■ Vehicle Automation & Accident Alert using CAN

This project implements a Vehicle Automation and Accident Alert System using Control Area Network (CAN) protocol. It uses multiple sensors (fire, water, vibration, speed) along with GPS and GSM modules to detect accidents and send real-time alerts.

■ Features

- ■ Fire detection alert
- ■ Water leakage detection
- ■ Vibration-based accident detection
- ■ Over-speed monitoring
- ■ GPS-based live location tracking
- ■ SMS alert via GSM to registered mobile number
- ■ CAN communication to share alerts with other vehicle nodes

■■ Hardware & Modules

- Microcontroller (8051 / AVR / ARM / STM32)
- Fire sensor
- Water sensor
- Vibration sensor
- Speed sensor
- GPS module
- GSM module (SIM900/800)
- CAN controller (e.g., MCP2515 + transceiver)

■■ Working Principle

1. Sensors continuously monitor vehicle conditions.
2. On accident/fire/water/overspeed, the GPS module fetches live coordinates.
3. GSM module sends an SMS alert with location to the registered mobile number.
4. CAN bus shares alerts with other nodes in the vehicle network.

■ Project Structure

■■■ README.md # Project documentation (this file)
■■■ docs/
■ ■■■ Vehicle_Automation_CAN_Accident_Alert_Project.pdf # Full project report
■■■ src/
■ ■■■ main.c # Embedded C source code

■■ Embedded C Code (main.c)

```
#include <reg51.h>   // For 8051 MCU, change header if using other MCU

sbit FIRE_SENSOR  = P1^0;
sbit WATER_SENSOR = P1^1;
sbit VIB_SENSOR   = P1^2;
sbit SPEED_SENSOR = P1^3;
void main() {
```

```
    char gps_data[64];
    UART_Init();
    CAN_Init();

    while(1) {
        if(VIB_SENSOR == 1) {
            GPS_ReadLocation(gps_data);
            GSM_SendSMS("Accident Detected! Location:");
            GSM_SendSMS(gps_data);
            CAN_Send("Accident Alert Sent");
        }
        if(FIRE_SENSOR == 1) {
            GSM_SendSMS("Fire Alert in Vehicle!");
            CAN_Send("Fire Alert");
        }
        if(WATER_SENSOR == 1) {
            GSM_SendSMS("Water Leakage Detected!");
            CAN_Send("Water Alert");
        }
        if(SPEED_SENSOR == 1) {
            GSM_SendSMS("Overspeed Alert!");
            CAN_Send("Speed Alert");
        }
        Delay(500);
    }
}
```

■ Full Report

Download the full detailed PDF report from
`docs/Vehicle_Automation_CAN_Accident_Alert_Project.pdf`

■■■ Author

Developed as an academic project on Vehicle Safety & Automation using CAN bus.