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Microcontroller Based Voice Activated Mobile Controlled Electronic Voting Machine

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Abstract: In this paper, enhancement to an existing model of an electronic voting machine is proposed. This machine overcomes the drawbacks of the various types of voting technologies used all over the world. The improvisations aim at increasing the security, reliability, scalability and flexibility of the model. Most of all this model of electronic voting machine is user friendly in which user can directly vote to selected party by home using mobile phone. Thus this machine will automatically increase percentage of vote. In addition, a simple circuit for voice based vote command unit has also been included which will give voice command to user how to use machine. The resulting machine is much more rugged and handles various anomalous situations effectively.

Keywords: Electronic Voting Machine, Microcontroller, Voice Activated, Communication Device

I. INTRODUCTION

Today, only about 1 percent of the population votes at polling places on hand counted paper ballots, but this figure is misleading. There are many elections conducted on optical mark-sense ballots that are actually hand counted, and many jurisdictions that use lever voting machines process absentee ballots by hand. Today, lever machines are used by about 19 percent of the population [1]. While these machines have not been made for many years, they are built to last, and it takes only a moderately skilled mechanic to keep them in good working order. Because these machines have been phased out by many counties over the past 45 years, surplus machines are widely available as a source of replacement parts. In India, about 31 percent of voters use punched card ballots; most of these use the Votomatic machine. This number is in rapid decline since the most recent election. Many jurisdictions that have used punched cards without question prior to that election are now committed to move to other voting technologies. Direct recording electronic voting machines are used in about 9 percent of the USA. The adoption of this new technology has been slow, largely because it is expensive; direct-recording electronic voting machines typically cost upward of $5000 each [2]. Another reason for the slow adoption is that many people are rightly suspicious of any voting technology that puts the entire election system in the hands of a few highly skilled computer programmers.

II. OBJECTIVE OF THE PROJECT WORK

Making a simple electronic device used to record votes in place of ballot papers and boxes which were used earlier in conventional voting system. It eliminates the possibility of invalid and doubtful votes which, in many cases, are the root causes of controversies and election petitions. It makes the process of counting of votes much faster than the conventional system. It reduces to a great extent the quantity of paper used thus saving a large number of trees making the process eco-friendly. It reduces cost of printing to almost nil as only one sheet of ballot paper required for each Polling Station.

A. *Security*

The system is free from intentional tamper. It is not possible to hack the machine. Though this factor depends on the personnel integrity, attempts should be made to make the model as secure as possible. In this model every user is provided with a password. The votes will be successful only after successful verification of password.

B. *Reliability*

The machine registers the votes faithfully. A vote is never altered. A valid vote is never eliminated, from the final tally and an invalid vote is not counted. Vote counting is flawless. The final vote tally must be perfect. Most importantly the votes are stored in EEPROM memory, where the numbers of votes are stored permanently.

C. *Scalability*

It is easy to use the basic design for any number of voters. The model is able to handle increasing voter participation without any stress on performance.

D. *Flexibility*

The design is such that it can be put to use in various polling systems, with different requirements and mechanisms.

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III. LITERATURE REVIEW

Computer scientists who have done work in, or are interested in, electronic voting all seem to agree on two things [3]: Internet voting does not meet the requirements for public elections. Currently, widely-deployed voting systems need improvement [5].Voting on the Internet using every day PC's offers only weak security, but its main disadvantages are in the areas of anonymity and protection against coercion and/or vote selling. The Presidential elections of 2000 brought national attention to problems with current American methods of casting and counting votes in public elections [4].Most people believe that the current system should be changed; there is much disagreement on how such changes should be made [11].The MIT/Caltech researchers see a promising future for electronic voting, despite its problems today (under a few conditions). They advocate using the methods currently in use which results in the lowest average numbers of "uncounted, unmarked, and spoiled ballots, like in-precinct optical scanning. Their report even proposes a framework for anew voting system with a decentralized, modular design [13].

One of the advantages of electronic voting is that, in most cases, most ballots will be tabulated into the results. Paper-based voting machines can actually miss ballots because of human error in placing the paper-based ballot in the machine. Another advantage is obviously the ease of tabulating the results. All counting and ordering is done by a machine, quickly and efficiently, and without human error. DRE voting machines also have the advantage of never running out of paper ballots at a polling centre, since the computer can count an unlimited number of ballots. They also can provide multiple languages to users who may not have English as a first language. This cannot be achieved through a paper-based system. There are also advantages when dealing with people with disabilities, such as blindness. Electronic voting machines can provide headphones to read off instructions to the blind user. Also other tools can be added to these electronic voting machines to help with other disabilities such as people with limited mobility or the elderly.

