Embedded System Based Autonomous License Testing System

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Abstract:

The license procuring process is not an easy task, it is tedious and time consuming. This project aims at automating the field-monitoring of license approval, thereby saving time and providing improved efficiency. The project identifies and solves the manual field errors and provides accurate results despite people's concern. This makes the license issuing process faster and flawless. This project is based on the principle of the parallel plate capacitor. The testing site consists of the parallel metal plates on the top and bottom surface which helps to detect the flaw made by the candidate in the testing site and reject the application immediately. The experimental setup has been developed and is functioning exactly as per the requirements. This system approves/rejectsthe candidate automatically and the process is done with no or less human power. This digitalizes the government procedure. This paper also comprises working and construction of the system.

Keywords: *Capacitance measuring block, IoT, IR transmitter and receiver, Parallel plates,Wi-Fi Module.*

I.   INTRODUCTION

Autonomous License Testing System helps people in procuring their license faster and the evaluation process is accurate. The main advantage of this project is to avoid corruption in the governmentprocess. Paper less environment is provided inside the testing site. [1] It investigated a sine wave frequency generator with parallel plates capacitor sample was used to span the difference in capacitance caused by the introduction of a banana fruit into the sensor, this concept is used in the project.Any flaw in the procedure will automatically lead to the rejection of the candidate. [2] Wireless network system is used to provide result to the inspector and also to the candidate. This paves way

for the digitalization of the government procedure, which will make the process easy for citizens.

II.   Problem Definition

The present method involves usage of manpower. It is time consuming and the process might take even whole day. This system doesn't have any automated techniques to completely check and provide results of the test. The candidate is said to drive an '8' inside the testing area with certain rules to be followed. This whole test will be monitored by the officials and they will provide the result.

III.   Construction

[3][4][5]The proposed system consists of two parallel metal plates which should be installed in certain height, that one forms the ground and the other forms the ceiling. The whole setup works on the principle of parallel plate capacitance.The change in the value of capacitance between the metal plates will be used. The change in the value will detect the placing of foot on the ground. The IR Transmitter and Receiver installed in the pathway will detect whether the person drives the whole '8' path or not. The result will be sent to the inspector as it is connected IOT network system. Whole system is automated and doesn't need any manual observation.
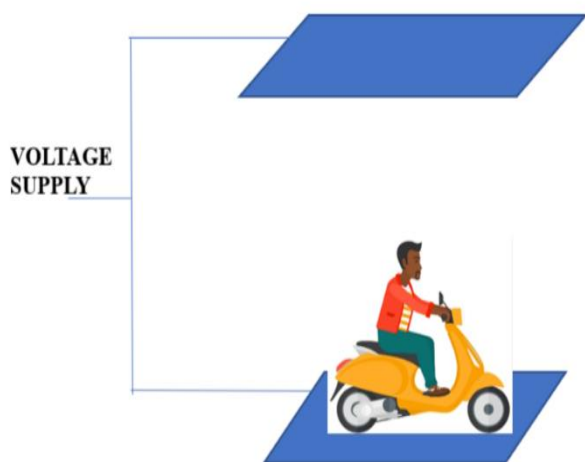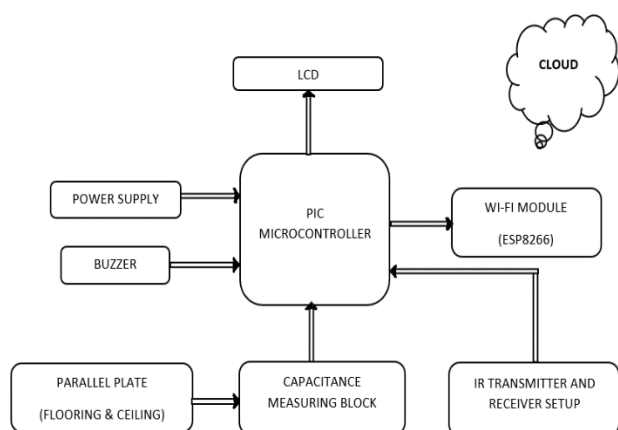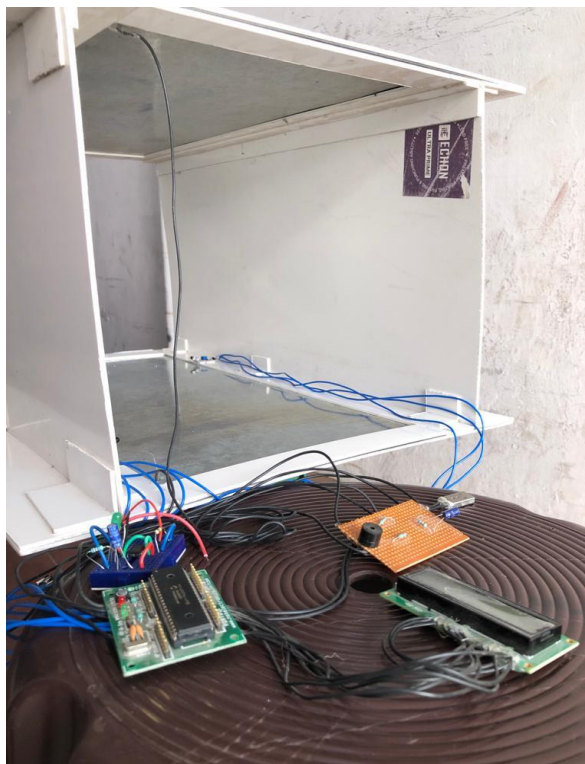

