

# IoT based Automatic Driving License Test

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**Abstract**— This paper presents about the automation of driving license test system and notifying the result of the candidate wirelessly. Normally, in driving test a candidate applied for license have to drive over a closed loop path in front of the authorities. The candidate has to drive over the path with specific rules and if he fails to do so he will be disqualified and should try next time. These authorities watch the errors of the candidates manually. In this paper, the Arduino system with necessary sensor modules has been developed for watching the candidate for getting their license. By using this system, the candidate who take up the test are monitored and the result whether the candidate is passed or failed is updated to the candidate as well as the authorities wirelessly using IOT and GSM modules. This monitoring of the driving test ground is done autonomously using the Arduino system. This system is developed for improving the standards of license issuing mechanism in order to improve road safety.

**Keywords**- Driving license , Manually inspecting, Arduino system, Autonomous, notifying wirelessly.

## I. INTRODUCTION

A driver's license is an official document, often plastic and the size of credit card, permitting a specific individual to operate one or more types of motorized vehicles, such as a motorcycle, car, truck, or bus on a public road. The laws relating to the licensing of drivers vary between jurisdictions. In some jurisdictions, a permit is issued after the recipient has passed a driving test, while in others, a person acquires their permit before beginning to drive. Different categories of permit often exist for different types of motor vehicles, particularly large trucks and passenger vehicles. The difficulty of the driving test varies considerably between jurisdictions, as do factors such as age and the required level of competence and practice. The minimum driving age in India is 16 for mopeds under 50, and 18 for cars and motorcycles of

more than 50 cc. The Regional Transport Office (RTO/RTA) issue their own driving licenses in various states. Drivers are legally obliged to carry a valid driving permit in India whilst driving, and it must be produced if required to do so by a police officer. In India, people aged 50 or more, have to undergo strict medical tests in order to obtain a permit that has limited validity and requires renewal every five years. A Commercial Driving License is valid for 3 years and then requires to be renewed.

Nowadays getting a driving license is an important thing in every adult's life. The RTO office issues the license to a trainee provided the trainee passes the prescribed test. These tests should challenge the capability of the trainee in every way possible. The aspirant must be perfect and confident in driving. In the end, the trainee has to earn the license. Road safety is an issue of national concern as it impacts on the economy, public health and general welfare of the people. More than 85% of traffic is carried out by road transport because of easy availability of roads, adaptability to individual needs and cost savings. The survey conducted by International Finance Corporation implies that most of the road accidents are happening because of improper knowledge about how to drive the vehicle. The other survey conducted shows that 54% of the license holders are not having the proper knowledge of driving the vehicle.

In this paper we are presenting an automated driving license test capable of testing the knowledge and mental awareness of the person while driving a vehicle so as to improve the standard of license issuing mechanism in order to improve road safety in a country. This automated system is done by interfacing Arduino UNO board with number of sensors, these sensors are kept on the test track to identify the errors of the candidate while he is taking the test. Arduino UNO microcontroller reads the data

collected by sensors, processes them and send the result information to the candidate and authorities of RTO weather he/she is passed or failed to get a driving license.

## II. SYSTEM OVERVIEW

- The main aim of this project is to provide automation in the driving license process and IOT is used to ease the viewing of the results.
- The sensors such as ultrasonic sensor, IR sensor, Crash sensor, RFID and LCD display are used for this process.
- The Arduino UNO is used as a microcontroller which has 8 Analog pins and 13 digital pins which has RX and TX for serial communication, with 5 volts power supply.
- In this project there are three stages i.e,
  - (i) Ramp Test.
  - (ii) Curve Test.
  - (iii) Parking Test.

*The trainee has to scan the RFID card which holds all the details and then the gate is opened.*

- In the ramp test, IR sensors are used to check if the trainee can clear an inclined path without backing the vehicle.
- In the curve test, the trainee is provided with a path such as 8 which is planted with crash sensors, the trainee should successfully clear the test without crashing to the walls.
- In the parking test, the trainee should park the vehicle in a given square border, which is monitored by ultrasonic sensors.
- The Arduino system collects the data
- The score from each test is taken and displayed on a LCD display, saying the trainee is passed or failed.
- The result is mailed to the candidate that can be viewed easily.

