Automobile Driver Authentication system using Electronic Driving License

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ABSTRACT: An Electronic Driving License (EDL) based ignition system in cars incorporates security as well as provides safety measures against theft, under age driving, etc. Driving license is devised to be used as a key to ignition of vehicle in the proposed system. A License Contact sensor will be equipped to start the car just by inserting a valid driving license into it.

KEYWORDS: Driving License, Vehicle Ignition, EDL, Road Safety.

I. INTRODUCTION

One of the primary objectives of Driving License based Automobile ignition system is to facilitate prevention of driving by drivers with invalid driving license, suspended driving license and underage driving by minors leading to accidents. The Electronic Smart card version of driving license consist of a micro chip embedded into a plastic card which uses a processor and memory to provide security features and information regarding the driver. An EDL can be used as a primary key for any vehicle such that the system proposed checks for the validity of the license inserted as soon as the scanners detect a card. The system also aims at providing enhanced security to vehicles to prevent theft of vehicles by using driving license as a key. For this, a GSM module is been incorporated into the system which generates and send an OTP (One Time Password) to the registered mobile number of the owner of the vehicle. The driver can enter the OTP to the vehicle system via a mini keypad. If the entered OTP matches with the generated one, permission will be granted to turn on the ignition system of the Vehicle.

In this paper, it proposes an efficient way of utilising modern electronic driving licenses from security and safety point of perspective. The system also scans another type of dummy card which is generally for valet parking purposes etc. This card will allow instant access to valet to use the car and park properly in the parking space, but this card only allows the driver to run the vehicle up to a predetermined distance in the system to prevent runaway by thieves using dummy cards.
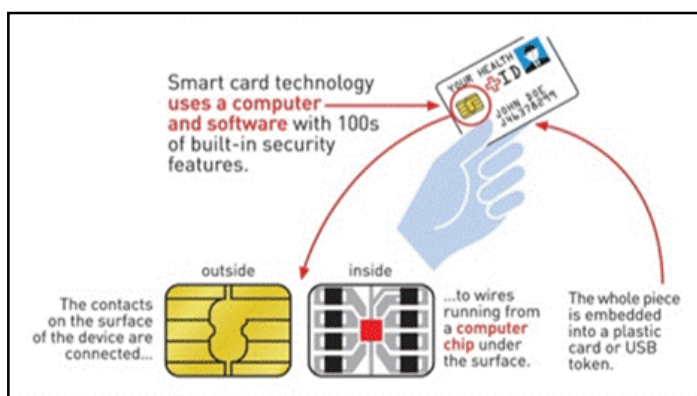

Fig. 1. Smart Card Technology [5]

II. RELATED WORK

In [1] author used a driving license as ignition key to car using RFID. Author has proposed a system in which identity of the driver will be downloaded into the car and verified for authentication and validity of the license. The owner and family members need to be preprogrammed into the car in order to use the car. When the driver leaves his/her car in front of a hotel, he will pass off one service card to the valet in order to parking, which will serve as good

as the driving license but up to a predefined limited distance required for parking. The author thereby proposes a system giving antitheft security by limiting the use of car only to the owner and his/her family members. In [2] author used driving license for authenticating the driver by considering three parameters viz., license expiry date, vehicle ownership and category of vehicle of which driving license is been issued. If the driving licence card is expired or if the person is not licensed to drive the vehicle category, the microcontroller will not allow the vehicle to be operated. In any case, if vehicle operation is not allowed, the system sends an alert to a preregistered mobile number. The mobile number receives the details of the driving licence which is being used to drive the vehicle.In [3] authors use proposed thesis aims at securing the automotive using the technologies like Radio Frequency Identification (RFID) technology, thumb registration system and face recognition which is efficient by nature. Initially the RFID system gets authenticated. The importance of this system is, it gets its verification from the Road Transportation Office (RTO).This authentication leads to the thumb registration module by which the efficiency of the thumb is enhanced using Pattern Matching Algorithm (PMA). Face recognition system is used after the thumb registration. Then the system allows the user to drive the car.In [4] authors focuses on developing an enhancement of the vehicle alarm security system via SMS. The idea is to design and develop an advanced vehicle locking system in the real time environment.

