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Smart Electronic Notice Board

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Abstract: *A notice board is commonly used in elementary schools and large organizations to communicate urgent notifications. A significant amount of paper is used and then discarded. Smart electronic notice board display the information on display of LCD. These notice boards can be utilized in a variety of settings such as educational institutions, stations, and others to post notices or some information to those that require it as technology advances, as the number of people using it grew. In this proposed system the user will enable to send information or notices wirelessly on a notice board using NodeMCU (ESP32) which consist of Wi-Fi Module. The information is sent to smart phone via an application which interact with the notice board. The notice board will be operating by using solar power energy. The result obtained is achieved the expectation where to display information sent from smart phone. Also, the prototype is working and function well.*

Keywords: Electronic Notice Board, LCD Display, Internet of Things, Wi-Fi Module, Application

I. INTRODUCTION

A digital bulletin board is a digital display of information. In the present world, these are much more commonly used to communicate information, messages, notifications, and other things. It entails digital presentations replacing papers, cork boards, and other manual methods of information transition [1]. We developed the following prototype model in order to implement the desired electronic notice board on the Thingspeak platform. It is made up of a NodeMCU with an integrated Wi-Fi Module. The proposed model is tested using an LCD panel and a mobile phone. The ESP32 modules can be programmed with LUA script using the NodeMCU firmware. It is quite similar to how Arduino is programmed. With just a few lines of code, you can connect to Wi-Fi, manage the ESP32 GPIOs, transform your ESP32 into a web server, and much more. The user will send the message using an application.on their smartphone. The notice that read from the application by the NodeMCU and displayed on the notice board. The prototype is green energy because it is using solar power.

II. PROBLEM STATEMENT

In the proposed method, a representative announces the news and is responsible for posting it on all public notice boards [2]. This is most commonly observed during the examination period. Students must be given an exam schedule by writing it on the notice boards. However, updating the information on the board takes a long time. During this environmentally-conscious age, the concept of printing paper and posting it on bulletin boards is not particularly green in this ecologically concerned day. Consider alternative methods of providing information to students that do not require as much paper and ink. The major drawback of designing these boards is not flexible and cannot be located anywhere due to messy wire. However, the proposed project considers existed but without IoT, it could be difficult for the representative to pass the emergency information on the time.

III. METHODOLOGY

The Internet of Things (IoT) is one of the most widely used and top tier communication systems in today's world of innovation. In order to create a notice board system using the Internet of Things, there are three components: input, microcontroller, and output. The project consists of the following main components:

- Input (User Interface) – Smart Phone: User send notice from smartphone via application.
- Microcontroller – ESP32: Receive the notice from the application and send the notice to LCD display.
- Output – LCD display: Receive notice from ESP32 and display it.

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A. System Block Diagram

The key benefit of this piece of tech was that it would provide the NodeMCU for receiving data from the designed application on a smartphone. This system is a smart notice board that displays the message sent by the user, as well as to design a simple, user-friendly system that can receive and visualize notice in the LCD display which used as a notice board [3]. The information that we want to present on the LCD have been entered in the application in the transmission area. The application was constructed using MIT App Inventor, and the C programming language was utilized to provide functionality. To see the data that has to be submitted, type notice in the text box, then click send. The information is sent to the NodeMCU. The sender is in charge of sending important data across the wireless network. To use the Smart Notice Board, the sender should first install the appropriate application. We give security authentications such as login and password to prevent unwanted access to the application. This was the sender section. For the receiver section contains NodeMCU (ESP32), LCD display and Wi-Fi connection.

B. System Operation

Based on the project block diagram as shown in Fig. 1, the system automatically initializes the NodeMCU, ThingSpeak and the application when its starts. Then, the sender should be login to the application or else the sender cannot pass any information through the Smart Electronic Notice Board [4]. The information can be sent via the application on the NodeMCU. The information can only be accessed or sent by the authenticated sender. If a sender is not authorized, he or she would not be able to send information or notices. This project has gotten to the point where only the authorized user can submit information. After sender successfully logged in, they get access to send information. Sender may can pass their information to the notice board by click the send button after they done with their information typed. The information they want to display would be shown in the Smart Electronic Notice Board [5]. Meanwhile, the information that sent would not been change until the new information send. Last but not least, this system will be powered via DC cord connected to the solar panel, and when there is nightfall or no sunlight situation, the battery will take over to power the systems.