## III. SYSTEM ARCHITECTURE

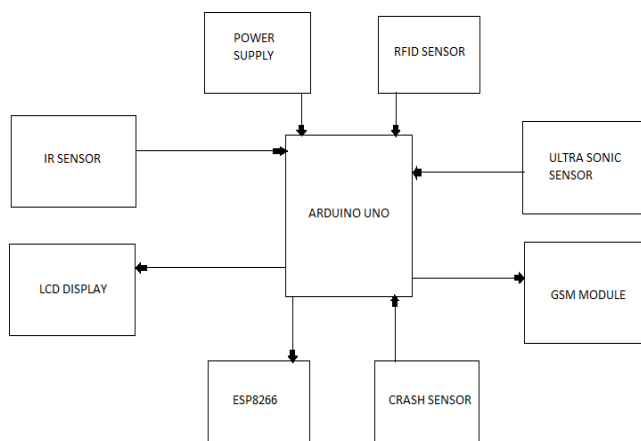


Fig.1: Block diagram of Driving license test.

Arduino UNO is used as the micro controller and Analog sensors such as IR sensor, Ultrasonic sensor and crash sensor is used in test to track conditions. RFID, ESP8266, LCD display are the digital modules, that are used for displaying results. All the connections are wired and have a serial communication interface with the micro controller.

Specification: The Arduino Uno board is a microcontroller based on the ATmega328. It has 14 digital input/output pins in which 6 can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button. This contains all the required support needed for microcontroller. In order to get started, they are simply connected to a computer with a USB cable or with a AC-to-DC adapter or battery. Arduino Uno Board varies from all other boards and they will not use the FTDI USB-to-serial driver chip in them. It is featured by the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. RFID is a technology similar in theory to bar codes. However, the RFID tag does not have to be scanned directly, nor does it require line-of-sight to a reader. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read. RFID technology allows several items to be quickly scanned and enables fast identification of a particular product, even when it is surrounded by several other items.

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only infrared radiation, rather than emitting it that is called a passive IR sensor. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation.

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound. In order to calculate the distance between the sensor and the object, the sensor measures the time it takes between the emission of the sound by the transmitter to its contact with the receiver. The formula for this calculation is

$$D = \frac{1}{2} T \times C .$$

The switch 10T85 is a snap action switch. It is connected internally in such a way that the pins 1 and 2 are connected. The pin 2 is connected to pin 1 when the switch is closed. The switch is used as a crash sensor.

ESP8266 is Wi-Fi enabled system on chip module developed by Express if system. It is mostly used for development of IOT embedded applications. t employs a 32-bit RISC CPU based on the Tensilica

Xtensa L106 running at 80 MHz (or over clocked to 160 MHz). It has a 64 KB boot ROM, 64 KB instruction RAM and 96 KB data RAM. External flash memory can be accessed through SPI. ESP8266 module is low cost standalone wireless transceiver that can be used for end-point IOT developments. To communicate with the ESP8266 module, microcontroller needs to use set of AT commands. Microcontroller communicates with ESP8266-01 module using UART having specified Baud rate.

A liquid crystal display or LCD draws its definition from its name itself. It is combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. Liquid crystal displays are super-thin technology display screen that are generally used in laptop computer screen, TVs, cell phones and portable video games. LCD's technologies allow displays to be much thinner when compared to cathode ray tube technology.

The SIM900A is a complete Dual-band GSM/GPRS solution in a SMT module which can be embedded in the customer applications. Featuring an industry-standard interface, the SIM900A delivers GSM/GPRS 900/1800MHz performance for voice, SMS, Data, and Fax in a small form factor and with low power consumption. With a tiny configuration of 24mmx24mmx3mm, SIM900A can fit in almost all the space requirements in user applications, especially for slim and compact demand of design.

