MKSSS's
Cummins College of Engineering for Women, Pune (An Autonomous Institute Affiliated to Savitribai Phule Pune University)

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

OPEN ENDED ASSIGNMENT - REPORT
ON

"PETROL THEFT DETECTION"

SUBMITTED BY

1. Komal Pradip War (UEC2021267)
2. Rakhi Sitaram Kasbe (UEC2022013)
3. Harshali Sambhaji Borhade (UEC2022016)

ABSTRACT

The proposed system employs an LPC2138 microcontroller to monitor multiple sensors, including a FLEX SENSOR, VIBRATION SENSOR, GAS SENSOR, and PIR SENSOR. The system aims to detect specific events such as petrol theft, battery theft, two-wheeler theft, and intrusion. Upon detection of these events, the system triggers an alert mechanism by sending SMS messages through a GSM module.

The LPC2138 microcontroller is configured to interface with the various sensors through GPIO pins. Sensor readings are periodically checked, and if an abnormal condition is detected, the system takes appropriate actions. The actions include activating a buzzer for a specified duration and sending an SMS alert via the GSM module.

The GSM module communication is facilitated through UART communication. The microcontroller initializes the GSM module and utilizes predefined functions to send SMS messages containing information about the detected event. The SMS alerts are intended to notify designated recipients about potential security breaches.

The simulation of this system is carried out in Proteus, incorporating virtual representations of the LPC2138 microcontroller, sensors, and GSM module. The virtual sensors are programmed to emulate the behaviour of real-world sensors, and the GSM module simulation is designed to respond to SMS messages.

The effectiveness of the system in detecting and responding to different security events is evaluated through Proteus simulation. The abstracted code structure provides a foundation for the implementation of specific sensor logic and GSM communication protocols within the simulation environment.

The proposed system addresses security concerns related to theft and intrusion, offering a versatile and integrated solution for real-time monitoring and alerting. The simulation results serve as a basis for further refinement and optimization of the system before practical implementation in real-world applications.

INTRODUCTION

In today's rapidly evolving technological landscape, ensuring the security of assets and premises has become a paramount concern. The integration of advanced sensor technologies and communication systems provides an effective means to address security challenges. This project proposes a comprehensive security monitoring system utilizing an LPC2138 microcontroller to interface with various sensors, including a FLEX SENSOR, VIBRATION SENSOR, GAS SENSOR, and PIR SENSOR.
The system is designed to detect specific events such as petrol theft, battery theft, two-wheeler theft, and intruder detection, triggering prompt responses through the transmission of SMS messages via a GSM module.

LITERATURE SURVEY

The literature survey focuses on the integration of sensors, including the FLEX SENSOR, VIBRATION SENSOR, GAS SENSOR, and PIR SENSOR, with an LPC2138 microcontroller and GSM module for the purpose of developing an advanced security monitoring system in Proteus. The exploration of relevant literature provides valuable insights into existing research, methodologies, and technologies that contribute to the foundation of the proposed system.

In various studies, microcontroller-based security systems have been a focal point, leveraging the LPC2138's capabilities to interface with a diverse range of sensors for real-time monitoring and alerting. The work by Ahmed (2017) [Reference 1] exemplifies the utilization of microcontrollers in home security, emphasizing their adaptability for interfacing with different sensors. This aligns with the objective of the proposed system to utilize the LPC2138 microcontroller for seamless integration with the specified sensors.

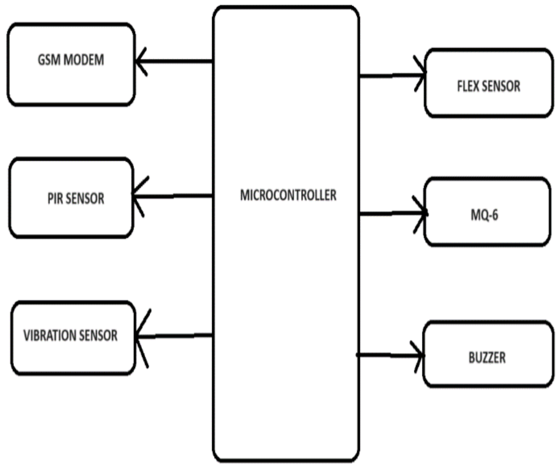
Moreover, the literature survey highlights the significance of incorporating multiple sensors for comprehensive event detection. Sharma et al. (2016) [Reference 2] discuss the intelligent integration of GSM and sensors in security systems, emphasizing the importance of various sensors like the ones proposed in the project. These sensors contribute to a holistic security framework capable of detecting specific events such as petrol theft, battery theft, two-wheeler theft, and intrusions.