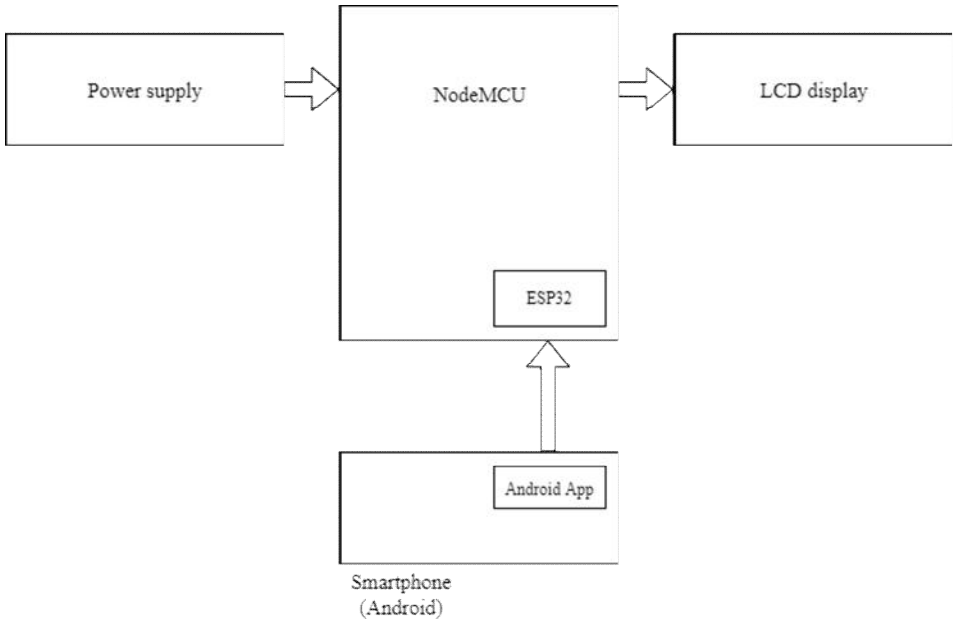

Fig. 1 Project Block Diagram

IV. RESULT AND DISCUSSION

The overall system for this project is starts when ON the circuit. The power supplies have two methods controlled by solar charge controller. First, the system is attached to the solar panel which charge the battery while supply power to the system. When there is a nightfall, 12V lead-acid battery will take over their turn to supply the power to the system.

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The system is using ESP32 [6]. When the system ON, the LCD display and NodeMCU (ESP32) will be initialized. The ESP32 will auto-connect to the designated Wi-Fi. After initialized, user have to login to the Smart Electronic Notice Board Application. If the user is unauthorized, they cannot login to the application. Then the authorized user logged in, they can type and send whatever information they want to send. The information will be received by Thingspeak, send to the ESP32 and display the information in the LCD display. The system always looping the last information until the new information send.

Fig. 2 Project Prototype Overview

Fig. 2 above shows the overall of experimental setup of consist of ESP32, LCD display, solar panel, solar charge controller and lead-acid battery. The power supplies have two methods controlled by solar charge controller. First, the system is attached to the solar panel which charge the battery while supply power to the system. When there is a nightfall, a lead-acid battery will take over their turn to supply the power to the system. The system is using ESP32. When the system ON, the LCD display and NodeMCU (ESP32) will be initialized. The ESP32 will auto-connect to the designated Wi-Fi.

Fig. 3 Login Interface of Smart Electronic Notice Board Application

The LCD display will show text when the NodeMCU (ESP32) connected with Wi-Fi and the user send the message. Meanwhile, the solar charge controller will be act as a middleman for solar panel and battery which prevent the battery from over charged and at the same time it also makes the battery as a power source for the NodeMCU (ESP32). The

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power source is a 12V valve regulated lead-acid battery and an alternative source which is solar panel is also a 12V output.

