Vehicle Tracking System

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Abstract— The increased rate of vehicle theft led to increasing concern among vehicle owners. In addition, most of the smaller car rental companies or personal car rental are also a concern when their rented vehicles are not returned on the dateline. Thus, the purpose of this project is to study and analyse the existing vehicle tracking system. Next, a tracking system is configured and developed using the Internet of Things platform (Arduino) and web-based application. Then, the usability and functionality of the Global Positioning System and Global System for Mobile Communications module are tested together with Arduino to get the location for vehicle tracking. This project is developed using the Extreme Programming methodology. During the planning phase, requirements are gathered through a questionnaire from 40 participants. Requirements and data collected are analysed, and features that need to be included are identified. Iteration starts at design phase where every time there are changes to the system, the design needs to be changed first. Coding is done based on the features, functions, flows, and interfaces from the design phase. The code is tested before small release of part of the system. Feedback is gathered from the user after every small release of the system during the iteration. The completed system enables vehicle owners to track their vehicle through web application or Short Message Service (SMS) anytime, anywhere.

Index Terms— Arduino, GSM, GPS, SMS, Vehicle Tracking System, IoT, Tracking, Real-time.

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1 INTRODUCTION

VEHICLE Tracking System is developed using a web-based and an IoT platform (Arduino), which act as a tracking device. This system is developed for all vehicle users to provide easy tracking of their vehicle location. Before tracking the vehicle, the users will need to register via the web and install the tracking device (Arduino) on their vehicle.

The system consists of Arduino Uno R3 microcontroller, Global Positioning System (GPS) module and Global System for Mobile Communications (GSM) module for the IoT platform. More specifically, the Arduino Uno R3 microcontroller is the main controller that controls and interacts with GPS and GSM modules. GPS module is responsible for getting the location in the form of latitude and longitude from the satellite. The location will then send to the Arduino microcontroller and processed before being redirected to the GSM module. In the meantime, the GSM module is responsible for sending the location to the users via Short Message Service (SMS) or data transfer to the webserver. This tracking device is installed inside the vehicle where it is not visible to anyone.

Tracking can be done in two ways. The first one would be via a web-based application, where user login to the system. Then, the user needs to register the tracking device and also a contact number for tracking via SMS. The user clicks on the track button and is redirected to the tracking page where the location of the vehicle is marked on the map embed to the webpage. The second way is through SMS. Users only need to send a valid tracking command to the tracking device. The tracking device checks if the command and phone number are valid before replying to the user current location of the vehicle. The quick overview of the overall system flow is shown in Figure 1.

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Fig. 1. The Quick Overview of Vehicle Tracking System