a valuable hands-on learning experience that will help me in my career.

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1. Preface

This report summarises my 4-week internship experience with upskill campus and The IoT Academy in collaboration with UniConverge Technologies Pvt Ltd.

During this period, I worked on the project “Human Detection Robot” using Arduino.

My project, Human Detection Robot, focused on building a robot capable of detecting human presence using a PIR sensor and alerting with a buzzer.

The project taught me the importance of embedded systems in developing real-time applications.

I would like to thank Upskill Campus, The IoT Academy, and UCT for giving me this opportunity. I also thank my mentors and peers for their guidance.

2. Introduction

2.1 About UniConverge Technologies Pvt. Ltd (UCT)

UniConverge Technologies Pvt Ltd (UCT) is a company established in 2013 working in digital transformation, IoT, and industrial automation. They provide solutions in predictive maintenance, smart cities, and connected devices.

UCT developed products and solutions leveraging Cutting Edge Technologies such as:

- Internet of Things (IoT)
- Cyber Security
- Cloud Computing (AWS, Azure)
- Machine Learning
- Communication Technologies (4g/5g/LoraWAN)
- Java Full-stack, Python, Front-end frameworks

UCT IoT Platform (UCT Insight)

UCT Insight is an IoT platform designed for quick deployment of IoT applications while providing valuable “Insights” for processes/businesses.

Backend in Java, Frontend in ReactJS

Supports MySQL and various NoSQL Databases

Device Connectivity via MQTT, CoAP, HTTP, Modbus, TCP, OPC UA

Cloud and on-premises deployment

Features: dashboard builder, analytics, alerts, notifications, integration with power BI/SAP/ERP, rule engine

Smart Factory Platform (Factory Watch)

A modular SaaS-based smart factory solution for OEE, predictive maintenance, and digital twin capabilities.

UCT is also one of the early adopters of LoRaWAN technology, providing solutions in agritech, smart cities, industrial monitoring, and utility meeting.

2.2 About upskill Campus

Upskill Campus, along with The IoT Academy and UCT, facilitated the smooth execution of the internship.

It is a career development platform delivering personalized executive coaching in an affordable and scalable way, aiming to upskill 1 million learners in the next 5 years.

2.3 The IoT Academy

The IoT Academy is EdTech Division of UCT that is running long executive certification program in collaboration with EICT Academy, IITK, IITR and IITG in multiple domains.

2.4 Objective

- Gain hands-on industrial experience
- Solve a real-world problem

- Improve job prospects and technical skills

Enhance personal growth in problem-solving and communication

2.5 References

[1] Arduino Lectures on YouTube

[2] IoT Protocol Standards

[3] UCT Websites for Introduction

2.6 Glossary

Arduino UNO: Microcontroller board used for robot control.

PIR Sensor: Human motion detection sensor.

Buzzer: Audio alert component.

Battery: Power supply for portability.

3. Problem Statement

In many cases, detecting unauthorized human entry is important for security, automation, and monitoring applications. Conventional surveillance systems are costly and complex. A low-cost, sensor-based robotic system is required to detect human presence and raise an alarm immediately.

4. Existing and Proposed Solution

Existing Solutions

CCTV cameras (require monitoring, high cost).

Manual security checks (less reliable).

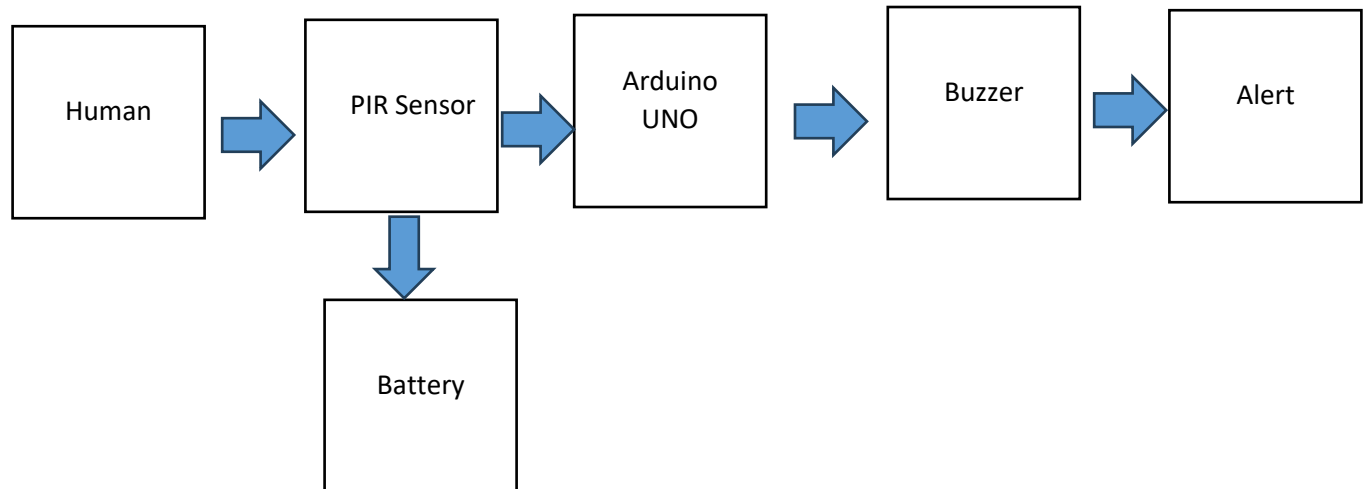
Advanced motion detection systems (expensive).

Proposed Solution

The Human Detection Robot uses a PIR sensor to detect human presence. The Arduino UNO processes the sensor signals and triggers a buzzer alarm. The robot can be powered using a rechargeable battery, making it portable and suitable for real-time security applications.

5. Proposed Design / Model

5.1 High Level Diagram



5.2 Interfaces

- Hardware Interfaces: PIR sensor, Arduino UNO, buzzer, jumper wires, battery.
- Software Interfaces: Arduino IDE for coding.

6. Performance Test

6.1 Test Plan / Test Cases

- Human detected → buzzer ON
- No human detected → buzzer OFF
- Continuous human motion → buzzer continues
- Battery low → system performance decreases

6.2 Test Procedure

- Connected PIR sensor to Arduino
- Wrote program to detect human motion
- Connected buzzer to output pin
- Powered system with battery and tested in different conditions
- Performance Outcome

6.3 Performance Outcome

The System successfully detected Human presence or movement within second and activated the buzzer or LED to alert.

7. My Learnings

I learned about:

- Embedded systems
- IoT communication protocols (MQTT, HTTP)
- Arduino
- Circuit design and prototyping
- Python for embedded systems
- IoT integration for automation projects

8. Future Work Scope

- Add GSM or IoT module to send remote alerts.
- Use motors for mobility (make it a moving robot).
- Add camera for image capture.
- Improve power efficiency with better batteries.