Figure 3. Prototype model

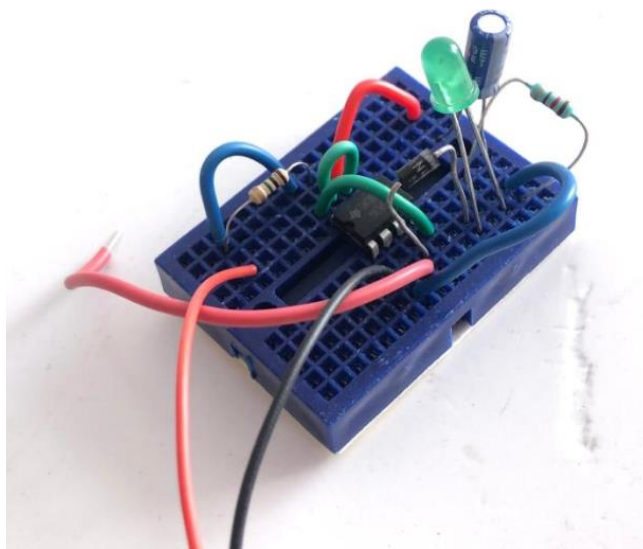Figure 1. Proposed setup

Figure 4. Capacitance measuring block

Figure 2. Block diagram of prototype

IV. Methodology

The prototype is a connected IOT network systemusing PIC Microcontroller. The information about the test-candidate is sent to the officer. After cross checking the identity through application, the officer then allows the candidate to take test from his

office room itself. The name of the candidate will be displayed on the screen in the testing area. The candidate then must drive a '8' inside the testing area. The candidate can drive with or without footwear. If he/she choose to wear any, then a use-and-throw thin glove made of aluminiummetalwill be given, which can be worn over their footwear. This works on the principle of parallel plate capacitance,metal electrodes are used which are placed parallel [ground and ceiling] between which a dielectric medium is created. In this medium the capacitance value is measured and noted as reference value. Whenever the candidate places his foot on ground, there will be a huge deflection in the value of capacitance.This value is regularly checked with reference value. This huge deflection will confirm that the candidate has placed his feet on the ground. Other than this monitoring setup, couple of active IR (transmitter and receiver) sensor are placed on the path, such that they will regularly monitor the pathand confirm whether candidate has completed his test properly as per the rules. Then this result is sent to inspector and further procedures will be carried out.

V. Objectives

- To simplify the field monitoring of license approval.
- To monitor test in flawless manner.
- To automate the general prevalent procedure.
- Ease way of managing candidate's data.
- To avoid corruption.
- Digitalize or Paperless procedure.

