

Abstract

Insecurity is one of the biggest problems the world is facing today. Vehicle security is one of the main requirements for the users of vehicles. On the other hand, the cost of anti-theft systems is very expensive; hence, there is a need for an effective and low-cost alternative.

This study aims to build a vehicle safety system using various devices that are small size, low power consumption, and low cost compared to the price of the vehicle. The proposed system provides several possibilities for vehicle owners to control their vehicles, such as controlling the vehicle's speed, as well as controlling the vehicle doors, and driver's window, controlling the fuel pump, in addition to transmitting a live camera, taking photos, and recording videos from inside the vehicle. The proposed system also provides the ability to communicate with the vehicle and determine its location from anywhere and at any time, enabling the owners to detect any movement inside the vehicle with the possibility of contacting relatives or the police in emergency cases.

An efficient system based on a Wi-Fi modem and a Raspberry Pi 4 Model B was implemented and tested in a modern vehicle, where the system succeeded to control the speed of the car using a Raspberry Pi 4B Kit with MICRO SERVO SG90 and potentiometer. Relays were used to manage the vehicle doors, driver's window, and fuel pump. Photos and videos were captured directly by the camera installed inside the vehicle.

A Vehicle Tracking System (VTS) was implemented and tested based on GSM SIM 800L and GPS NEO-6MV2. Several commands, such as fuel pump control, vehicle location tracking, and real-time testing were carried out in Erbil for several days at different times and in different

ways, and an experiment was conducted to test the accuracy of the location coordinates obtained from GPS NEO-6MV2 by comparing them with Google Maps location coordinates. PIR (Passive Infrared) sensor was detected any movement inside the vehicle and also, when the emergency button was pressed, a relative was contacted. The implementation of the proposed system depends on the Internet of Things (IoT) technology, where the system is controlled through an application that allows vehicle owners to control it. This application contains an interface with multiple keys to control the vehicle's speed, doors, and driver's window, turn on / off the fuel pump, as well as, to transmit a live broadcast, take photos, and record video from inside the vehicle. There are also keys that have the possibility of communicating with the vehicle via SMS. Through these messages, the fuel pump can be turned on/off, the vehicle can be located, a voice call can be made, or an informational message can be received in the event of movement inside the vehicle. The application was designed using the platform Node-Red and programmed in Python language.