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Design of Secured Wireless EVM for Data Acquisition

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Abstract— Electronic Voting Machine (EVM) is a widely used device for the counting of the votes at the time of Poll. The counting is generally done and stored inside the EVM machine which cannot be reliable circumstances as theft may occur at the time of travelling with the EVM. The problem is solved in this paper which have a special emphasis on the wireless counting of the polling data in a remote place and the EVM machine will act as a general purpose input machine where no counting and storing operation will be done. In the remote part at the counting and display station will be done in real time module. So, the risk for theft will be minimized and the counting and storing of data can be performed easily.

Keywords— Wireless Data Acquisition, RF Module, Microcontroller, Security, Amplitude Shift Keying, Wireless Count.

I. INTRODUCTION

Electronic Voting Machine is a widely used device for the counting and storing the result of polls inside its memory[1][2][3][5]. But there is a drawback of the system[3][5][6][9][11]. The process of the polling system is that, the voters will press a switch for their desired candidate and this input goes to the counting part of the EVM and there the result is stored. That is the result of the poll can only be available inside the polling machine or EVM. If any problem occurs such as the fault in the machine or theft of the machine, all the result will be lost and only one measure is available then is to Repeat poll. That is, this system has several drawbacks[2][5][7][8][10].

To overcome these drawbacks, a design is proposed in this paper which will be operated through the RF module for real time display of the poll result and to store them in a remote section and the EVM will only be used for giving input section. Thus if any fault of theft will be occurred, this will be efficiently overcome. When the voters will enter their button for their desired candidates, it will be displayed on the display section and simultaneously the count is stored in the memory installed in the remote section. The communication will be taken place with the introduction of Two RF module one of which installed at the EVM section and another is installed at the counting section. At the counting section, there is a Microcontroller is incorporated which will help to show and store the count. The proposed block diagram and required specifications are discussed in the preceding sections. In this proposal, the data acquisition is effectively takes place in between two RF module with a well matched frequency.

II. PAGE LAYOUT

There were many works and progresses are taken place regarding to the Electronics Voting Machine and the Authentication System[1][2][9][12][13][22][24]. Electronics Voting Machine, if constructed with some controller environment, becomes an Embedded System. Akash Konnur, Archana Nandibewoor and Nita Kakhandaki have proposed a system for Electronics Voting Machine and its solution for computation[1].Vaibhav Bhatia and Rahul Gupta have placed a proposal for the Electronics Voting Machine with GSM interface[2]. The construction of Electronics Voting Machine by means of FPGA is proposed by Timardeepkaurarneja, Jasleenkaurbassi and Damanjeetkaur[3]. Moreover the technology also developed for the implementation of the Electronics Voting Machine by Telephone technology[4]. The Electronic Voting Machine technology is also developed with the Public Key Cryptography by Hayam K. Al-Anie, Mohammad A. Alia and Adnan A. Hnaif[6]. For enhancement of security system, the authentication system is incorporated with the Electronics Voting Machine. The Biometric verification and authentication process have been introduced in it for several times. One of the widely used biometric security is the Fingerprint Verification and authentication system.[9][10][11][12][13][23]. There also other biometric authentication process incorporated in Electronic Voting Machine[11][12][13][21]

III. PROPOSED DESIGN

In our proposed design, the push buttons are arranged in a column which are connected with an Encoder circuit. When a voter gives his/her vote by pressing the respective button, the signal will pass through the encoder and reaches to RF transmitting module. In the transmitting section, the received signal will be modulated and transmitted to the Remote Section.

