Raspberry Pi Alcohol Detection System with Cloud Integration

BCSE312L- Programming for IoT Boards

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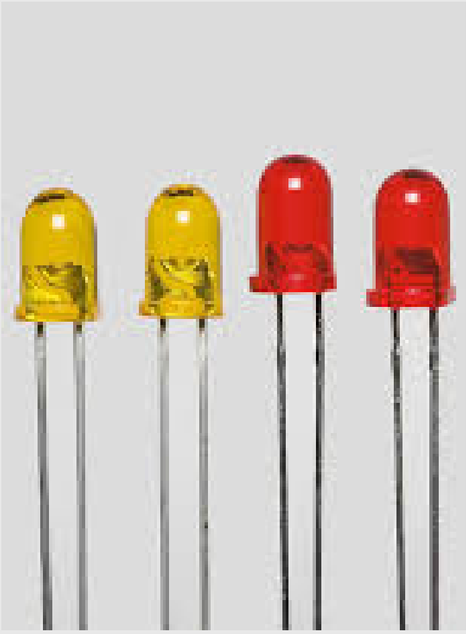
Project Overview

- Intelligent alcohol detection system
- Combines Raspberry Pi with cloud connectivity
- Real-time alcohol level monitoring
- Comprehensive web-based visualization
- Data storage and analysis capabilities

Key Objectives

- Develop accurate alcohol detection using MQ-3 sensor
- Implement real-time data processing on Raspberry Pi
- Create secure cloud storage for detection data
- Design an interactive web portal for monitoring
- Enable instant alerts and notifications
- Ensure system reliability and data accuracy
- Implement user authentication and access control

System Components

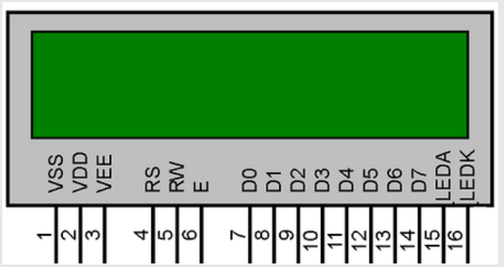


Hardware Requirements

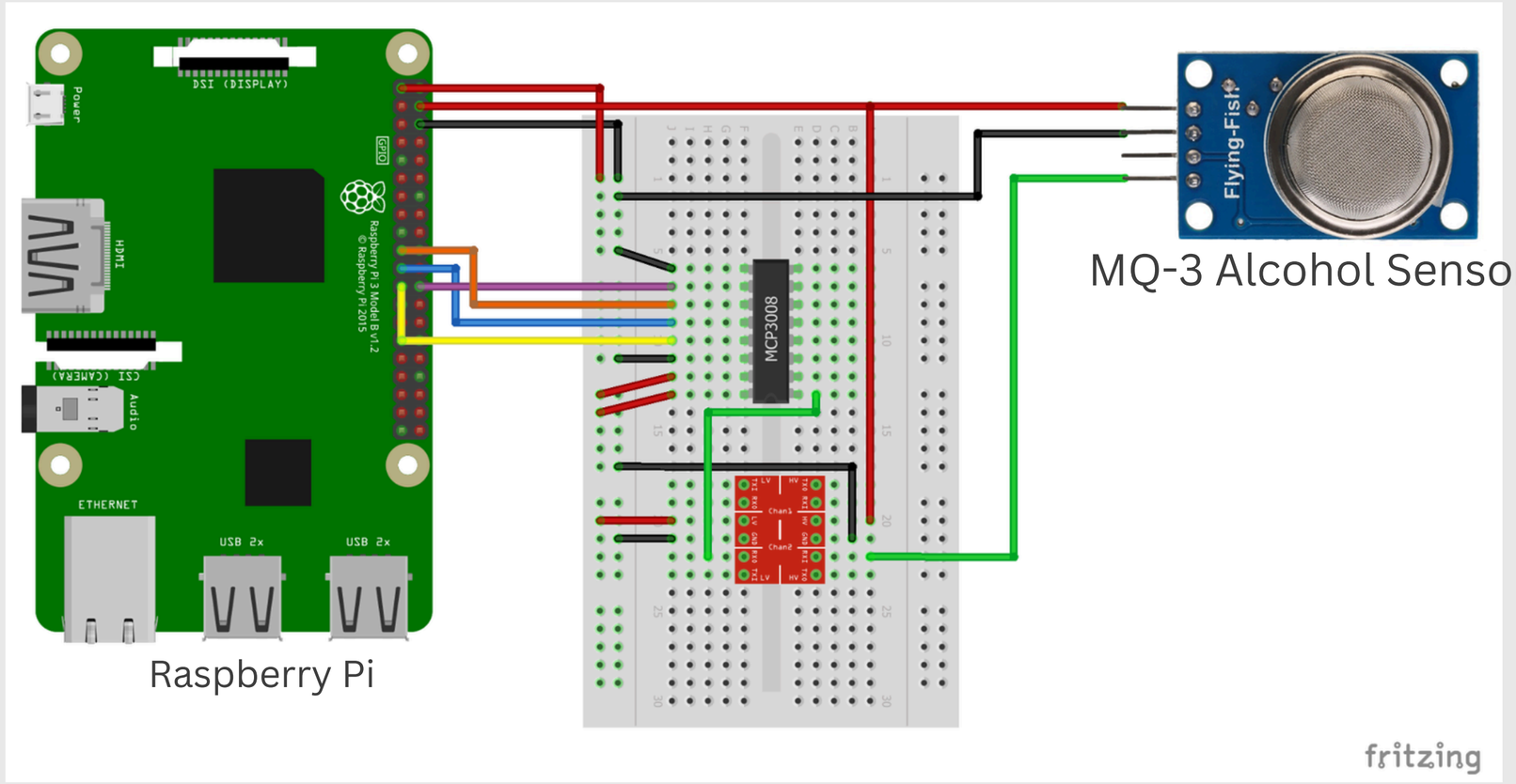
- Raspberry Pi 4 Model B
- MQ-3 Alcohol Sensor
- 16x2 LCD Display
- LED Indicators
- Push Buttons

Software Requirements

- Raspberry Pi OS
- Python 3.x, JavaScript
- Required Libraries
- RPi.GPIO
- Adafruit_MCP3008
- python-firebase
- Cloud Platform: AWS/GCP/Azure, Firebase
- Web Stack: React.js, Node.js/Python, MongoDB



Circuit design



System Architecture

Layer Structure

Sensing Layer

- MQ-3 alcohol sensor
- ADC for analog-digital conversion
- Continuous monitoring

Processing Layer

- Raspberry Pi data processing
- Real-time calibration
- Alert generation

Cloud Layer

- Secure data transmission
- Real-time database updates
- Authentication services

Application & Presentation Layer

- Web server implementation
- API endpoints
- Real-time dashboard

Web Portal Features

- Dashboard Real-time alcohol level display
- Historical trend graphs
- Alert notifications
- Analytics Statistical analysis
- Pattern recognition
- Trend visualization
- Administration User management
- Device configuration
- Calibration settings

Benefit of the Project

- Real-time monitoring
- Accurate alcohol detection
- Automated alerts
- Comprehensive data logging
- Remote monitoring

Implementation