IV. CIRCUIT WORKING

The Working of Project can be divided into 4 main parts as:

i) DTMF Transmitter
ii) DTMF Receiver
iii) Voice processor
iv) Microcontroller

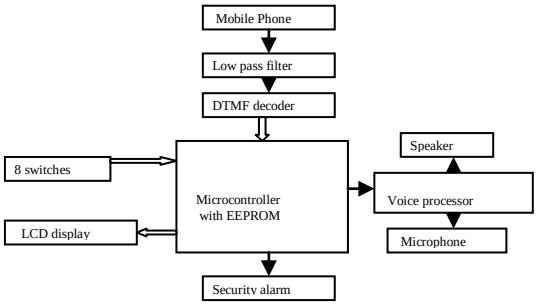

Fig 1: Block Diagram of Project

A. *DTMF Transmitter*

Mobile is based on DTMF Technology [8]. When you press a button of mobile keypad, a connection is made that generates a resultant signal of two tones at the same time. These two tones are taken from a row frequency and a column frequency. The resultant frequency signal is called "*Dual Tone Multiple Frequency*". These tones are identical and unique. A DTMF signal is the algebraic sum of two different audio frequencies, one from low frequency group and other from high frequency group. Each of the low and high frequency groups comprise four frequencies from the various keys present on the telephone keypad; two different frequencies, one from the high frequency group and another from the low frequency group are used to produce a DTMF signal to represent the pressed key. When you send these DTMF signals to the telephone exchange through cables, the servers in the telephone exchange identifies these signals and makes the connection to the person you are calling.

B. *DTMF Receiver*

Mobile work as a DTMF receiver and encoded hybrid frequency DTMF code tone is decoded by 8870 IC. 8870 Decode DTMF tone and convert into BCD code, output depending upon which key is pressed at the transmitter side.

TABLE 1: DECODED OUTPUT

Pressed Mobile key	**D3**	**D2**	**D1**	**D0**
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
*	1	0	1	1
0	1	0	1	0
#	1	1	0	0

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This four digit output is directly given to uC. It will collect this code and start comparing it with inbuilt code. When it finds a perfect match it display code on 7 segment display and switches to a subroutine and perform that particular task.

C. Voice Processor

As known this circuit has three pushbuttons: one for recording, one for playback on edge detection and one for playback on level detection. Simple wire bridges are used to simulate the buttons (to simulate a pushed button we connect the wire bridge to ground).The recording button does exactly what it says: pushing it allows you to record sound. There are two versions of play buttons: an edge-activated (PLAYE) and a level-activated (PLAYL) button. PLAYE starts the playback upon edge detection. Edge detection in this case means a change in Voltage from HIGH to LOW or from a LOW to a HIGH state. This allows it to be used like a toggle switch. The level-activated play function triggers playback when a change from a HIGH state to a LOW state is detected. Accordingly, it stops playback once the pin is pulled HIGH from a LOW state.

D. Microcontroller and EEPROM

Microcontroller Logic: The function of microcontroller is to control input output based on the programmed embedded hex logic. The microcontroller continuously scans input logic. The input logic is BCD data from 9170 and keypad. The BCD data is used in voting mode while keypad data is used in administrative mode for checking total number of vote for corresponding party.

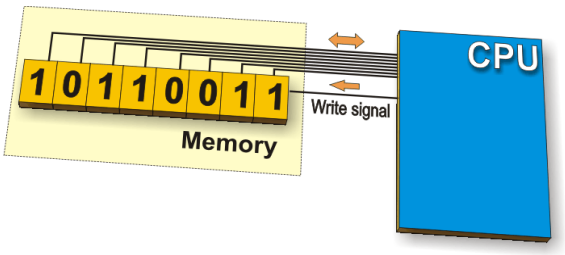

Fig 2: Input logic is BCD data from 9170 and keypad

V. CONCLUSION

Based on the design principles and requirement, a prototype of the system for E-voting System has been developed using PHP. The system has several advantages that had been achieved. The advantages of the system are as follows:

i) It gives confidence in voting system; only the legitimate voter is allowed to gain access to voting.

ii) The system is user friendly, in the sense that the user can easily understand the system although the user is a first time user. This is because the design is simple, attractive and do not have too many graphical items.

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