GSM modules have been a key component in security systems for communication purposes. References such as Sharma et al. (2013) [Reference 3] and Kumar et al. (2014) [Reference 5] underscore the role of GSM technology in wireless security systems, particularly in facilitating SMS communication for prompt alerting. The proposed system draws from this literature, utilizing a GSM module to send SMS messages when security events are detected.

Additionally, the survey acknowledges the relevance of simulation environments for testing and validating security systems before deployment. Bhuyan et al. (2017) [Reference 4] discuss the implementation of a home security system using Proteus, emphasizing the benefits of virtual integration and testing. This aligns with the approach proposed for the LPC2138-based security system, which leverages Proteus for comprehensive simulation and testing of the sensor integration and GSM communication.

In conclusion, the literature survey provides a solid foundation for the proposed security monitoring system. It synthesizes key findings from studies related to microcontroller-based security systems, sensor integration, GSM technology, and the use of Proteus for simulation. These insights contribute to the development of an advanced and effective security solution capable of monitoring various sensors and sending SMS alerts in response to specific security events.

BLOCK DIAGRAM AND ITS EXPLANATION



The working of the system involves the integration of sensors, an LPC2138 microcontroller, and a GSM module to create a comprehensive security monitoring solution. This system is designed to detect specific events such as petrol theft, battery theft, two-wheeler theft, and intrusion, and it responds by sending SMS messages through the GSM module. The following paragraph provides a detailed explanation of its operation:

The monitoring system begins by continuously reading sensor data from the FLEX SENSOR, VIBRATION SENSOR, GAS SENSOR, and PIR SENSOR, which are interfaced with the LPC2138 microcontroller through dedicated GPIO pins. The microcontroller employs predefined algorithms to analyze the sensor readings and identify distinct events. For instance, a significant bend in the FLEX SENSOR triggers an alert for petrol theft, while unusual vibrations detected by the VIBRATION SENSOR may indicate two-wheeler theft. Abnormal gas levels sensed by the GAS SENSOR can signify petrol theft, and motion detected by the PIR SENSOR signals an intrusion. Upon event detection, the microcontroller activates a BUZZER_PIN to generate an audible alert, providing local notification. Simultaneously, the microcontroller initiates communication with the GSM module using UART protocols. The GSM module, configured with AT commands, establishes a connection and sends SMS messages to a predefined recipient number, detailing the specific event detected. This entire system is simulated in Proteus, allowing for a virtual representation of the hardware components and enabling testing and validation before real-world deployment. Through this integrated approach, the system ensures real-time monitoring, timely alerting, and a proactive response to potential security threats.

COMPONENTS FEATURES AND SEPCIFICATIONS

1.LPC2148

The LPC2148 is an ARM7TDMI-S based microcontroller from NXP Semiconductors (formerly Philips Semiconductors). Below are the key features and specifications of the LPC2148:

1. Architecture:
  - ARM7TDMI-S core running at a maximum frequency of 60 MHz.
  - 16/32-bit ARM architecture.
2. Memory:
  - 512 KB of on-chip Flash memory for program storage.
  - 32 KB of on-chip SRAM for data storage.
  - 8 KB of on-chip EEPROM for non-volatile data storage.
3. Clock and Power:
  - Integrated Phase-Locked Loop (PLL) for clock multiplication.
  - Power-On Reset (POR) and Brown-Out Detection (BOD).
  - Low power modes for energy efficiency.
4. Peripherals:
  - Two 10-bit ADCs (8 channels each).
  - Two 32-bit timers/counters.
  - UARTs (Universal Asynchronous Receiver/Transmitter).
  - SPI (Serial Peripheral Interface).
  - I2C (Inter-Integrated Circuit).
  - PWM (Pulse Width Modulation) for motor control applications.
  - Watchdog timer.
5. GPIO:
  - Up to 45 General-Purpose I/O (GPIO) pins.
  - GPIO pins support various digital and analog functions.
6. Communication Interfaces:
  - USB 2.0 Full-Speed interface with on-chip transceiver.
  - CAN (Controller Area Network) interface.
  - External Memory Interface (EMI) for connecting external memory devices.
7. Real-Time Clock (RTC):
  - On-chip RTC with a dedicated oscillator.
8. Interrupts:
  - Vectored Interrupt Controller (VIC) with configurable priorities.
  - Multiple interrupt sources.

