International Journal of Recent Engineering Science (IJRES)
ISSN: 2349 – 7157 / doi: 10.1445/23497157/IJRES-V7I2P109

Volume 7 Issue 2, 42-46, Mar-Apr 2020
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An Immobilizer-Key System For Motorcycles Using Thumstamp And Ticker

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Abstract

In India, the report says, automobile theft has become a significant crime. Urban cities experience over 100 stolen vehicles per day. Another problem that the nation is facing is the road accidents in which the teens of the 14-17 age group involves the most. The idea deals with improving user identity and security through an IoT network as a solution to reduce the above problems. The vehicle key works with the priory collected user data stored for future access. We were also introducing a system involving a thump stamp and requested user authentication as two-door security.

Keywords *— age, theft, security, fingerprint, accidents, user, authentication.*

I. INTRODUCTION

With the increase in population and residential areas, the need for technology has become an essential one in every individual’s life. In our daily routine, vehicles play an essential role in reaching out destinations in time and transporting things in a faster way. In the business talk, the export and import of motor vehicles have reached its peak, and it is an evergrowing marketing area both in trade and development side. Many developments have been made in motor vehicles over time. People are practiced to function the technological updates made each day.

On the other hand, there is a need to face their consequences in a lossless way. Even the developed countries are facing daily road accidents and theft cases. In India, the report says, automobile thefts have become a significant crime over the years. Urban cities experience over 100 stolen vehicles per day. Moreover, noticeably is an increasing crime not only in India but all around the world. According to a survey, the reason behind the theft cases is inadequate parking spaces in growing residential areas.

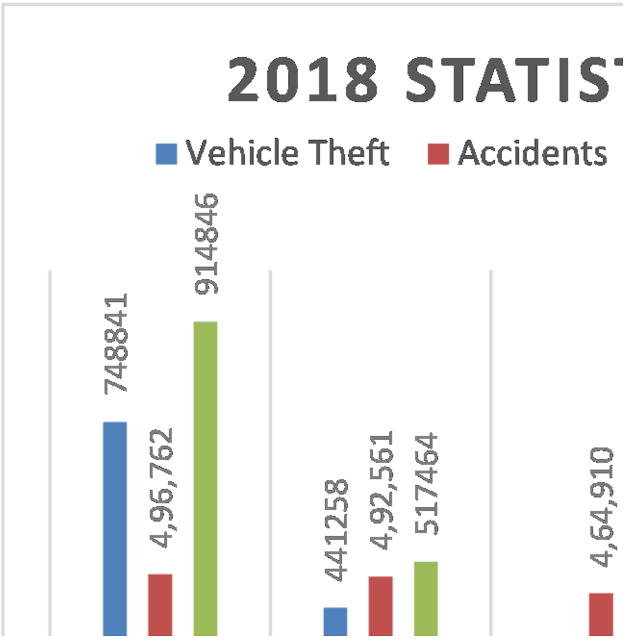
To balance in an economical growing rate and to lead a sustainable life, people are running against the time, and they do not have time to concern about the perfect vehicle parking, which in turn leads to a theft practice and running against the time somehow leads to an accident while in a hurry. Many top private industries have been promoting their products to trace vehicles once they have been stolen. With the help of GPSWOX and GPS modules, we can easily find the location where the thief has driven the vehicle off to. Alternatively, the accidents have been another primary concern to the country since road crashes are a fatal one. Motorbike accidents are the leading cause of fatal rate for 15 18 years old in the US, and about 2364 drivers of equal age institutions have been killed in injured in 2017; because of this, six young adults died each day in the motor injuries loads were injured.

Drivers of age organization 14 to 17 continue to have the highest rate of accidents, leading to injuries and even deaths. A rate of nine young adults was killed each day from motor wheeler injuries. To avoid these losses, many scientific innovations have been made each day to track the theft vehicle and to provide faster first aid services and it sometimes prove to a successful method, But our only concern is to prevent the occurrence of theft and deaths rather than allowing it to happen.

Teens involved in fatal crashes likely to driven the vehicle without the concern of their elders and parents. The statistical data of the four different countries in the year 2018 are provided for the clear knowledge and analysis.

In this paper, we come up with the solutions to avoid motorbike thefts and to prevent teen accidents through an IoT platform. The application we created is installed in the mobile device; thus, it shows the requested user’s data if the data is already available and allows the owner to permit or decline the request with a time representation to access the vehicle. The module we implemented uses ESP8266EX and Atmega 328P and an LCD module for a displaying purpose.

Data collection



The users with their respective ages and pictures are collected for a detailed identity of the requested user. The data are stored in a specific address as a permanent memory and can be erased or overlapped with new data.