III. PROPOSED ALGORITHM

A. *Design Considerations:*

*   GSM Coverage should be required for Authentication of License.
*   Owner Mobile number should be preregistered within the vehicle system.
*   Keeping track of inserted driving license.
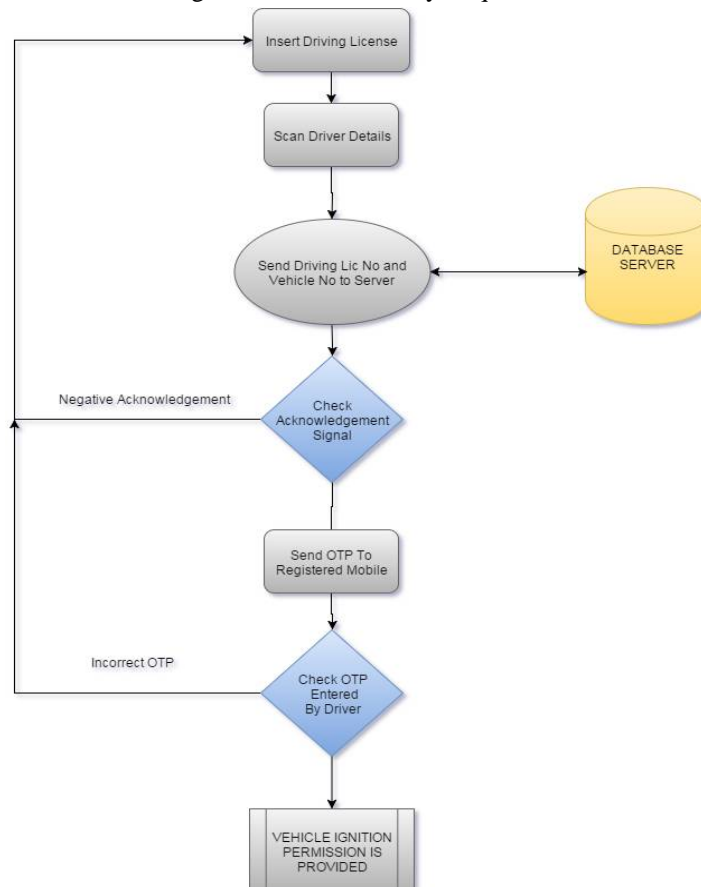*   License Card should be maintained against wear and tear by frequent use.
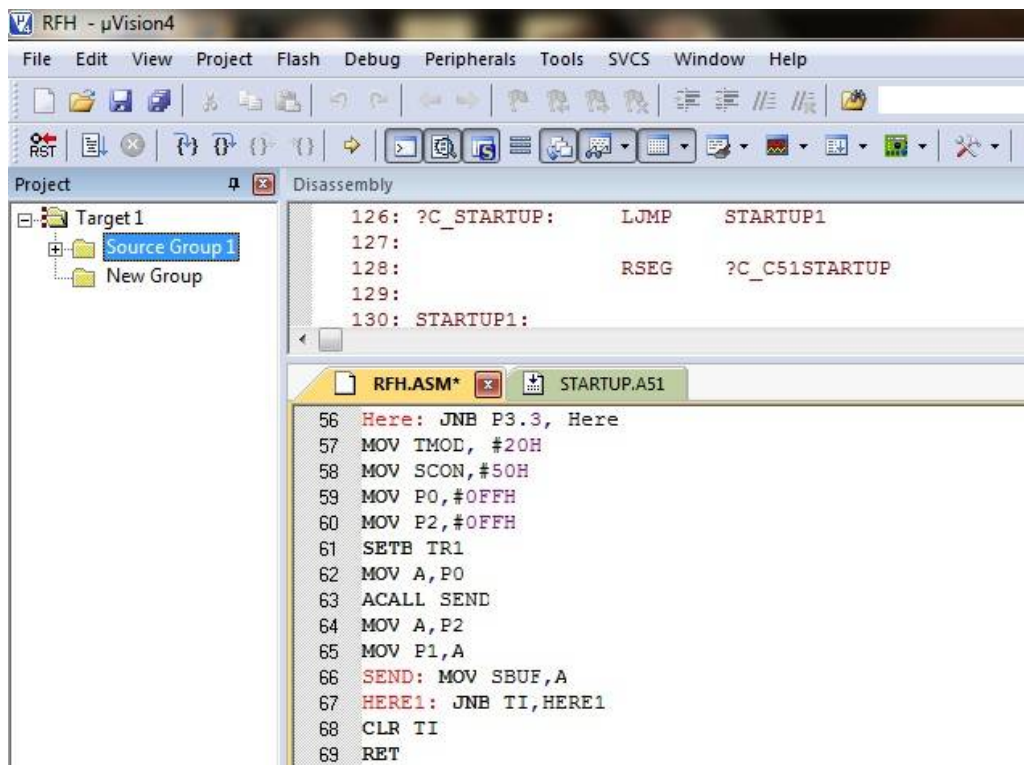