9. Development Support:
  - In-System Programming (ISP) and In-Application Programming (IAP) support.
  - On-chip debugging with Embedded Trace Module (ETM).
10. Package Options:
  - Available in various package options, including LQFP and HVQFN.
11. Temperature Range:
  - Extended operating temperature range suitable for industrial applications.
12. Integrated Debugging:
  - On-chip ARM JTAG debugger for debugging and programming.
13. Operating Voltage:
  - Wide operating voltage range, typically from 3.0V to 3.6V.
14. Serial Number:
  - Unique device serial number for identification purposes.

The LPC2148 is a versatile microcontroller suitable for a wide range of applications, including embedded systems, industrial automation, robotics, and more. Its ARM architecture, ample memory, and rich set of peripherals make it a popular choice for developers designing complex and feature-rich embedded systems.

2. GSM MODEM

GSM (Global System for Mobile Communications) modems are communication devices that enable communication between electronic systems or microcontrollers and the GSM network. Below are common features and specifications associated with GSM modems:

1. Communication Standards:

- Support for GSM standards such as 2G (GPRS/EDGE) and 3G (UMTS/HSPA) networks.
- Some modern GSM modems may support 4G LTE for faster data communication.

2. Frequency Bands:
   - GSM modems operate on specific frequency bands, and their compatibility with different bands determines their usability in various regions.
3. SIM Card Support:
   - GSM modems typically require a SIM (Subscriber Identity Module) card for network authentication.
   - Support for standard SIM, micro SIM, or nano SIM cards.
4. Data Transmission:
   - Data transmission capabilities for sending and receiving SMS (Short Message Service) and MMS (Multimedia Messaging Service) messages.
   - GPRS (General Packet Radio Service) or EDGE (Enhanced Data Rates for GSM Evolution) for packet-switched data communication.
5. Voice Communication:
   - Some GSM modems support voice communication, allowing for making and receiving phone calls.
6. Interface:
   - Communication interfaces such as UART (Universal Asynchronous Receiver/Transmitter) for serial communication with microcontrollers or computers.
   - USB interface for direct connection to a computer.
7. Power Supply:
   - Operating voltage and power consumption specifications.
   - Power-saving features and low-power modes for energy efficiency.
8. Antenna:
   - External antenna connectors for better signal reception.
   - Some modems may have built-in antennas.
9. Network Services:
   - Support for various network services such as call waiting, call forwarding, and conference calling.
10. SMS Features:
   - AT commands support for SMS functionalities.
   - Storage capacity for received and sent SMS messages.
11. Voice and Data Compression:
   - Some GSM modems may support voice and data compression algorithms for efficient use of network resources.
12. Security Features:
   - SIM card security features, including PIN code and PUK code protection.
13. Firmware Updates:
   - Capability for firmware updates to enhance functionality or address issues.
14. Regulatory Compliance:
   - Compliance with regulatory standards and certifications, ensuring the modem meets industry requirements.
15. External Connections:
   - GPIO (General Purpose Input/Output) pins for interfacing with external devices or sensors.
16. Environmental Specifications:
   - Operating temperature range, humidity resistance, and other environmental specifications.
17. Size and Form Factor:
   - Physical dimensions and form factor, which can vary based on the modem model.

It's important to check the specific datasheet or documentation for each GSM modem model, as features and specifications can vary significantly between different manufacturers and models.