Data processing

The processing includes data normalization, segmentation of the data, noise filtering, overlapping, or new data addition, respectively.

User data classification

In case of multiple user registration to the system, there is more likely to occur data loss or improper arranging of data. Thus it creates an error in user identification. Hence the data are classified under respective user details through an address space, and the data can be rewritten or overlapped.

Sensor data detection

The sensor detects the thump impression and stores the data in the digital form. The data comparison is done by checking the respective bits.

II. RELATED WORKS

[1]David Hallac∗, Abhijit Sharang∗, Rainer Stahlmann‡, Andreas Lamprecht‡,2019 "Driver Identification Using Automobile Sensor Data from a Single Turn", As automotive electronics continue to advance; cars are becoming more and more reliant on sensors to perform everyday driving operations. These sensors are omnipresent and help the car navigate, reduce accidents, and provide comfortable rides. However, they can also be used to learn about the drivers themselves. In this paper, we propose a method to predict, from sensor data collected at a single turn, the driver's identity out of a given set of individuals. We cast the problem in terms of time series classification, where our dataset contains sensor readings at one turn, repeated several times by multiple drivers. We build a classifier to find unique patterns in each individual's driving style, visible in the data even on such a short road segment. To test our approach, we analyze a new dataset collected by AUDI AG and Audi Electronics Venture, where a fleet of test vehicles was equipped with automotive data loggers storing all sensor readings on real roads. We then focus on the 12 most frequently made turns in the dataset, including rural, urban, highway on-ramps, and more, obtaining accurate identification results and learning useful insights about driver behavior in various settings.

[2]Minh Van Ly†, Sujitha Martin† and Mohan M. Trivedi (2013)" Driver Classification and Driving Style Recognition using Inertial Sensors", currently there is much research focused on using Smartphone as a data collection device. Many have shown its sensors' ability to replace a lab testbed. These inertial sensors can be used to segment and classify driving events reasonably accurately. In this research, we explore the possibility of using the vehicle's inertial sensors from the CAN bus to build a driver's profile to ultimately provide proper feedback to reduce the number of dangerous car maneuvers. Braking and turning events are better at characterizing an individual compared to acceleration events. Histogramming the time-series values of the sensor data does not help performance. Furthermore, combining turning and braking events helps differentiate between two similar drivers when using supervised learning techniques compared to separate events alone, albeit with anemic performance.

[3]Jin-Hyuk Hong, Ben Margines, Anind K. Dey (2014) "A Smartphone-based Sensing Platform to Model Aggressive Driving Behaviours", Driving aggressively increases the risk of accidents. Assessing a person's driving style is a useful way to guide aggressive drivers toward having safer driving behaviors. Several studies have investigated driving style, but they often rely on self-reports or simulators, which are not suitable for the real-time, continuous, automated assessment and feedback on the road. In order to understand and model an aggressive driving style, we construct an in-vehicle sensing platform that uses a smartphone instead of using heavyweight, expensive systems. Utilizing additional cheap sensors, our sensing platform can collect useful information about vehicle movement, maneuvering, and steering wheel movement. We use this data and apply machine learning to build a driver model that evaluates drivers' driving styles based on several driving-related features. From a naturalistic data collection from 22 drivers for 3 weeks, we analyzed the characteristics of drivers who have an aggressive driving style. Our model classified those drivers with an accuracy of 90.5% (violation-class) and 81% (questionnaire-class). We describe how, in future work, our model can be used to provide real-time feedback to drivers using only their current Smartphone

[4]Arijit Chowdhury, Tapas Chakravarty, Avik Ghose, Tanushree Banerjee, and P.Balamuralidhar (2017) "Investigations on Driver Unique Identification from Smartphone's GPS Data Alone", Driver identification is an emerging area of interest in-vehicle telematics, automobile control, and insurance. A recent body of works indicates that it may be possible to identify a driver using multiple dedicated sensors uniquely.In this paper, we present an approach for driver identification using Smartphone GPS data alone. For our experiments, we collected data from 38 drivers for two months. We quantified the driver's natural style by extracting a set of 137 statistical features from data generated for each completed trip. The analysis shows that, for the "driver identification" problem, an average accuracy of 82.3% is achieved for driver groups of 4-5 drivers. This is comparable to the state of the arts, where mostly a multi-sensor approach has been taken. Further, it is shown that specific behavioral attributes like high driving skill impact identification accuracy. We observe that the Random Forest classifier offers the best results. These results have tremendous implications for various stakeholders since the proposed method can identify a driver based on his/her naturalistic driving style, which is

quantified in terms of statistical parameters extracted from only GPS data.