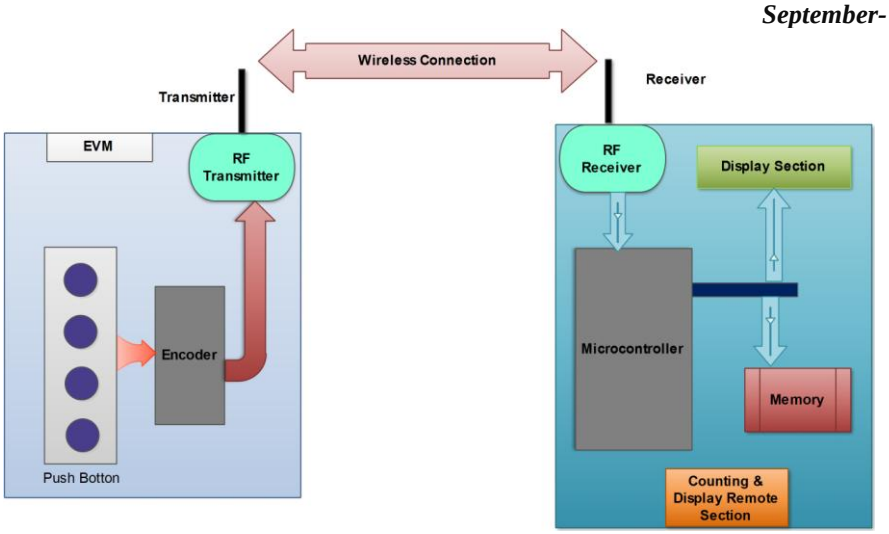

Fig.1 Wireless EVM

The transmitter and the receiver are paired with wireless connection. When the receiver receives the signal, it goes to the microcontroller. In Microcontroller, it is decided by the pre burnt code, that the signal comes from which button as each and every button has its separate frequency. After determination, the logic goes to the Memory section and display section. In the display section, the count will be shown for separate result. The sections for the receiver side are described below.

A. Display Section

The display section comprises of eight 7-Segment displays primarily as there are four push buttons in the EVM section. The prototype of the display section is given below.

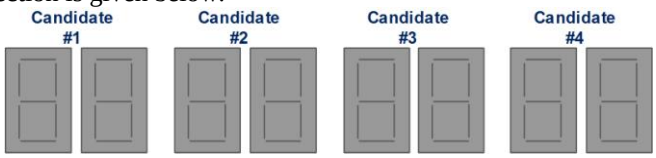

Fig.2 Display Section

When the voter press the button to vote their desired candidate the corresponding vote count is shown on the display. When the second vote is given the count is incremented by one and simultaneously displayed on the 7-Segment Display.

B. Memory Section

The output from the Microcontroller is divided into two parts. One goes to the Display section and another goes towards the memory section. EPROM is used in this purpose to store the result.

IV. ALGORITHM

Two different algorithms are used for receiving the poll and other for counting and displaying the result. The algorithms are described below.

A. Algorithm for receiving Poll

The algorithm for receiving the poll from the voters is shown below:

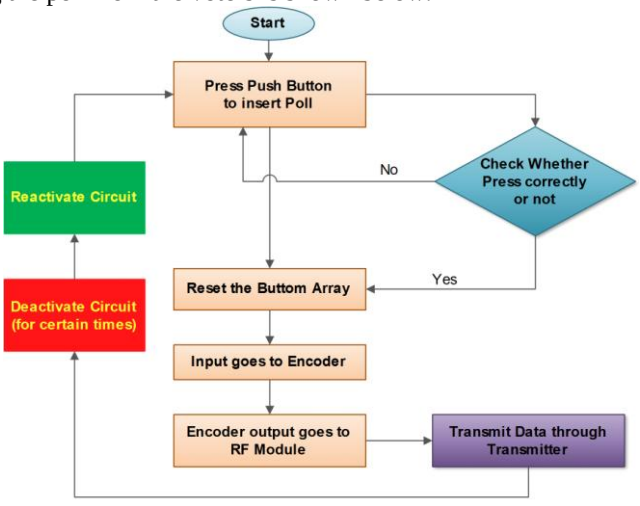

Fig.3 Algorithm for Receiving Poll

In this section, voters will press the push the button for giving their votes. The correct pressing will be checked by the correction section, that will be incorporated later. If the voter want to press the button twice, it will not be possible as the circuit will be disabled after once he/she has pressed the desired button. After certain amount of time, when the second voter will come, the circuit will again enabled. So, in that case the violation of twice voting will be eliminated. Once the button is pressed, the signal goes to the Encoder section through where the final pulse reaches to the RF Module. RF Module will send the pulse to the another section. It is worth nothing to be mentioned that each button produces different frequency.

B. Algorithm for Display and Storing Section

The algorithm for the display and storing section is shown below:

