

Master 2022

Ms. Kaveesha Gangadari Induruwa

Development of a Mobile Fuel-Sensor-Device to Monitor the Fuel Level in a Parked Vehicle.

ABSTRACT - Masterthesis

The project aims to design and implement a low power, user-friendly, high accuracy, microcontroller-based system, capable of monitoring and reporting the fuel level of a parked vehicle's fuel tank in real-time, to prevent fuel theft.

The project hardware for the Anti Fuel Theft Device (AFTD) is designed around a commercially available ultrasonic level sensor. The rest of the hardware consists of an accelerometer to detect motion and a microphone to process the audio signals.

The electronic circuitry is designed to constantly monitor the fuel level in the vehicle and the vehicle's status such as if it is moving or stationary. Signal processing and decision making are carried out by an Atmel AT32UC3L0128 32-bit microcontroller in the electronic circuitry. Software for the AFTD is implemented in Embedded C, with advanced algorithms to find out the fuel theft accurately and inform the user as soon as possible, along with the incident location. Once potential theft is detected, the system sends an alert to the authorized persons using wireless communication.

In order to make the AFTD user friendly, the unit is powered by a rechargeable battery contained within it rather than drawing power from the vehicle's battery, allowing the system to function even if the vehicle's battery is removed. However, this makes power management, primarily conserving power, a key area of concern in this project. The fuel level measuring sensor is woken up only when suspicious activity is detected. At other times it is in sleep mode and the unit consumes very little power from the battery. Once fully charged, the system will run for 6-7 days after which the unit has to be detached and charged.

The advantages of this system are mobility and ease of use. No tank modification is required because all sensor components are integrated into a unit. It can easily be attached to the tank using powerful magnets.