III. PROPOSED SYSTEM

The idea is to provide two-door security to the vehicle and to avoid teen accidents. The security and the key are generally based on the priorly collected user's data. The thump sensor senses the thump prints as a first method, and once it recognizes the data, the system sends an authentication message to the owner's mobile phone as a second step of security. As the owner can check the requested user's details like name, age, and even photo, he can permit or decline the request with a time representation.

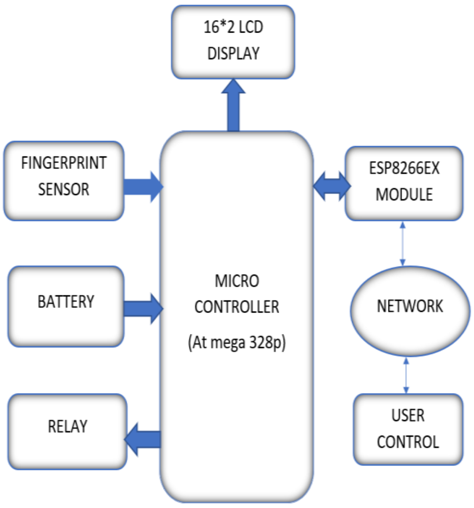


Fig 3.0 Block diagram of the proposed system

The battery provides the power required to run the system. Furthermore, the system remains ON even when the vehicle turns OFF. The system continuously monitors the vehicle status, and the system can alter the vehicle's ON-OFF status for a while mentioned by the owner.

Methodology

Fingerprint sensor module

The system functions with the addition of the user's data along with a dactylogram. The data is stored in specific address space in the system. The sensor is responsible for the user's thump identification and detection. The thump detection forms the initial step once the system is incorporated.

Supply voltage: 3.6 - 6.0VDC The scanning module comprises of a glass plate, on top of which the finger is placed. After the scanning process, an inverted picture of the thump is saved. The ridges and valleys of the finger are shown in the image. The ridges can be represented by the darker areas where the light reflection is more excellent. The valleys can be represented by the lighter areas, where the light reflected is lesser.

The current signal generated in response to the photon waves hitting on the CCD forms pixels which are collectively joined to make an image. The pixels are converted using an ADC to make a digital picture. Through these procedures, the images are compared with the existing stored images. Fingerprint imaging time: <1.0 seconds

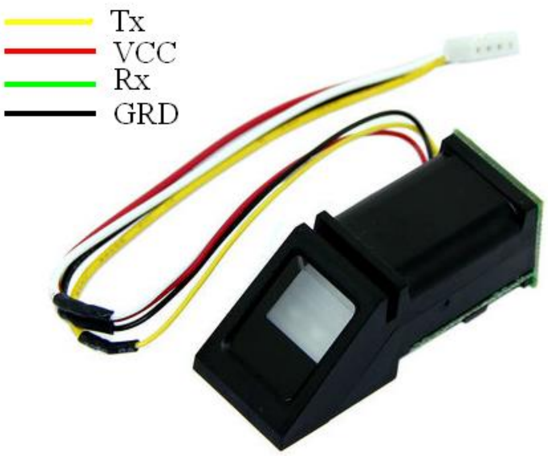
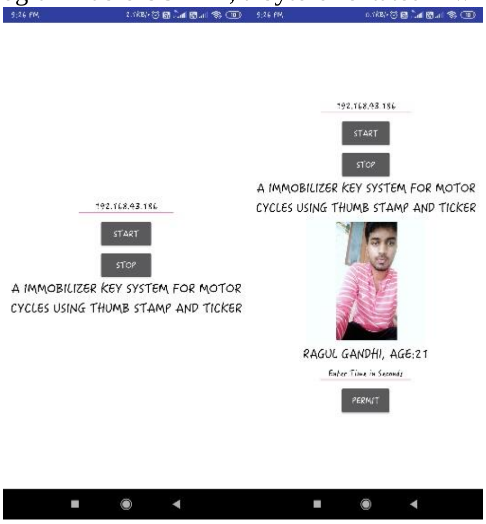


Fig 4.0 Fingerprint scanner module

AT mega 328p microcontroller

The ATmega328P is a low-power CMOS 8-bit microcontroller. It is based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega328P achieves throughputs approaching 1 MIPS per MHz, allowing the system designer to optimize power consumption versus processing speed. Low Power Consumption at 1 MHz, 1.8V, 25°C forATmega328P: Active Mode: 0.2mA, Power-down Mode: 0.1µA,Power-save Mode: 0.75 µA (Including 32 kHzRTC).