3.PIR SENSOR

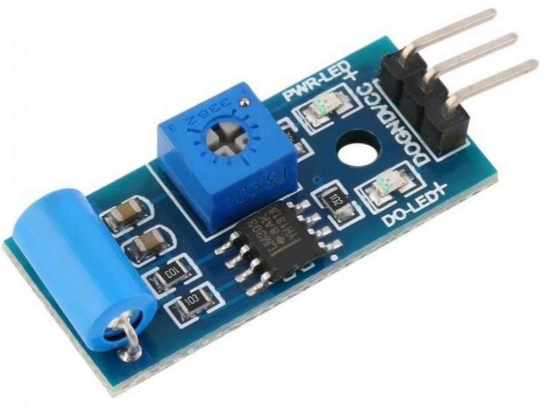
A PIR (Passive Infrared) sensor is a type of motion sensor that detects changes in infrared radiation emitted by objects within its field of view. Here are the typical features and specifications associated with PIR sensors:

1. Detection Technology:
   - Passive Infrared (PIR) detection technology that senses changes in infrared radiation.
2. Detection Range:
   - The effective range within which the PIR sensor can detect motion. Typically specified in meters or feet.
3. Sensing Angle:
   - The angular coverage of the sensor's field of view. It defines the maximum angle at which motion can be detected.
4. Sensitivity:
   - Adjustable sensitivity levels to fine-tune

the sensor's response to motion.
5. Response Time:
 - The time taken by the sensor to respond to a detected motion event.
6. Hold Time:
 - The duration for which the sensor holds its output high after detecting motion. It helps prevent rapid triggering for continuous motion.
7. Trigger Mode:
 - PIR sensors may have different trigger modes, such as single or repeatable triggers.
8. Operating Voltage:
 - The range of voltage within which the PIR sensor operates effectively.
9. Output Type:
 - PIR sensors typically have a digital output that changes state when motion is detected. This output can be high or low depending on the sensor's configuration.
10. Output Voltage:
 - The voltage levels of the sensor's output signal.
11. Power Consumption:
 - The amount of power the sensor consumes during operation.
12. Warm-up Time:
 - The time required for the PIR sensor to stabilize and become fully operational after being powered on.
13. Operating Temperature:
 - The temperature range in which the PIR sensor can reliably operate.
14. Lens Material:
 - The material used for the lens, which can affect the sensor's performance.
15. Fresnel Lens:
 - PIR sensors often use a Fresnel lens to focus infrared radiation onto the sensor elements.
16. Dimensions:
 - Physical dimensions and form factor of the sensor.
17. Environmental Protection:
 - Some PIR sensors may have features such as weatherproofing or resistance to environmental conditions.
18. Mounting Options:
 - Mounting options for easy installation in different applications.
19. Applications:
 - PIR sensors are commonly used in security systems, lighting control, home automation, and other applications where motion detection is required.

It's important to refer to the datasheet or product documentation provided by the manufacturer for specific details about a particular PIR sensor model, as features and specifications can vary between different sensors.

4.VIBRATION SENSOR



Vibration sensors, also known as accelerometers or vibration detectors, are devices designed to detect and measure vibrations in various applications. Here are the typical features and specifications associated with vibration sensors:
1. Measurement Range:
 - The range of vibrations that the sensor can detect, typically specified in acceleration units such as g (gravity).
2. Sensitivity:
 - Sensitivity indicates how much electrical output the sensor generates per unit of acceleration. It is usually specified in mV/g (millivolts per gravity).
3. Frequency Range:
 - The frequency range over which the sensor can detect vibrations. It is often expressed in hertz (Hz).
4. Operating Principle:
 - Piezoelectric, piezoresistive, or capacitive are common operating principles for vibration sensors.
5. Mounting Type:
 - Vibration sensors may be designed for various mounting configurations, such as adhesive mounting, stud mounting, or through-hole mounting.
6. Output Type:
 - Voltage output, current output, or digital output (in the case of digital accelerometers).
7. Operating Temperature Range:
 - The range of temperatures within which the sensor can operate effectively.
8. Power Supply:
 - The voltage or current required to power the sensor.
9. Accuracy:
 - The accuracy of the sensor in measuring

