Thebes intelligent university

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Abstract– Given the importance of modern technology and its effective role in saving time and effort and saving money, we decided to make a miniature model (maquette) that simulates how we were able to use sensors, motors, displays and microcontrollers, connect them together and link them with software codes to perform a specific task (or solve a problem). We will also clarify in the rest of the paper, but we can briefly describe the project as a smart university, and we said it is smart because of the multiplicity of electronic systems in it that replace the human element. Moreover, the systems are distinguished by high efficiency and the absence of mistakes made by the human element.

I. INTRODUCTION

Let us agree that time and money are one of the most important weapons on which any successful system depends on. And during our studying period as university students, we found that there are some problems facing students and universities that lead to waste of time and money. Examples of problems that waste time, waiting for students at the entrance Gate until the security person verifies their identity, waiting for students to take the names of the attendees one by one and can also be wasted while going to the cafeteria and waiting to order food and drinks. We also mentioned that there are problems that lead to the waste of money, including the operation of fans and air conditioning inside the halls without the need for them, the lighting of lights in the internal roads and corridors during the daytime unnecessarily, and the waste of money by wasting water while watering plants and green spaces. Hence, we have decided that our project will remain a model for solving these problems.

Our goal of the project is to summarize five basic points.

1. Achieve Convenience :by relying on modern techno-logical systems and methods and connecting them with each other to get the most out of the least effort.
2. Ensuring Sustainability: by rationalizing consumption in the use of resources so that we can get the longest benefit.
3. Achieving Security: by securing walls and gates so that strangers cannot enter the university spaces.
4. Raising Efficiency: by reducing the use of the human element and then reducing errors.
5. Saving Money and Time: by relying on electronic systems based on sensors and sensors linked to a program to carry out specific tasks without error.

The rest of the paper is organized as follows: Section II presents Parking system, while Section III introduces the Automatic Login system for Students using ID, followed by the Cooling and heating system in Section IV. In Section V shows The Attendance System for students. Section VI shows the automatic Irrigation System. Section VII shows the Smart Lighting System. Section VIII shows the Security and Alarm System. Section IX shows the Fire Alarm System. Section X shows the University Mosque Management System. Section XI shows the Electronic Cafeteria System. Section XII shows the security systems of Control room. Finally, the conclusion and future work are highlighted in Section XIII.

II. PARKING SYSTEM

Our parking system depends on the parking of each car within the specified area inside the garage, as in each specific place of the car there is a sensor responsible for sensing whether the place is occupied by a car or empty, then sending data to the microcontroller, which in turn processes the data and sends message to the screen so that the user (student or doctor) can read it and see if there are empty places, so he enters or there are no available places, so he looks for another garage.

The entry mechanism differs from one parking system to another, but in our system, we relied on Radio Frequency Identification technology (RFID), where we used RFID tags and programmed them for each user and added their data inside the system code so that strangers could not use the users' places.

As for the exit gate, we used the Sharp IR sensor, which senses the proximity of the car to the gate and thus opens the exit gate.

## III. THE AUTOMATIC LOGIN SYSTEM FOR STUDENTS USING ID

We mentioned in the introduction that one of the problems is wasting time for students while waiting at the entrance gate until the security personnel verify their identity, so we created this system to solve that problem. Identity recognition systems are numerous, including identification using the ID card, identification using a fingerprint, and identification using a face print. In our system, we relied on identification through the identity card supported by the Near-field communication (NFC) feature, which is characterized by fast data transfer and data exchange with high security.

It is also distinguished from fingerprint recognition in that it does not need contact, especially in our time due to the spread of diseases such as Corona and is distinguished from facial recognition in that it is cheaper in the cost of its implementation.

