

Active Sharing and Management in Automatic Vehicle Monitoring

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Abstract— Vehicle Sharing is a mechanism of owning an automobile for limited period of time. The process enables the clients with vehicles of less usage to enable others without such an attractive vehicle to use it for allowed or required time. The scheme is simple: drop ones car in any permitted parking areas provided at various regions of the city, where customers can then avail their favorite transportation via cell phone call. The analysis of travel distance per day and collision detection analysis are performed. The idea was experimentally implemented and the desired result was obtained successfully.

Keywords: GPS, GSM, HEW, RENESAS

I. INTRODUCTION

Vehicle sharing is a procedure which involves providing customers the facility to avail automobiles at hourly rate. This new generation business enables the consumer to directly contact the owner and hence clarify the details of the rent directly. The main aim of this form of business is to enable usage of vehicle for a very short span of time and also reduces the risk of consumer being cheated. The process involves payment of bill even before the journey is started according to the distance travelled. The vehicle sharing is an all rounder in major cities when accomplished successfully, because the system involves car parking reserved areas where the details are done in simple steps via few formal phone calls. Incase if the owner desires to use his vehicle, he can demand for it anytime. On the other hand if car remains at workspace, the client can avail it, when he desires.

There are no role of intermediaries between user and vehicles such as reserving, acquiring, and releasing vehicle which are performed automatically through GSM (Global System for Mobile Communication) which is a central fact of this system. The GSM is used to send vehicle information such as usage statistics and trip data (e.g., speed) to the owner. The password is exchanged between the user and the owner though a message by GSM and it is utilized to open or close the vehicle doors and to enable the vehicle movement. The GPS (Global Positioning System) applied science is applied to locate the position of the vehicle.

This report deals with the basic principles behind the vehicle sharing system. The first part explains the purpose of the proposed scheme. The second segment will present the detailed specs and a blueprint of the epitome. And the final segment will discuss around the performance and test results of the epitome.

II. PROPOSED SYSTEM DESIGN

The vehicle sharing system is composed of microcontroller, vibration sensor, speed sensor, camera, GPS, GSM, keypad and LCD (Liquid Crystal Display). A microcontroller handles each signal from the sensor. The paradigm is made on RENESAS R5F21244SNFP microcontroller. All the communication between the user and owner is through

GSM. If anyone requires a vehicle for rent, then users can contact the owner through his mobile, after completing the money transaction, the proprietor will provide the password of the vehicle to the requested user. Then, using this password the user can open the vehicle and apply that for sustainable mobility. The total procedure is separated into two phases: driver authentication and vehicle monitoring. The background driving license checks have been performed by incorporating face recognition method. If the user receives an invalid license, a message has been institutionalized to the owner; thereby the owner can call off the trip. Collision detection is also integrated into the organization by using vibration sensor. The travel distance per day is too studied.

A. Driver Authentication

The face recognition method is employed to find wrong person's license by using PCA (Principal Component Analysis) algorithm. Client's photo is captured and the system examines each driver's license photo stored in the database, mapping the facial data points and comparing pictures to others. If the photo taken does not match, then a message is sent to owner's mobile phone indicating that the driver's license is an invalid, hence forbidding the user to enable the vehicle.

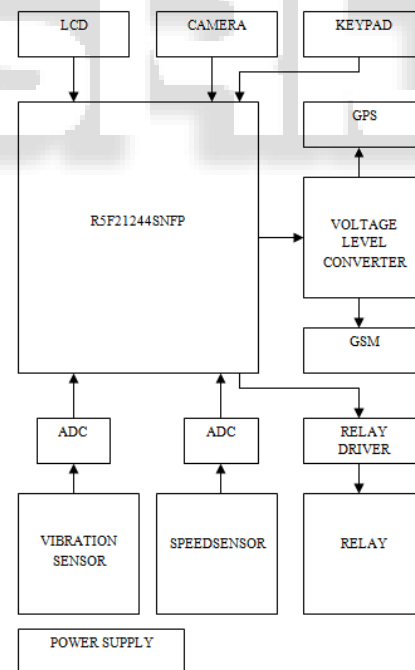


Fig. 1: Block diagram

B. Collision Detection

Collision Detection System for a vehicle comprising a sensor for sensing the acceleration and deceleration of the vehicle. The acceleration sensor is a piezoelectric sensing element. Since the yield from the detector is an analogue in nature, an ADC (Analog to Digital Converter) is utilized to get digital output. The piezoelectric sensor consists of electrode segments, where at least one of the electrode

segments is an output electrode for providing an electrical signal and other is an input electrode for receiving an electrical signal.

C. Travel Distance Per Day Analysis

The travel length is computed after the vehicle has travelled a fixed distance. When the vehicle reaches a desired distance; a corresponding signal is brought forth. The input from the sensing element is transmitted to the controller. An owner gets a message; thereby an additional rate is drawn out. A tachometer sensing element is used for reading the speed of the vehicle.

III. PROTOTYPE

The Table 1 indicate the components utilizes in the prototype.

Table. 1: Prototype Components

Components	
R5F21244SNFP	LCD
CAMERA	RELAY
GPS	SPEED SENSOR
GSM	VIBRATION SENSOR
KEYPAD	



Fig. 2: Hardware implementation

The paradigm is made on RENESAS R5F21244SNFP microcontroller. The prototype strictly follows the proposed system ideas a RENESAS microcontroller, feature a packed lineup of 52 pins, a maximum operating frequency of 20 MHz and supports operating voltages from 2.2 to 5.5 V. It combines 16 KB of flash memory, 1KB RAM (Random Access Memory), a 12 channel 10-bit ADC, 8-bit timers, 16-bit timers, UART (Universal Asynchronous Receiver or Transmitter), power-on reset circuit and watchdog timer. Collision detection is working on the basis of vibration sensor module. A camera is employed to hold the image of the driver; to enforce the anti-fraud system. Also the position of the vehicle can be caused from the GPS receiver and that value can be beamed to the controller for processing. When the owner requests the location of vehicles through GSM and the resolution is given through GSM. Also owner can control different parts such as dashboard, door opening, etc., in the vehicle through relay circuit which is an attached to these sections of the vehicle. This control circuitry consists of a transistor, relay, LED (Light Emitting Diode) and resistor. A keypad is provided for the user to input information and wanted messages are indicated along the LCD module. Proper programming is required for the system. This is managed by using HEW (High Performance Embedded Workshop).



Fig. 3: Message received on user's mobile indicating position and password

IV. PROTOTYPE PERFORMANCE

The prototype realized almost all the properties of the proposed system. It has a collision detection capability and anti-fraud facial recognition system. An integration of GPS technology and GSM offer a comprehensive and rigorous vehicle sharing system with mobile phone and GPS tracking capability to vehicle rental businesses.

V. CONCLUSION

The vehicle sharing system finds very useful application in present day life. There are several opportunities for future enhancements and it can be successfully implemented to reduce driving cost and to reduce pollution and carbon dioxide emission thereby reducing global warming. It also provides social connections in an increasingly disconnected society.

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