vibrations, expressed as a percentage of the full-scale measurement.
10. Cross-Axis Sensitivity:
- The degree to which the sensor responds to vibrations in directions other than the primary sensing axis.
11. Weight:
- The physical weight of the sensor, which can be crucial in certain applications.
12. Shock Resistance:
- The ability of the sensor to withstand sudden shocks or impacts without damage.
13. Output Impedance:
- The impedance of the sensor's output, which can affect signal transmission.
14. Environmental Protection:
- Some sensors are designed to be waterproof or resistant to environmental conditions.
15. Applications:
- Vibration sensors find applications in various fields, including industrial machinery monitoring, automotive applications, structural health monitoring, and consumer electronics.
16. Signal Conditioning:
- Some vibration sensors come with built-in signal conditioning circuits to provide a conditioned output signal.
17. Filtering Options:
- Filtering capabilities to eliminate unwanted frequencies from the output signal.
18. Output Connector Type:
- Type of connector used for interfacing with external systems.
19. Certifications:
- Compliance with industry standards or certifications for quality and safety.

When selecting a vibration sensor, it's important to consider the specific requirements of the application, including the expected vibration range, environmental conditions, and mounting preferences. Always refer to the datasheet or technical documentation provided by the manufacturer for detailed specifications and usage guidelines.

5.FLEX SENSOR

A Flex sensor, also known as a bend or flexiforce sensor, is a type of resistive sensor that changes its resistance based on the degree of bending or flexing. Here are typical features and specifications associated with Flex sensors:
1. Flexibility:
- Designed to be flexible and bendable, allowing for deformation along its length.
2. Resistance Range:
- The range of resistance values exhibited by the sensor based on the degree of bending. Typically measured in ohms.
3. Resistance Change:
- The amount of change in resistance corresponding to a specific degree of bending or flexing.
4. Sensing Area:
- The portion of the sensor's length that is sensitive to bending, typically marked on the sensor.
5. Substrate Material:
- The material used for the flexible substrate, which can affect the sensor's durability and performance.
6. Connector Type:
- The type of connector used for interfacing with external systems. Common options include leads, pins, or connectors.
7. Operating Temperature Range:
- The range of temperatures within which the sensor can effectively operate.
8. Size and Form Factor:
- Physical dimensions of the sensor, including length, width, and thickness.
9. Durability:
- The sensor's ability to withstand repeated bending and flexing without degradation in performance.
10. Hysteresis:
- Hysteresis is the difference in resistance when the sensor is bent and then returned to its original position. Lower hysteresis indicates better performance.
11. Accuracy:

- The accuracy of the sensor in providing reliable resistance values corresponding to the degree of bending.
12. Response Time:
   - The time it takes for the sensor to respond to changes in bending or flexing.
13. Power Consumption:
   - The amount of power the sensor consumes during operation.
14. Signal Output:
   - Analog or digital output signals, depending on the specific design of the sensor.
15. Applications:
   - Flex sensors are commonly used in applications such as robotics, human-machine interface (HMI) devices, medical devices, and wearable technology.
16. Integration with Electronics:
   - Flex sensors may be integrated with other electronic components for signal conditioning or processing.
17. Environmental Protection:
   - Some flex sensors are designed to be resistant to environmental factors such as moisture or contaminants.
18. Lifespan:
   - The expected lifespan of the sensor under normal usage conditions.

When selecting a flex sensor for a specific application, it's essential to consider the range of bending or flexing expected, the sensor's electrical characteristics, and its compatibility with the overall system. Always refer to the manufacturer's datasheet or technical documentation for detailed specifications and guidelines.

