SOFTWARE SYSTEM ENGINEERING

2IW60

“Requirements Elicitation on Driving License Slot”
Driving license slot system

Scenario

In order to reduce the number of accidents and the thefts of cars a number of European OEM-ers has decided to introduce a slot in the dashboard where the driver has to insert the his or her driving license.

The assumption is that all European driving licenses are standardized and have a chip. The slot and corresponding electronics are available.

Your task is to draft a requirements document which contains the software requirements. Try to think of unexpected situations. Formulate the requirements as precise as possible. The idea is that these requirements will be used to make a design, to develop tests and to write the documentation.

Overview of the system

First of all, it is important to define the purpose of the Driving license slot device. The device consists primarily of a slot in the dashboard of the automobile that will read the driver license of the person who will drive the car. This device is intended to determine felonies, validity of the license or any other information from the user’s driving license and this way the car can determine the level of danger this driver represents for others. Its main purpose also is to reduce the number of stolen cars by knowing who is the one driving the car. So if in case a car is stolen, there would be a database of the last known person who drove that car.

The system is intended by the European OEMs in the near future so it means that anybody in Europe with a legal license driver will be able to drive a car. For the problem, the first assumption to be taken into consideration is that all the driving licenses will be standardized and the databases of each country must be open to any car in Europe trying to retrieve information.

The device must be a combination between hardware and software. The hardware must consist in a card recognition slot in the dashboard, a LCD display that will inform the user about any irregularity or problem and a sound alarm near to the slot in the dashboard to remind the user to take the license. The software must determine information of the user in the database of any European country part of the OEMs.

Functional Requirements

Statements of services the system should provide how the system should react to particular inputs and how the system should behave in particular situations. To find the functional requirements, according to the definition given before, it is important to understand the functionality or system services so a description of the system services can be done in detail.
The next are functional requirements the device must achieve:

- The system’s slot can only accept one license at a time.
- The system can accept any valid license from a OEMs driver.
- The system should inform the user if the card is correctly inserted in the slot or not.
- Inform the user if his/her license is still valid (information from the license) and no other felonies (from the database) prohibit the user to drive the car.
- If it can't connect with the database but the driver has a valid license, the system will allow the user to drive the car until a new connection can be done with the database in order to confirm that the user is allowed to ride the car.
- If an invalid license is being used, the device must inform the car so it can’t be switch on the engine. This is due to the fact that if the user doesn’t have a valid license he/she shouldn’t ride a car.
- Warn users that the license will soon expire.
- The system must be able to communicate to a database to confirm the user’s data from his/her license.
- The system must send and storage in the memory of a database the information of the latest user that drove the car in case the car is reported stolen.
- When shutting down the car, inform the user to not forget his/her driver license.
- The language of the LCD display will be the language of where the car was bought.
- The sound alarm should beep two times after the car is switch off to remind the user to take his/her license.
- The license should be inserted all time during driving to assure that the user has a valid driving license during all his/her travel.

Non-Functional Requirements

Non-functional requirements are defined for this report as constraints on the services or functions offered by the system such as timing constraints, constraints on the development process, standards, etc. This way, the non-functional requirements can be divided as following:

Performance Requirements

- The system must wait 0.5 seconds after sensing something being introduced in the slot to read and determine if the license was correctly inserted or not in the slot.
- The system must read the information of the car in less than 0.2 seconds.
- The system must connect with the database in no more than 0.4 second.
• If the system is not able to connect with the database, the driver will be allow to drive and the system will try to connect with the database every 2 seconds until it receives an answer.
• The response in the LCD display must take less than 0.3 seconds about any irregularity or problem.
• Parallel to the information being sent to the LCD display, if the card was accepted, the system must send a flag of validation to the car so the user can switch on the engine in less than 0.2 seconds.
• After the car is switch on, the information of the license must be send to the database for storage in case the automobile is reported as missing in no more than 3 seconds.
• After switching the car off, a signal to the device must be sent in no more than 0.5 seconds.
• After receiving the signal that the car has been switch off, the reminder sound alarm must beep after 0.3 seconds twice during 1 second each beep with an interval of 0.5 seconds between each beep.
• If the system determines an error in its functionality, it must reboot in less than 0.3 seconds.
• The system must sense every 1.5 seconds to determine if the license is still correctly inserted in the slot.

Safety Requirements

These requirements are concern to possible loss, damage, or harm that could result from the use of the product. In this case, the only danger could be caused if the license is being removed, on purpose or by accident, and its consequences.

• If the license is removed during driving the car, the system should not stop the car. It must warn the user with a recorded voice through the sound system of the device that if the license is not inserted again in less than 5 minutes the license will be canceled and will not be valid if the car wants to be switch on again. This warning will be send to the user every minute until the license is inserted again or the 5 minutes limit is over. If the license is inserted again, the 5 minutes will be reset.
• The slot must be design such that the user must be able to remove the card at any moment for any emergency.
• The slot of the device must be positioned between the steering wheel and the door, so only the driver will have access to it.
• The slot must be positioned 45 degrees up so the vibrations of the car due to the road will not make the card get out of the slot and possibly fall.

Security Requirements

Requirements regarding security or privacy issues due to the use of the product or protection of the data used or created by the product.
The information retrieved from the license of the user will not be presented in the LCD display or in any other way of communication to the people in the car. The information retrieved from the license of the user will only be the expiry date of the license and the license number that will be send to the database for information and storage. If the driver commits a felony during driving, the system will not send any information about this felony to the database. A police officer must be the one updating this information.

**Interface Requirements**

**User Interfaces**

- The user must insert his/her license in the slot of the device.
- The user reads message about updates of the processes being done by the system in the LCD display (validation of the license, connection to database, etc.)
- The user receives a warning via sounds system if there is a problem (if the user remove the license, if the user forgot to remove his/her license after switching off the car, etc.)

**Hardware Interfaces**

- The device must be connected to the battery for power supply.
- When a license has been inserted in the slot, the system will read the card and send the information to the system for verification.
- Information about the status of the license will be send by the system to the LCD display.
- The slot will read if the license has been removed and will send a signal to the system.
- If the license got remove, the system will send a signal to the sound system of the device to create a warning.
- When the car is switched off, the system will send a signal to the sound alarm system.

**Software Interfaces**

- The system will verify the information of the license with the server.
- The system must send the information of the license for storage.
User Case

User inserts the license

- Correctly inserted
  - YES: License expired
  - NO: LCD display shows the card is not correctly inserted

  - YES: License expired
  - NO: Connection to Database

- Connection to Database
  - TOO MANY FELONIES?
    - YES
    - NO: License expired
    - YES: Too many felonies?
      - YES: License expired
      - NO: The user is able to drive

- The user is able to drive
  - YES
  - NO: License still in slot

- License still in slot
  - YES
  - NO: System asks the user to put it again if not license will be canceled

- System asks the user to put it again if not license will be canceled
  - NO: License expired
  - YES: Car switch off

- Car switch off
  - NO
  - YES: Signal to sound system alarm reminding the user to take his/her license

- Signal to sound system alarm reminding the user to take his/her license
  - YES
  - NO: LCD display shows license unvalid. Can’t drive the car