A REPORT ON IOT BASED SUICIDE PREVENTION SYSTEM

BY

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AT

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A Practice School-I Station of

Birla Institute of Technology & Science, Pilani

July 2024

Acknowledgements

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Abstract

This project presents an IoT-based suicide prevention system designed to detect and alert in case of potential suicide attempts. Utilizing a combination of load sensors and PIR sensors, the system monitors unusual activities and triggers an alert mechanism. Notifications are sent to a predefined server for further action. The project demonstrates the potential of IoT in enhancing mental health safety measures.

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Introduction

Suicide is a significant public health issue that demands immediate attention. Traditional prevention methods often fall short in providing timely intervention. This project aims to leverage IoT technology to create a real-time alert system that can potentially save lives by detecting and responding to suicide attempts more effectively.

Main Text

System Design

The IoT-based suicide prevention system comprises sensors and microcontrollers to monitor the environment for signs of distress. The system uses load sensors to detect changes in weight and PIR sensors to detect movement. When both sensors are triggered, an alert is sent to a server via an ESP8266 Wi-Fi module.

Components

- **Load Sensor**: Detects changes in weight.
- **PIR Sensor**: Detects movement.
- **Buzzer**: Sounds an alarm when sensors are triggered.
- **ESP8266**: Sends notifications to the server.
- **Arduino**: Acts as the central controller.

Implementation

```
#include <SoftwareSerial.h>


// Define the pin numbers
const int loadSensorPin = A0; // Analog pin for load sensor
const int pirSensorPin = 2; // Digital pin for PIR sensor
const int buzzerPin = 3; // Digital pin for buzzer
```

```
// Initialize SoftwareSerial for communication with ESP8266
SoftwareSerial espSerial(10, 11); // RX, TX pins for ESP8266

// Wi-Fi credentials and server URL
const char* ssid = "your_SSID";
const char* password = "your_PASSWORD";
const char* serverUrl = "http://yourserver.com/notify";

// Function to send AT commands to ESP8266
void sendATCommand(const char* command, const char* response, unsigned long timeout)
{
  espSerial.println(command);
  unsigned long start = millis();
  while (millis() - start < timeout) {
    if (espSerial.find(response)) {
      break;
    }
  }
}

void setup() {
  // Initialize serial communication for debugging
  Serial.begin(115200);

  // Set pin modes
  pinMode(loadSensorPin, INPUT);
  pinMode(pirSensorPin, INPUT);
  pinMode(buzzerPin, OUTPUT);
```

```
  // Initialize SoftwareSerial for ESP8266
  espSerial.begin(115200);

  // Connect to Wi-Fi
  sendATCommand("AT", "OK", 1000);
  sendATCommand("AT+CWMODE=1", "OK", 1000);
  String cmd = "AT+CWJAP=\"" + String(ssid) + "\",\"" + String(password) + "\"";
  sendATCommand(cmd.c_str(), "OK", 5000);

  // Check if connected to Wi-Fi
  sendATCommand("AT+CIFSR", "OK", 5000);
  Serial.println("Connected to Wi-Fi");
}

void loop() {
  int loadValue = analogRead(loadSensorPin);
  int pirValue = digitalRead(pirSensorPin);

  // Check if both sensors are triggered
  if (loadValue > 500 && pirValue == HIGH) { // Adjust loadValue threshold as needed
    triggerBuzzerAndAlert("Both sensors triggered!");
  } else if (pirValue == HIGH) { // Check if only PIR sensor is triggered
    sendNotification("PIR sensor triggered!");
  }

  delay(1000); // Delay to avoid rapid triggering
}

void triggerBuzzerAndAlert(String message) {
```

```
    // Sound the buzzer
    digitalWrite(buzzerPin, HIGH);
    delay(1000);
    digitalWrite(buzzerPin, LOW);

    // Send notification via ESP8266
    sendNotification(message);
}

void sendNotification(String message) {
    // Send notification via ESP8266
    sendATCommand("AT+CIPSTART=\"TCP\",\"yourserver.com\",80", "OK", 2000);
    String postData = "message=" + message;
    String httpRequest = "POST /notify HTTP/1.1\r\nHost: yourserver.com\r\nContent-Type: application/x-www-form-urlencoded\r\nContent-Length: " + String(postData.length()) + "\r\n\r\n" + postData;
    String sendCmd = "AT+CIPSEND=" + String(httpRequest.length());
    sendATCommand(sendCmd.c_str(), ">", 2000);
    espSerial.print(httpRequest);
    sendATCommand("", "SEND OK", 2000);
    sendATCommand("AT+CIPCLOSE", "OK", 2000);

    Serial.println("Alert sent: " + message);
}
```

Conclusions and Recommendations

The IoT-based suicide prevention system demonstrates significant potential in providing timely intervention for individuals at risk. Further improvements can include integrating additional sensors for more comprehensive monitoring and developing a mobile application for real-time alerts.