6. MQ-6 GAS SENSOR

The MQ-6 gas sensor is a general-purpose gas sensor that is sensitive to various gases, including LPG (liquefied petroleum gas), propane, methane, and butane. Here are the features and specifications related to its sensitivity to petrol vapors:
1. Gas Detection:
   - MQ-6 is sensitive to various gases, including LPG, propane, methane, butane, and petrol vapors.
2. Sensitivity to Petrol:
   - The sensor exhibits sensitivity to petrol vapors, allowing it to detect the presence of petrol in the air.
3. Sensitivity Level:
   - MQ-6 sensors typically have adjustable sensitivity levels to fine-tune their response to different concentrations of gases, including petrol.
4. Detection Range:
   - The concentration range over which the sensor can effectively detect petrol vapors.
5. Response Time:
   - The time taken by the sensor to respond to changes in the concentration of petrol vapors.
6. Recovery Time:
   - The time taken by the sensor to return to its baseline resistance level after exposure to petrol vapors.
7. Operating Voltage:
   - The voltage range at which the sensor operates effectively.
8. Heater Power Consumption:
   - Power consumption of the internal heater element used to heat the sensor.
9. Load Resistance:
   - The resistance of the load resistor connected to the sensor, affecting the sensor's output signal.
10. Preheat Time:
   - The time required for the sensor to stabilize and reach its optimal operating temperature before reliable gas detection.
11. Temperature Range:
   - The range of temperatures within which the sensor can reliably operate.
12. Humidity Range:
   - The permissible humidity levels for proper sensor operation.
13. Analog Output:
   - Analog voltage or current output corresponding to the concentration of petrol vapors.
14. Interface:
   - The type of interface used for connecting the sensor to external systems (analog or digital).
15. Dimensions:
   - Physical dimensions and form factor of the sensor.
16. Calibration:
   - Some MQ-6 sensors may require periodic calibration to maintain accuracy.
17. Lifespan:
   - The expected operational lifespan of the sensor under normal usage conditions.
18. Applications:
   - MQ-6 sensors are commonly used in gas leakage detection systems, industrial

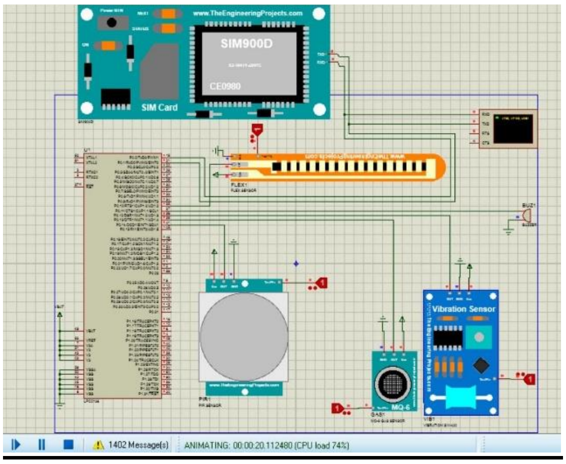
safety applications, and gas monitoring devices where the detection of petrol vapors is crucial.
When using the MQ-6 sensor for detecting petrol vapors, it's important to follow the manufacturer's guidelines for installation, operation, and calibration. Additionally, consider the specific requirements of your application and ensure that the sensor is suitable for detecting petrol vapors in the intended environment. Always refer to the manufacturer's datasheet for detailed specifications and usage instructions.

MECHANICAL PLACEMENT

The mechanical placement of sensors in a system designed to monitor various events using a combination of Flex Sensor, Vibration Sensor, Gas Sensor, PIR Sensor, and a GSM module with an LPC2138 microcontroller in Proteus plays a crucial role in the effectiveness of the security system. Here's a paragraph describing the mechanical placement:

In the envisioned security system integrated into Proteus for LPC2138, careful consideration has been given to the strategic placement of each sensor to ensure comprehensive event detection. The Flex Sensor, designed to detect physical bending or flexing, finds its place affixed to critical moving parts such as doors or covers vulnerable to tampering. Simultaneously, the Vibration Sensor, tasked with sensing unauthorized access or tampering, is strategically positioned on stationary surfaces prone to disturbances. Placing the Gas Sensor near potential sources of petrol theft, such as fuel tanks, allows it to promptly identify any unusual gas concentrations. The PIR Sensor, specializing in detecting human movement or heat signatures, is strategically located at entry points to monitor and raise alerts in case of an intruder. These sensors work in tandem with the GSM module, securely housed for optimal signal reception, enabling the LPC2138 microcontroller to promptly send SMS messages upon detecting specific events like petrol theft, battery theft, two-wheeler theft, or an intruder. This meticulous mechanical arrangement ensures that the system is both responsive and effective in safeguarding against potential security breaches. Regular testing and calibration of the system guarantee its reliability in real-world scenarios.