Fig. 2. Flowchart of Proposed System

B. *Description of the Proposed Algorithm:*

Automobile Engine Ignition by electronic driving license authentication proposes a system which is supposed to be installed inside the vehicle electronic control panel, integrated with car engine ignition control and odometer. The vehicle driver is supposed to insert his/her driving license inside the driving license slot provided in the system panel inside the vehicle. The system will immediately detect the inserted driving license and reads the driving license number and user info from the EDL. The license number read from the card is sent to Database server of Regional Transport Office or Administrative Authoring which act as a Control Station. The License data is sent over wireless medium by GSM module. At the Control Station or Regional Transport Office Database server, the license number and user info are authenticated and license is checked for the validity. It will be also checked that engine number corresponding to vehicle from which GSM connection is made is been licensed to be driven by the user or not, so that a person with license to drive only two wheeler vehicle doesn't false swipe the card into a four wheeler and get authenticated to use it.

Step 1: Detect the Driving License and keep track it remains inserted while the vehicle is on.
Step 2: Scan the driver details from the electronic smart card license.
Step 3: Send primary key or Unique driving license number and vehicle ID to Control Station via GSM.
Step 4: Authentication of Driving license for validity, suspension etc is verified at Control Station.
Step 5: If positive acknowledgement signal is received from Database server, then send OTP to Reg. Mobile.
Step 6: Enter the OTP received into Vehicle system via keypad provided.
Step 7: Check OTP, if incorrect, Go to step 1.
Step 8: Access is given for vehicle Ignition.

IV. CODE SNIPPET

The code for microcontroller is done in Keil uVision4 software. Serial transmission is used to send driver details and data acquired from the driving license to the Database server via GSM Module unit.