The ATmega328P has the following features: 32K bytes of In-System Programmable Flash with Read-While-Write capabilities, 256/512/512/1K bytes EEPROM, SRAM of 512/1K/1K/2K bytes. It has 23 general motive Input-Output traces and 32 general motive working registers. It also provided with 3 flexible Timer with evaluating modes, internal and external interrupts, a serial programmable USART, a byte-orientated 2-wire -



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RAGUL GANDHI, AGE:21

Enter Time in Seconds

Fig 4.1 The pinout diagram of ATmega 328p

-Serial Interface, an SPI serial port, a 6-channel 10-bit ADC. The programmable Watchdog Timer with an internal oscillator and five software selectable energy-saving modes are present. The Power-down mode saves the register contents but freezes the oscillator, nonfunctioning all different chip features until the next interrupt or hardware reset. In Power-save mode, the asynchronous timer keeps functioning, allowing the user to preserve a timer base even as the rest of the tool is in sleep. The ADC Noise Reduction mode stops the Central Processing Unit and all I/O modules besides asynchronous timer and ADC to reduce switching noise during ADC conversions. In Standby mode, the crystal/resonator Oscillator functions while the tool's relaxation is in sleep. This permits a very rapid startup combined with low energy consumption. The idle mode freezes the CPU at the same time as permitting the SRAM, Timer, USART,2-twine Serial Interface, SPI port, and interrupt system to keep operating.ATmega328P is an efficient microcontroller that provides a highly flexible and cost-effective solution to many embedded control applications.

ESP8266EX module

ESP8266EXdelivers enormously integrated Wi-Fi SoC solution to satisfy the non-stop needs for efficient electricity usage, compact layout, and reliable performance in the industry. The incorporated high-velocity cache facilitates the growth of the machine's overall performance and optimizes the device memory. Also, ESP8266EX may be carried out to any micro-controller layout as a Wi-Fi adaptor through SPI / SDIO or I2C / UART interfaces. Operating voltage: 3.0 V to 3.6 V.

Figure 4.1 describes the pin diagram of ESP8266EX node MCU and its configuration. The ESP8266EX is designated as an IoT module; thus, it connects the system with the user's device through an IoT network. This device is also incorporated with some memory elements and possesses a memory of 128Kbytes and storage of 4Mbytes. The node MCU ESP8266EX itself a microcontroller unit with serial port pins, input-output pins, and storage elements like flash memory space. The node MCU quickly found its application in an embedded system using an IoT platform. The ESP8266EX is powered through a USB port available in the device board, and it can also be used as an interface to the software platform through which the instructions are dumped in the controller.

Application installed

An application is designed such that it carries out an authentication process. The application is installed in the owner's device; thus, it provides user control over the IoT network. Once the user request for key access, in the second step, the owner gets intimation about the user's detail which are priorly stored. The window displays the user's details, and it asks for a time duration for which the user is allowed to access. The time representation can be given in minutes, hours, or even days. The application designed holds access to the requested user details stored in cloud storage or a memory unit, and it displays the details through a pop-up window. Figure 4.3 and figure 4.4 show the application's home window and the window showing the requested user's details, respectively. The application can also use cloud and other external modules as a storage element. Thus it releases additional memory space in the system implanted.

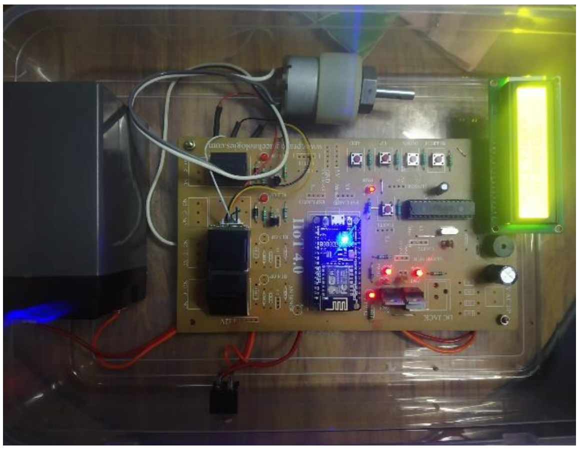

Fig 5.0 The hardware model of the proposed system

The figure shows the working hardware model of our proposed system. The system is designed to prevent the vehicle from theft situations and restrict the users from key-accessing the vehicle without the owner's knowledge. The system also restricts users from driving the vehicle for a long time. Moreover, the owner can restrict or stop the user from driving the vehicle since the system is incorporated with the
vehicle's startup technology.

Advancement

The advancement in the proposed system can be made in the field of vehicle's fuel injection system and the storage elements of data, which can provide a faster outcome and increases the overall efficiency of the system. The proposed system can be developed further with the vehicle's Control Unit; thus, it immobilizes the vehicle once the security system fails or being removed by the intruder. The intruder identity can be improved with the incorporation of security systems. The Immobilizer system with proper installment and guidelines can reduce the theft rate, and it allows the owner to monitor and control the vehicle with remote access.

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