After initialized, user have to login to the Smart Electronic Notice Board Application. The user should be login to the application or else the user cannot pass any information through the Smart Electronic Notice Board. The information can only be accessed or sent by the authenticated user. If the user is unauthorized, they cannot login to the application. When the authorized user logged in, they can type and send whatever information they want to send in the application interface as shown in Fig. 3. The information will be received by Thingspeak, and send to the ESP32. Then, it will display the information in the Smart Electronic Notice Board [7]. The system always looping and showing the last information until the new information are sent by the users.

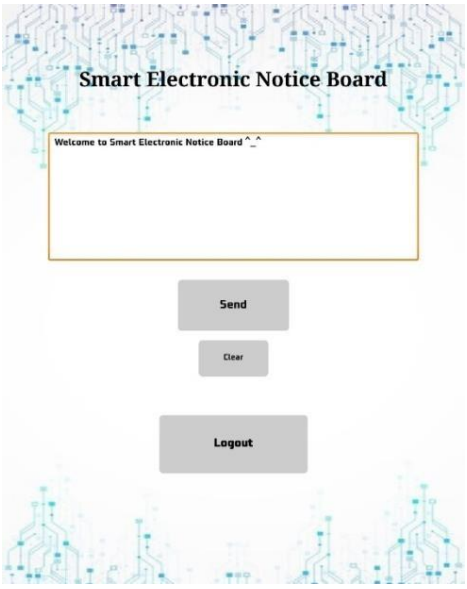

Fig.4 Text Interface of Smart Electronic Notice Board Application After Successfully Logged in

Based on all figure above shows that electronic notice board system was successfully built because able to send notice from application and display notice in LCD display [8]. For Fig. 4, the concept flow is authenticated user logged in to the Smart Electronic Notice Board Application using correct login username and password. When the user is authenticated, the text interface will appear so the user can text on notice board. If the user is not authenticated, the interface will remain the same and there will be a “Incorrect Username and Password” message appeared.

When the NodeMCU (ESP32) in the prototype connected with designated Wi-Fi, the system allows the prototype to interact with the application and shows the message or information which send by the user via application as shown in Fig. 5. Therefore, it will display whatever information typed and sent by the user in the LCD display. If the NodeMCU (ESP32) does not connected to the Wi-Fi, the LCD display will does not show anything even though the user attempt to send information from the application [9]. The system will be looping the previous message until there is any new message sent using the application.

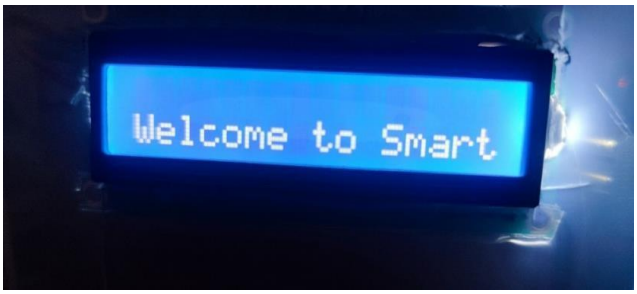

Fig. 5TextMessage Sent From Application Displayed on LCD Display

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V. CONCLUSION

In the conclusion, this project known as "Solar Powered Internet of Things Based Smart Electronic Notice Board" is apropos to be designed because it can give a big impact to the traditional notice boards and huge contribution to the university authorities especially staffs and representatives. Briefly, this project has achieved main objectives and scopes of the project which are to develop a wireless notice board which displays messages sent from the smartphone, to create portable notice board which is powered by solar energy. Therefore, the project develops an application which allows users to interact with smart electronic notice board. As future recommendation is with some upgrade and enhancement, this project can be become greater project by adding picture-based and text-based information rather than text-based information only and add GSM to make this project always online and not depend on Wi-Fi.

VI. ACKNOWLEDGMENT

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