IV. THE COOLING AND HEATING SYSTEM

As we highlighted in the introduction that one of the reasons for wasting money in universities is to run fans and air conditioners in the halls without the need for them. So, we designed this system to help us rationalize the use of energy and thus save money. This system depends in its work on reading the temperature and humidity from the air and then taking the necessary action, whether it is operating the fans or air conditioning in the event that the room temperature reaches the maximum degree (stored on the code) or operating the heaters in the event that the temperature reaches the minimum degree (stored on the code); This is the first feature of the system (automatic start and stop control). Another advantage is the ease of remote control in case of manual control. We have designed an interface for the user (student or doctor) with indications of temperature and humidity and many control buttons to control manual operation and stop, in addition to lighting control buttons, all of these are done through the mobile phone provided that you are inside the hall.
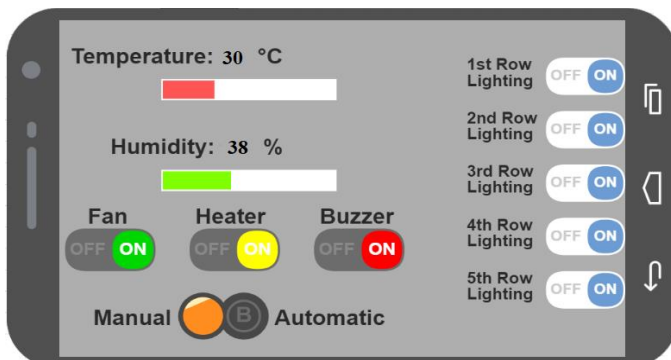
V. THE ATTENDANCE SYSTEM FOR STUDENTS

The attendance system that we designed is an application that is downloaded to the phone of both the students and the doctor, and we designed it to solve the problem that we presented in the introduction, which was one of the reasons for wasting the student's time, which is waiting for the students to take the names of the attendees one by one. Through this application, each student logs in using the email given to him by the admin. The doctor also logs in using his own email, then the doctor opens a new lecture by creating a QR code, and then the students scan the code, and the program records attendance in a list with the date and time of the lecture.

VI. THE AUTOMATIC IRRIGATION SYSTEM

This system helps in solving the problem we raised in the introduction, which is the waste of water during watering plants and green spaces, which represents a form of wasting money. This system is based on measuring soil moisture through moisture sensors installed in the cultivated areas, which give the reading values to the microcontroller, which in turn compares the data with the values saved in the code and then takes the decision either to operate the water pump in case of soil moisture deficiency, or to turn off the water pump In the case of reaching the maximum degree of soil moisture (recorded on the code) in addition to another feature, which is for follow-up, where we designed an interface for the monitor that displays the moisture content in the soil, the percentage of water in the tank and the status of the water pump (working or not working).
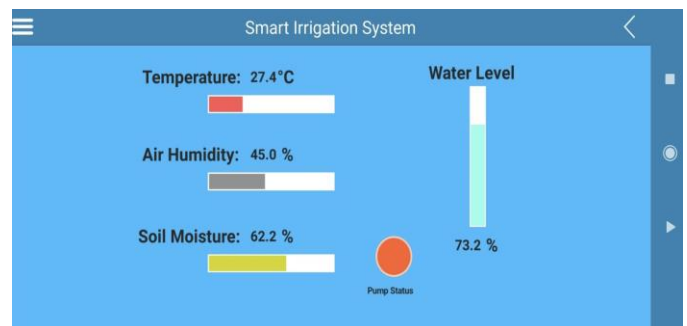
VII. THE SMART LIGHTING SYSTEM

This system represents the solution to the problem of wasting money in the form of unnecessarily operating road and corridor lighting during the day. The mechanism of its work depends on sensing the intensity of sunlight, and therefore the decision is taken either to turn on the lighting in the event of sunset or to turn on the lighting in the event of the brightness of the sun. This system can be developed to operate the lighting completely in the event of movement inside the place (in addition to sunset) or operate a small part of it in the absence of movement inside the place (in addition to sunset) to reduce consumption and save energy.