#### IV. FLOWCHART

The flowchart of the driving license system is shown in the Figure . To receive the driving license one must go through few tests. At first, the Ramp test of driving license system is done and the result of this test is recorded. The result of the second test called the curve test where the candidate should drive through the curve is also recorded. After the curve test is the parking test, where the candidate has to park vehicle in the given space and the result of this also is recorded. Now all the three test's results are added. We have set a particular score to pass in the test; the candidate has to reach the particular score to pass in the test. If the candidate doesn't attain the particular score, the candidate's result is shown as fail and the candidate is not eligible to receive the driving license. The results will be displayed in the LCD.

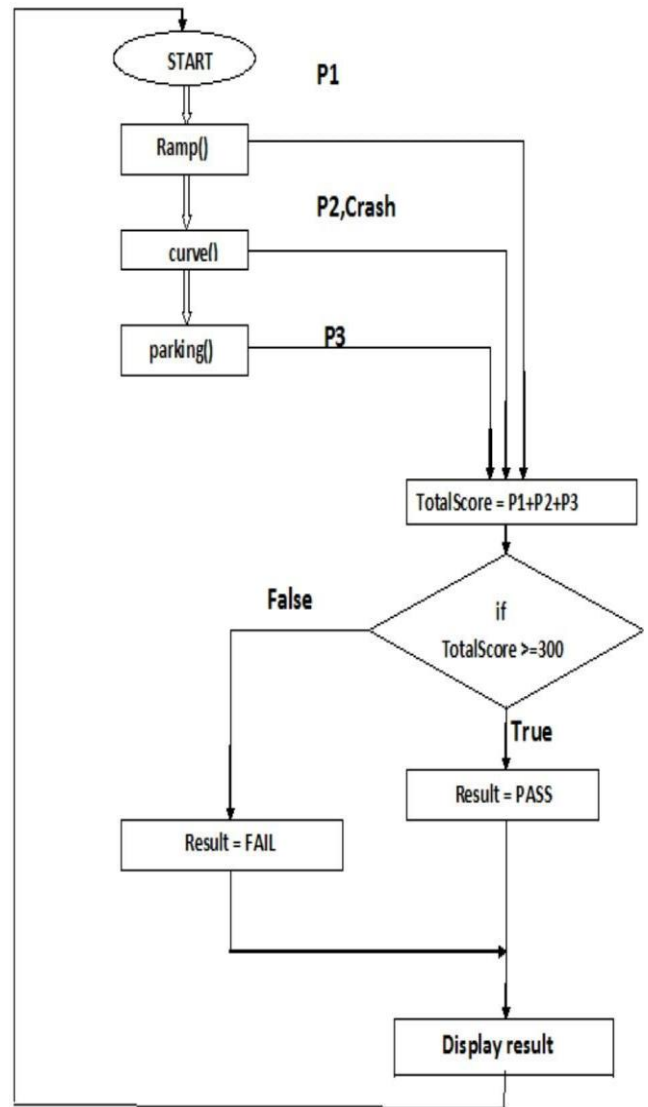


Fig.2: Flowchart representation.

#### APPLICATION

- In RTO Driving test zones.
- Private practice zones.
- Training zones.
- Racing tracks for crash monitoring.

#### ADVANTAGE

- Ensuring transparency in the system by tackling corruption.
- Promoting quality drivers.
- Unbiased results.
- Increases confidence in the trainee.
- Aids the RTO officers.

## CONCLUSION

In this project we are trying to prevent problems faced by a normal candidate for getting a driving license without and corruption or influence by automation of driving license test, this project can be installed on every driving license track.

In conclusion the we perform all the required tests for getting a driving license using various sensors and that data is stored in micro controller and based on the predefined instructions the test will we validated and the result will be displayed on the LCD display and mailed for officer for keeping track of further processes and candidate will be sent a message about test result and the next slot scheduled if the test is failed.

Since the components used in the project are easily available and less cost it is easy to be replaced.

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