Fig. 3. Code Snippet uVision 4 Keil

V. SIMULATION RESULTS

The Proposed automobile ignition system is simulated in Proteus 7.7. A Sensor LED together with a photodiode constitutes the driving license slot which ensures that driving license remain inserted. An internal mechanical locking system will be provided in the slot such that the inserted driving license cannot be removed until the vehicle ignition is turned off. The Driver details and Vehicle ID like engine number and license number will be serially sent to Database server via GSM module connected to the system. An acknowledgement will be received by the GSM from the Central server after checking for the validity of the license. Thereafter the system will send an One Time Password to registered
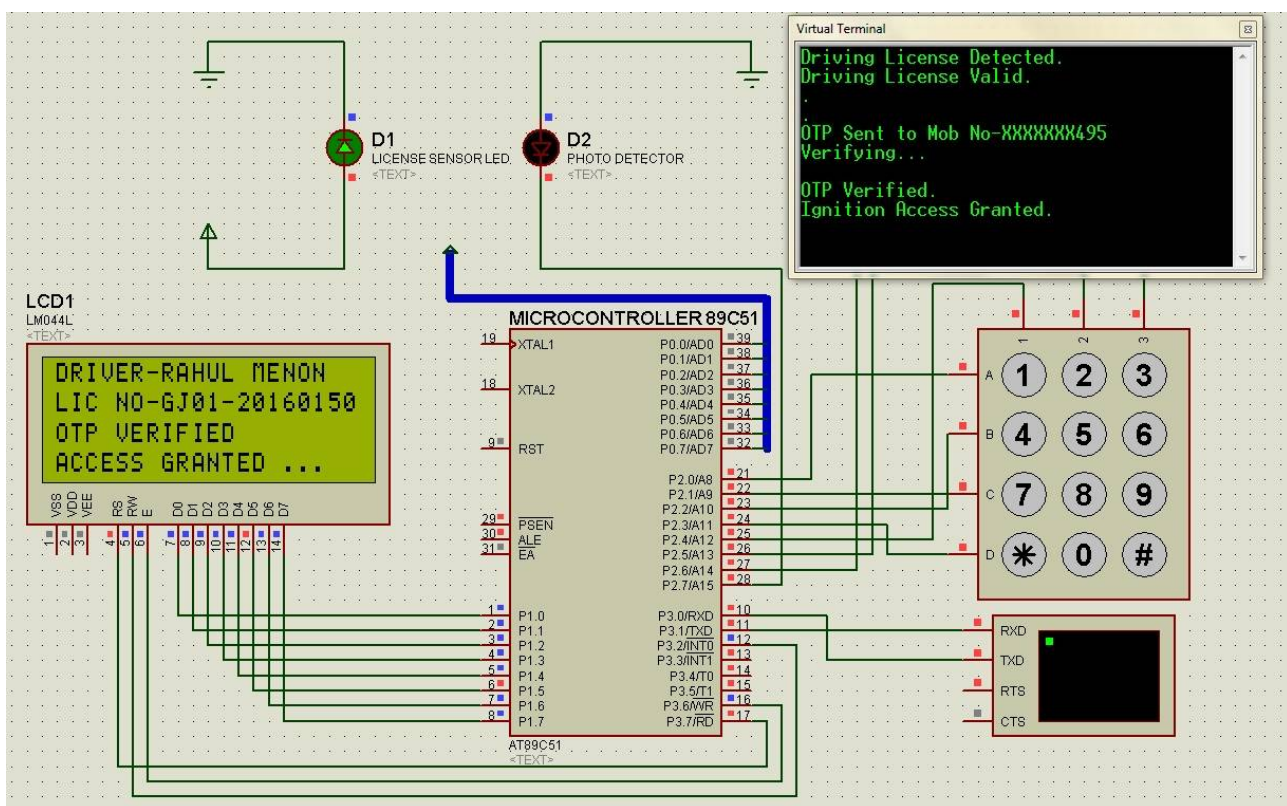

Fig. 4. Proteus 7.7 Simulation

mobile number of the owner. In case the driver enters correct OTP into the vehicle system, ignition access will be granted. OTP is used to ensure that no one is able to start the vehicle without consent of the owner.

VI. CONCLUSION AND FUTURE WORK

The proposed system presents a electronic unit for vehicles which act as ignition lock with valid electronic driving license as the key. Automobile will not start without a valid driving license or without consent of the owner of the vehicle. The driver is supposed to insert his driving license (EDL) into the unit, the system will verify the validity of license by checking in database server. The system will send the data to central server via GSM connection and receive an acknowledgement signal of verification on the same medium. The proposed system then automatically send an OTP (One time password) to registered mobile number of the owner which needs to be entered in the vehicle by a mini keypad. Thus the system incorporates authentication of driver as well as doesn't compromise the security the vehicle by use of OTP. The system can be further enhanced by checking other details of driver at the Central server like to check whether the driver is suspended for violating traffic rules or for drink and drive. Furthermore advancement in system

may incorporate central level control over all vehicles which can be used by security forces and cops for blocking the culprit vehicle and thus avoiding long outrun chases.

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