VI. Results

Series of observations were made based on the working of the setup. Number of different results were obtained based on the sensitivity of the capacitance circuit. The difference in the value of capacitance can be shown with the help of these sinusoidal graphs obtained as a result of touch from

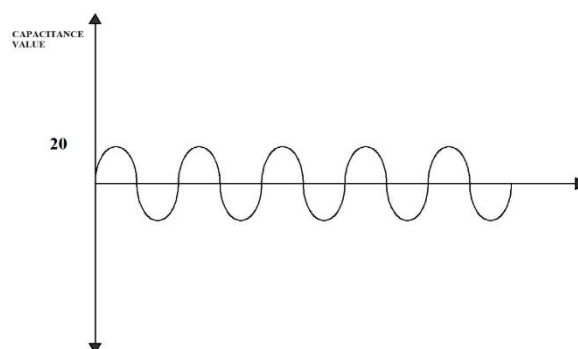the prototype model. In the working prototype, 20 is taken as reference value.

Figure 5. Capacitance reference value

The figure 5 represents the reference value. Any increase in this value will result in rejection of license.
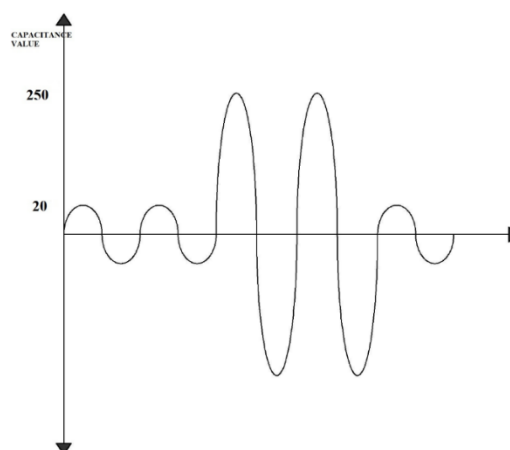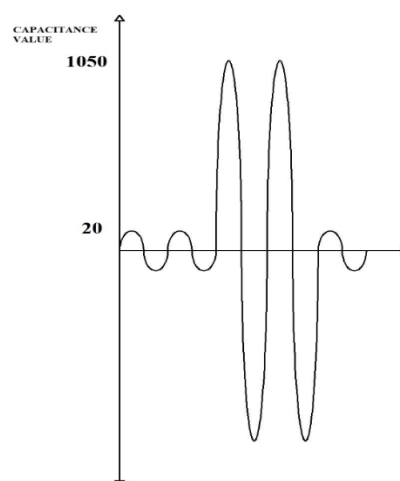

Figure 6. Change in capacitance due to touch

Figure 7. Higher intensity oftouch

The figure 6&7represents change in the value of capacitance over a period of small time. This

variation shows that candidate has kept his foot or any body part touching the ground. As the electrode (metal plates) are highly sensitive, slight touch can result in high variation in the capacitance. In the figure 6, a slight touch response has increased the value from 20 to around 250. In figure 7, intensity of touch is increased and hence there is a surge in value of capacitance. The change in value provided is only approximate and it keeps fluctuating.

If the candidate drives the '8' perfectly which is monitored by IR sensor and the capacitance value is maintained less than 20, then the candidate will pass the test. If the capacitance value increases beyond 20 or any change in path '8', then message will be sent directly to inspector through Wi-Fi module, stating the rejection of applicant.

VII.   Conclusion

The system designed will be useful in term of accuracy while testing the candidates in license testing and issuing. This can be used to save time and be helpful in avoiding manual mistakes which are done by human. As whole process isautomated no wrong decisions can be taken by anyone including the testing officer, which avoids corruption. The data which is recorded will be useful in many ways.

A. Difficulties

The initial setting up cost is high as the system will require precise dynamics and standard quality of metal should be used. It will require separate space for testing, preferably a covered area where there won't be any disturbance due to foreign materials, to provide accurate results.

VIII.   FUTURE SCOPE

In future,result of the test can be sent through message soon after the test is over. License can also be home delivered or delivered to the address provided thereby saving time. [6]Fingerprints can be recorded to authenticate the identity of the person and so there won't be any malpractice involved in this system.

IX.   Acknowledgement

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