VIII. THE SECURITY AND ALARM SYSTEM

The system we are talking about now is a protection system from thieves who cross into the university through the external walls. This system relies on sending a laser beam using the transmitter and receiving it on the other side using the receiver. When the signal is cut off, an alarm bell occurs at the fence at which the signal was cut.
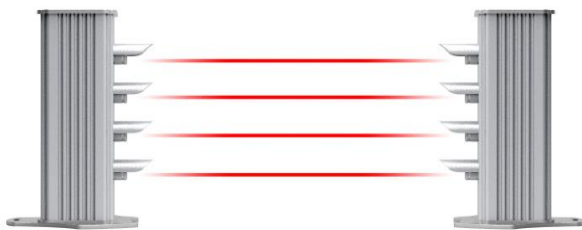
IX. THE FIRE ALARM SYSTEM

The fire alarm system is one of the protection systems available inside the university, especially in the laboratories, where it consists of two parts: the first is a gas sensing system and alerts when the proportion of gas increases in the atmosphere, and the second is a flame sensing system and the automatic operation of firefighting pipes when the flame reaches the threshold point (recorded in the code) in addition to operating alarms when a sensor occurs, and there is also an emergency switch that activates alarms and fire pumps in case of danger.

X. THE UNIVERSITY MOSQUE MANAGEMENT SYSTEM

We have designed this system to facilitate the management of the mosque inside the university through the automatic calculation of prayer times for the city using longitude and latitude, displaying the time, date and prayer time on a screen inside the mosque, in addition to the feature of automatically running the call to prayer at the time of each prayer.

XI. THE ELECTRONIC CAFETERIA SYSTEM

As we mentioned in the introduction, students' time is wasted while going to the cafeteria and waiting to order food and drinks, in addition to the crowding and the diseases it carries. So, we decided to make this system, which is a website that can be accessed by scanning the QR code on the tables and then ordering food or drinks and following up by entering the data to complete the order, then the order arrives at the table from which you completed the order.
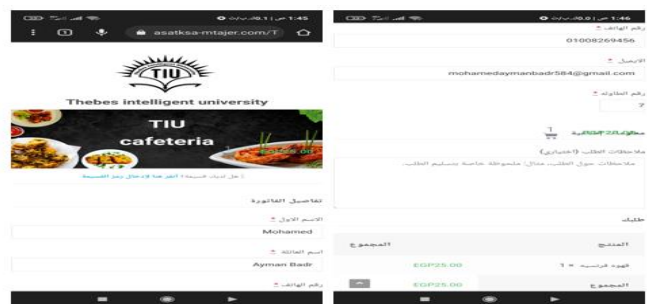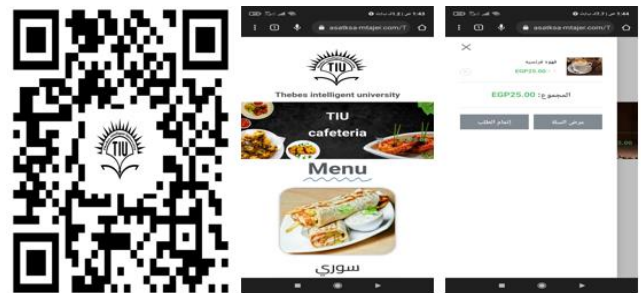
XII. THE SECURITY SYSTEMS OF CONTROL ROOM

This system is the last system that we have implemented. It is one of the security systems inside the university. It is a security system to open the door of the control room by typing a password using the keypad and verifying it using the microcontroller, and thus taking the decision either to open the Solenoid lock when the password is correct or not to open in the in case the password is incorrect.

XIII. CONCLUSIONS AND FUTURE WORK

After we have clarified the systems contained in the project as we mentioned before and we did an actual experiment through the maquette and made sure of the efficiency of the work, we have reached the goal of the project and it is ready for implementation on the ground and can be applied to any of the universities in to facilitate services for students and provide resources to universities.

In our future work, we plan to work on more than one project with the aim of facilitating services for users, and among these projects is the smart hospital, which we seek to make it work with the latest innovative systems that serve patients and visitors, preserve their protection, and provide them with comfort as much as possible.

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