JIS UNIVERSITY

Title : Sensored Robot

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Course Name : Skill X

Course Code : R23_YCS2504

Department : Bachelor of Technology

Programme : Computer Science and Engineering

Submission Date : 26/05/2025

Introduction:

This document presents a cutting-edge AI-powered human-following robot developed as part of the Skill-X project. Built using Arduino, ultrasonic sensors, and motor drivers, this robot embodies the integration of artificial intelligence and machine learning with robotics to deliver an advanced, context-aware, autonomous mobile assistant.

Hardware Components:

- Arduino UNO microcontroller
- Ultrasonic sensors (HC-SR04)
- Servo motors and motor driver (L298N)
- Power supply (Battery Pack)
- Chassis and wheels

Applications in Real World:

1. Healthcare Assistance: Helping elderly or disabled individuals move around while carrying essentials.
2. Smart Shopping Assistant: Carrying items while following customers through stores.
3. Security and Surveillance: Following authorized personnel while scanning for intruders or anomalies.
4. Logistics and Warehousing: Transporting items by following staff around large facilities.
5. Event Assistance: Guiding attendees or providing mobile information booths in conferences or exhibitions.

6. Home Automation: Following users to provide mobile lighting, reminders, or carry small items.

System Workflow:

- Ultrasonic sensors detect distance to the nearest object.
- When a human is detected within a predefined range, the robot initiates follow mode.
- The microcontroller adjusts motor speed and direction based on sensor feedback.
- Real-time feedback loop ensures continuous tracking.

Advantages of the System:

- Affordable and modular design
- Easily scalable with AI/ML libraries
- Highly interactive and dynamic
- Adaptable to indoor and outdoor environments

Future Enhancements:

i. AI-based human gait analysis

ii. Deep learning for emotion recognition

iii. Swarm robotics coordination for group tasks

iv. Cloud-based data logging and optimization

Conclusion:

The human-following robot project represents a promising prototype in the realm of AI-driven robotics. While currently operating on embedded logic, its potential lies in the integration of advanced AI/ML techniques, enabling it to evolve into a context-aware, intelligent robotic assistant for diverse environments