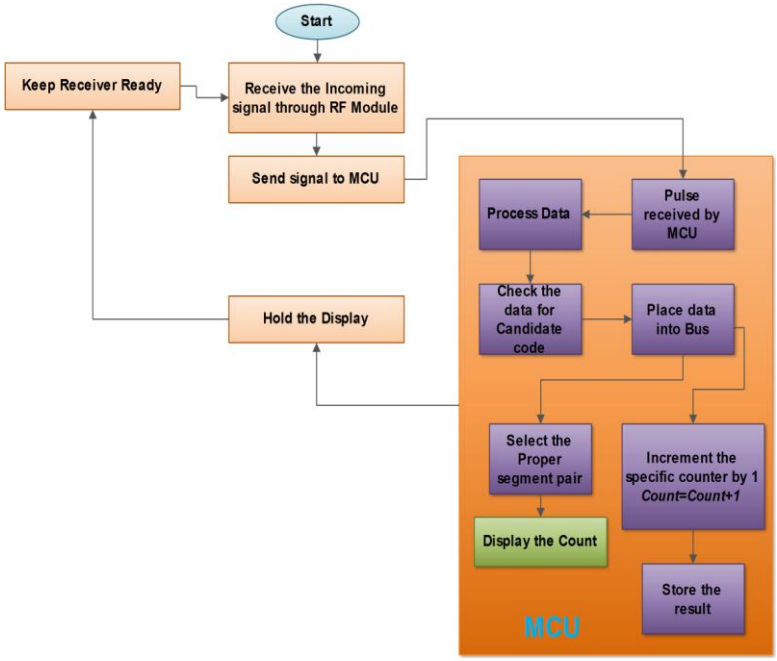

Fig.4 Display and Storing Unit

In this section, the receiving module receives the pulse coming from the transmitter. The pulse then goes to the MCU section where the rest routing will be performed. After the MCU receives the pulse, will send the pulse to the checking section for the determination of candidate code. For example, if Candidate#1 gets a vote then the corresponding counter will be incremented by 1 and this data is placed into the bus of the MCU. The data then goes to the EPROM and being stored by it and the same pulse will also goes to the display section and display the count value on the 7-Segment Display. The MCU section also controls the display section to hole the data as well as the receiving module to get next data or pulse that is coming from the transmitter.

V. PSEUDO CODES

The required pseudo codes for this two sections are given below.

A. Pseudo code for EVM

The pseudo code or the mechanism and steps for the EVM is given below:

```
Start_T:
Waiting for Push button to be ready;
If
  Push Button is Ready;
    Voter gives the vote;
    Check for correct pressing:
    If
      Pressed incorrectly;
        Press again;
    Else
      Reset the Button Array;
      Send the pulse to Encoder;
      Encode the Data;
      Data goes to RF;
      Deactivate the Button Array;
```



```
        Delay();
        Incoming Logic;
        Reactivate Button Array;
Else
  Make Push Button ready;
Goto Start_T;
```

B. Pseudo codes for Display and Storing Section

The pseudo code or the mechanism and steps for the Display and Storing Section is given below:

```
Start_R:
Get RF Receiver Ready;
Receive pulse from Transmitter;
Send pulse to MCU(Pn);
Get MCU Ready;
Process the Data;
Data goes to LUT;
Check for the Candidate Value(i);
For n=1 to 4
  i=i+1;
  Form Pn(i);
Loop End;
  Place Pn(i) bus;
  Activate EPROM;
  Pn(i) goes to EPROM;
  Data Stored;
  Send Pn(i)to Display;
  Select Proper Segment;
Hold the Display until Next Data;
Goto Start_R;
```

VI. SECURITIES OF THE SYSTEM

The proposed system have an enhanced security provided at the EVM end provided either by Polling Officer or by automatic system. By this security no voter can vote twice. This does not require any type of Biometric security or face detection security. A simple circuit to be designed to provide the enhanced security without use of any costly device. This system can be referred as the locking system that is provided by the digital circuit without any coding. That is why this system is reliable and hazard free and with minimal cost but much more effective than any previous design.

VII. APPLICATION AND FUTURE SCOPE

The proposed design can be applied for various field either indoor system or outdoor system by varying the Modulation technique or to vary the RF module thus by changing the range of frequency in between Transmitter and Receiver section. The Security of the system will an unique one which is free from any type coded control rather the implementation of digital switching and for this reason the cost of the system is much more lower but the efficiency will be much more as the RF Modules are perfectly matched and the Microcontroller is used for only Display and Storing purposes. So, the risk of theft will me minimized. Our next paper will reflect the variation and modification of the newly proposed design with the incorporation of the Security system.

VIII. CONCLUSION

The system proposed in this paper is now under research for the betterment in future interpretation. The most important parts of the system are the remote counting and the frontline security. This two feature makes the system perfect with minimum possibility of theft and moreover the cost will very low as no costly components are used for the construction of the system. The further implementation of the security system will be shown in the next manuscript.

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The idea of the system are taken from several research articles which shows the innovative topics on the Electronic Voting Machine. Though this type of instrument or Voting Machine is not actually used for counting pole till now, it can be helpful for counting and displaying the poll in Real Time Mode with lesser lose in integrity and efficiency.

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