Appendices

Server Code

```
const express = require('express');
const bodyParser = require('body-parser');

const app = express();
const port = 3000;

app.use(bodyParser.urlencoded({ extended: true }));

app.post('/notify', (req, res) => {
  const message = req.body.message;
  console.log(`Notification received: ${message}`);
  res.send(`Notification received: ${message}`);
});

app.listen(port, () => {
  console.log(`Server running at http://localhost:${port}`);
});
```

References

- Reference materials related to IoT, suicide prevention technologies, and related hardware components.

Glossary

- **IoT (Internet of Things)**: Network of physical objects that communicate over the internet.
- **PIR Sensor**: Passive Infrared Sensor used to detect motion.
- **ESP8266**: A Wi-Fi module used for connecting microcontrollers to the internet.

Appendix-A

A REPORT

ON

(IOT BASED SUICIDE PREVENTION SYSTEM)

BY

Name(s) of the Student(s)	ID.No.(s)
E Thirumala Sai Vardhan	2022A7PS0017H
K Hari Hara Prasad Goud	2022A7PS0011H

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(FERVID SMART SOLUTIONS)

A Practice School-I Station of

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(July, 2024)

Appendix B

A REPORT

ON

(IOT BASED SUICIDE PREVENTION SYSTEM)

Name(s) of the Student(s)	ID.No.(s)	Discipline(s)
E Thirumala Sai Vardhan	2022A7PS0017H	COMPUTER SCIENCE
K Hari Hara Prasad Goud	2022A7PS0011H	COMPUTER SCIENCE

Prepared in partial fulfillment of the Practice School-I Course Nos.

BITS C221/BITS C231/BITS C241

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BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
(July, 2024)

Appendix C

Abstract Sheet

Birla Institute of Technology and Science Pilani (Rajasthan)
Practice School Division

Station: Fervid Smart Solution
Centre: Hyderabad
Duration: 2 months
Date of Start: 28th May 2024
Date of Submission: 23rd July 2024

Title of the Project: IoT Based Suicide Prevention System

ID No./Name(s)/Discipline(s):

- E Thirumala Sai Vardhan (ID-2022A7PS0017H) - Computer Science
- Hari Hara Prasad Goud (ID-2022A7PS0011H) - Computer Science

Name(s) and designation(s) of the expert(s):

- Bhavani (IoT Mentor)
- Laxmikanth (HR)
- Kashyap (IoT Mentor)

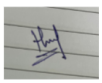
Name(s) of the PS Faculty: Srinivas Appari

Key Words: IoT, Suicide Prevention, Sensors, Alert System

Project Areas: Mental Health Safety, IoT Solutions

Signature(s) of Student(s):

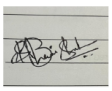
E Thirumala Sai Vardhan
Hari Hara Prasad Goud



Date: 23rd July 2024

Signature of PS Faculty:

Mr.Bhavani Shankar



Guidelines for Success Story:

It is observed that many of the PS-I students, not just meet stated learning outcomes, but also go that extra mile and contribute to the PS stations. Hence, it is suggested that a project can be nominated for "PS-I success story", if it meets in addition to the defined learning outcomes of PS-I course and its outcomes should be attested by the faculty and station authorities, as one, "benefitting the organization".

Contributions benefitting the organizations could be (not limited to) those efforts leading to:

1. Increased productivity
2. Increased revenue
3. Innovations
4. Increased quality of a product/ service
5. Researched and reliable information availability on relevant subjects, to the station, leading to paper publications, establishing IP etc.

In conclusion, it is proposed that any PS-I success story, not only leads to student learning outcomes being met, but also leads to quantifiable benefits to the practicing station.

Template for Success Stories:

Station Name: Fervid Smart Solutions

Project Domain: Iot

Project Title: Iot Based Suicide Prevention System

Student(s) Name: E Thirumala Sai Vardhan

K Hari Hara Prasad Goud

Typical benefits to PS station: Increased productivity and experience of the IT sector.