

Project Proposal: Kiro

Team: Nextronix

Institution: CSVTU College

1. Introduction

Objective:

The Kiro project aims to develop an AI-enabled mobile robot, similar to JARVIS (Joint Automated Resourceful Virtual Intelligence System). This state-of-the-art, AI-driven robotic system will support Nextronix lab operations and enhance the guest welcoming experience at CSVTU College. The robot integrates advanced AI technologies, robotics, and sensor systems to communicate, provide alerts, assist in lab operations, and physically welcome guests.

- Assist in Nextronix Lab operations.
- Greet visitors at CSVTU College.
- Provide real-time emergency alerts (fire, gas leakage, security).
- Communicate with users through voice/text and provide lab/college updates.

2. Key Features

- **AI Interaction** – Voice commands, chat-based NLP, and multilingual support.
- **Mobility** – Autonomous movement with SLAM and obstacle avoidance.
- **Alert System** – Detection of fire/gas through IoT sensors; sends SMS/email notifications to admins.
- **Guest Welcoming** – Facial recognition, guided tours, and event announcements.
- **Lab Assistant** – Inventory management, reminders for booking equipment, and AI-powered research assistance.

3. Technical Requirements

Hardware

- Raspberry Pi 5 (Central Controller).

- **Arduino Uno (Sensor Integration).**
- **Motor Drivers + Wheels (4WD Chassis).**
- **Sensors: Ultrasonic (obstacle detection), MQ-2 (gas detection), Flame sensor, Pi Camera.**
- **Outputs: LCD Screen, Speakers, LED Alerts.**
- **Power: 12V Li-ion Battery + Solar Charging (optional).**
- **3D Printing.**
- **Battery & Charger.**

Software

- **AI/ML: Python, TensorFlow/PyTorch (for NLP and face recognition).**
- **Navigation: ROS (Robot Operating System), OpenCV.**
- **Alert System: IoT Hub (AWS IoT/ThingSpeak), Twilio API for SMS.**
- **Database: SQLite/Google Firebase (for user/data logs).**

Tools

- **CAD Design (Fusion 360 for robot chassis).**
- **3D Printing (for custom parts).**
- **GitHub (version control).**

4. Implementation Plan

Phase 1: Research & Design

- **Define hardware components.**
- **Train voice command NLP model.**
- **Create robot chassis in CAD.**

Phase 2: Prototyping

- **Assemble motors, sensors, and Raspberry Pi.**
- **Implement core functionalities (navigation, alerts).**

Phase 3: AI Integration

- Develop face recognition and NLP modules.
- Integrate IoT-based alert system with Twilio/email.

Phase 4: Testing

- Test in lab/college environments.
- Optimize battery life and response accuracy.

Phase 5: Deployment

- Install in Nextronix Lab.
- Train users and provide system documentation.

5. Expected Outcomes

- 24/7 automated lab support.
- Enhanced campus security with real-time notifications.
- Improved interactive visitor experience at CSVTU.
- Publish project on GitHub for open-source collaboration.

6. Approval Request

We request approval for this project and the provision of the required resources.

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