EXPLORATION PROJECT-G29

HOME AUTOMATION: MAINTENANCE SYSTEM

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Motivation:

We see that in apartments, there is a system of collecting electric bills, especially maintenance on a monthly or quarterly or yearly basis. But a significant percentage of residents are reluctant towards the payment of the same. They keep postponing the deadlines of paying maintenance and when asked by the secretary, they have a thousand excuses for the same. This is a widespread problem which needs a proper solution.

The residents won't take the matter seriously until there is a personal loss associated with the same because until now there is no difference between the facilities accessed by the ones who pay maintenance and the ones who don't. So, our solution is inclined towards making this difference visible and more effective.

Introduction:

Our solution consists of developing a system wherein the residents need to punch a card each month in a device attached at the entrance of their houses. And this card needs to be recharged with the maintenance amount and if the amount is due, the electricity of the specific house will be cut. And it will be restored as soon as the resident pays the due maintenance. So the residents will become regular and responsible for paying the maintenance dues and the secretary need not go house to house for collecting maintenance and giving reminders to those who haven't paid their dues.

We approached this problem with a card system. Widely, We thought of a process in which the payment will be done by the card and if the payment has not been received by the system then in a due time, the automation will be activated and that will result in power cut.

Types of Cards:

We are going to briefly look at three of the commonly seen or used Card types.

Magnetic Stripe - possibly the most common and one we have probably all come across in the last decade or so. The magstripe key cards have a blakc strip that is swiped downwards through the reader.

Radio Frequency - often known as a type of proximity card, or tap or contactless technology. This is a short range card that can be held by the scanner to grant access within a few cms.

Hole Punch - typically on their way out nowadays, but these were very popular in years past. A unique combination of holes punched in the card.

Plan of implementation:

In this project, we will be implementing a card system using RFID(Radio-Frequency IDentification).

What is an RFID System?

While each system will vary in terms of device types and complexity, every RFID system contains at least the following four components:

- Readers
- Tags
- Cables

About RFID (radio frequency identification):

RFID is a form of wireless communication that incorporates the use of electromagnetic or electrostatic coupling in the radio frequency portion of the electromagnetic spectrum to uniquely identify an object, animal or person.

RFID is made up of 2 key components: Tags and Readers

Tags: RFID Tags are small objects that contain a chip and an antenna for wireless identification of the objects they are attached to (or embedded in) with the help of an RFID reader.

Reader: Readers, also called interrogators, are devices that transmit and receive radio waves in order to communicate with RFID tags. It's often called the brain of the system.

Functioning of the device:

The tag will be there on each card containing details about the individuals owning the card such as their current card balance, their account numbers, their monthly payment status and due bills.
RFID readers transmit and receive radio signals to communicate with RFID tags. It is divided into two types:fixed RFID tags and mobile RFID tags.
The RFID readers will pass on information via cables to the connected computers which would be connected with all the dataset where we can deduct the money from the card and update to the programmable system that the payment has been received.

Automation:

Now, when the device user will pay the bill using this system, the software device will automatically be updated. And if He/She forgets to pay the maintenance in a due time, the programmable device will automatise in a way that the electricity of the entire house will be cut off until the user pays it.

Programmable Device:

To automatise the power cut, we will be using an MCB device.
MCBs are electromechanical devices which are used to protect an electrical circuit from an overcurrent. It can be reclosed without any hand-operated restoration. MCB is used as an option to the fuse switch in most of the circuits.

Home /Office Automation and Protection: - not only automates the household but also provides protection on various levels. We can Download the app "Ewelink" and operate the device via smart phone. Also, the device comes with multiple protection levels like over voltage, undervoltage, over current and short-circuit protection.
WiFi Circuit Breaker: - Whenever required you can disconnect the power supply manually or via app. Break or connect the supply both options are in your hand.
Timer Function: - You can schedule a timer to home or office appliances. Through the app you can set the schedule to timely turn the device on or off.
Auto Reconnect: - Once tripped you don't have to take pain to turn the switch on manually because it will turn on automatically in the set time frame.

So, we shall send the data of the RFID card to the MCB app which will in consequence, update the timer of MCB. So whenever the app doesn't receive any maintenance data, the timer runs off, and the power will be cut off automatically until the user pays the maintenance.

Estimated Budget:

MCB 3,900/-
RFID Tags 100/-
RFID Reader 4,000/-
Cables 400/-
Card 500/-
Programming Software 1,840/-
Hardware 3,000/-
Miscellaneous 1,500/-

Total - 15,240/-