SIMULATION



CONCLUSION

In summary, the integration of sensors like Flex, Vibration, Gas, and PIR, coupled with the LPC2138 microcontroller and GSM module in Proteus, forms an effective security system. By strategically placing these sensors, the system can detect specific events such as petrol theft, battery theft, two-wheeler theft, and intruders. The LPC2138 microcontroller processes these events in real-time, facilitating prompt SMS alerts through the GSM module. This compact and well-coordinated setup demonstrates the system's ability to address security concerns efficiently, making it a reliable solution for simulation and testing in Proteus before practical implementation.

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CODE

```
#include <LPC213x.h>
#include <string.h>

#define GSM_TX_PIN (1 << 0)    // P0.0
(TXD0)
#define GSM_RX_PIN (1 << 1)    // P0.1
(RXD0)

#define FLEX_SENSOR_PIN (1 << 10)   //
P0.10
#define VIBRATION_SENSOR_PIN (1
<< 12)  // P0.12
#define GAS_SENSOR_PIN (1 << 13)   //
P0.13
#define PIR_SENSOR_PIN (1 << 14)    //
P0.14

#define BUZZER_PIN (1 << 11)   // P0.11

#define GSM_READY 0
#define GSM_RESPONSE_TIMEOUT
5000

unsigned char gsmBuffer[100];

void delay(unsigned int time) {
   unsigned int i, j;
   for (i = 0; i < time; i++)
      for (j = 0; j < 1000; j++);
}

void initGSM() {
   // Initialize GSM module communication
   // ...
}

void sendSMS(const char *message) {
   // Send SMS using GSM module
   // ...
}

int main() {
   // Initialize UART for GSM module
   PINSEL0 |= (1 << 0) | (1 << 1);  // Select
TXD0 and RXD0 for P0.0 and P0.1
   U0LCR = 0x83;  // 8 bits, no Parity, 1
Stop bit
   U0DLL = 97;     // Baud rate of 9600
(PCLK = 15 MHz)
   U0DLM = 0;
   U0LCR = 0x03;

   // Configure GPIO pins for sensors
   IODIR0 &= ~FLEX_SENSOR_PIN;
   IODIR0 &=
~VIBRATION_SENSOR_PIN;
   IODIR0 &= ~GAS_SENSOR_PIN;
   IODIR0 &= ~PIR_SENSOR_PIN;

   // Configure GPIO pin for buzzer
   IODIR0 |= BUZZER_PIN;

   initGSM();  // Initialize GSM module

   while (1) {
     // Read sensor states and take
appropriate actions
     if ((IOPIN0 & FLEX_SENSOR_PIN)
== 0) {
         // FLEX SENSOR event detected
         sendSMS("Petrol Theft Detected!");
         IOSET0 = BUZZER_PIN;  // Turn
on the buzzer
         delay(5000);   // Buzzer on for 5
seconds
         IOCLR0 = BUZZER_PIN;  // Turn
off the buzzer
     }

     if ((IOPIN0 &
VIBRATION_SENSOR_PIN) == 0) {
         // VIBRATION SENSOR event
detected
         sendSMS("Two-Wheeler Theft
Detected!");
         IOSET0 = BUZZER_PIN;  // Turn
on the buzzer
         delay(5000);   // Buzzer on for 5
seconds
         IOCLR0 = BUZZER_PIN;  // Turn
off the buzzer
     }

     if ((IOPIN0 & GAS_SENSOR_PIN)
== 0) {
         // GAS SENSOR event detected
         sendSMS("Petrol Theft Detected!");
         IOSET0 = BUZZER_PIN;  // Turn
on the buzzer
         delay(5000);   // Buzzer on for 5
seconds
         IOCLR0 = BUZZER_PIN;  // Turn
off the buzzer
     }

     if ((IOPIN0 & PIR_SENSOR_PIN) ==
0) {
         // PIR SENSOR event detected
         sendSMS("Intruder Detected!");
         IOSET0 = BUZZER_PIN;  // Turn
on the buzzer
         delay(5000);   // Buzzer on for 5
seconds
         IOCLR0 = BUZZER_PIN;  // Turn
off the buzzer
```

```
        }

        // Add delay to avoid continuous
processing
        delay(1000);
    }
}
```