

Design and Development of Zynq Board-Based Electronic Voting Machine using Verilog

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Abstract—Electronic Voting Machines, or EVM, are voting machines that use electronic means to either aid or take care of the chores of casting and counting votes. EVM is designed with two units: i) the control unit, and ii) the balloting unit. EVM is a safe product with good symbols that will be available on the machine. In this project, an electronic voting machine is designed and implemented using the hardware description language Verilog. The goal is to solve issues that arise during the voting process and record votes accurately. Electronic voting includes optical scan voting systems with technology, including direct recording with security, accuracy, integrity, and privacy. It performs many tasks in the real world that can be useful for election results as well as government. A voter who also migrates to a faraway place from his native place for work purposes can vote from his place of residence. This will save efforts, time, and unnecessary journeys for casting one's vote. This will make the false voting by political parties more transparent.

Index Terms—Zynq board, Verilog, control unit, balloting unit, elections, integrity, privacy, and accuracy.

I. INTRODUCTION

Electronic Voting Machines (EVMs) have totally changed the political process by offering a modern, efficient, and secure way to cast and count votes. The electoral commission in developing countries, such as "INDIA", employs a manual voting technique rather than, an electronic voting machine. So, it is important to ensure that this right is being utilized in the correct way as if there is any gambling or any misuse in casting the vote may not lead to elect the proper leader. Electronic voting machines (EVMs) replace traditional paper-based voting systems with electronic technology to expedite voting, lower error rates, and ensure election integrity. Electronic voting machines (EVMs) are composed of both hardware and software components [1]. While a control unit supervises the voting process, safely stores votes, and generates reliable results, a ballot unit gives voters the ability to select the candidates they wish to support [2]. Cryptographic techniques are one of the security aspects that safeguard the confidentiality and integrity of the voting process [3]. Secure techniques for voter authentication and encryption are built into the Verilog code to protect sensitive data. The data from many things register through the time given to the zed board using Vivado software terminated as the long-lasting process done through voting machine [4]. Although EVMs have many benefits,

questions over their security, dependability, and manipulation potential have led to scrutiny and criticism of the technology. Strong security protocols, stringent testing procedures, and transparent audit procedures must all be in place in order to ensure the accuracy and dependability of EVMs during elections [5]. All things considered, electronic voting machines represent a significant advancement in democratic processes, offering a modern, dependable, and user-friendly means for individuals to exercise their right to vote and participate in shaping the destiny of their countries [6].

The Election Commission has introduced many features that can be useful to government as well as people by taking surveys from different localities and they have disabled the secure location to volunteer the feedback from the people. It led to many security reasons to accept additional votes from the people and the device. EVMs are the secure process for the voters that can be registered using other scholars and resources [7]. It can be useful for election commission to increase the count of the people as well as the votes, and they can manage the time that can be required for voting [8].

II. LITERATURE SURVEY

Electronic voting refers and suggests the target audience having the rates and sizes that can be equipped by having a huge impact on the system. It can be suggested or removed through the blockchain technology having a scholar that can be developed through various process and it can be worked through efficient and create a secure environment for the people and the government [9].

The technology that suggests some message to the people follows by the paper that discuss the transactions among voters and system. To prevent problems and verified thoroughly and certified a long-term recommendation on the Verilog issues. On the day of voting, after the voting process is done, the buttons and mode would be automatically saved [10].

In Voting, the main thing is mode control, button control, and vote logger. It can be demolished by specifically that takes voting as a process in a huge number of candidates and votes [11]. In order to develop the thing, it can be done through Diligent Zed board through the given inputs. Internet Voting is a great convenience to the people and privacy for the people [12]. It can be done by voting officials, volunteers, and election

officials. It can be helpful for the different religion, caste and different states as well as different mindset people [13].

It can be used through inserting led and to detect a new voter or a fake voter by using a voter ID. After simulation, the controller turn itself on and make the list of voters as well as votes and submits the reports to the machine. And the overall thing can be done through vote logger to register votes from various areas into sub-divisions as well as localities [14].

Electronic voting systems have been the subject of active research for decades, with the goal to minimize the cost of running an election, while ensuring the election integrity by fulfilling the security, privacy and compliance requirements [15]. In particular, we evaluate the potential of distributed ledger technologies through the description of a case study; namely, the process of an election, and the implementation of a blockchain-based application, which improves the security and decreases the cost of hosting a nationwide election [16].

III. PROPOSED SYSTEM

The physical environment that can be used to store the data about voting process is a record module that records the generation of votes. It can be unauthorized and helps to manipulate the data that come under the election process. It includes the present security concerns and can be described by the specific community and people who decided the character of votes and vote information led to distribution of votes in the source of the present situation. An extensive manner is one of the main reasons to propose the solution to control all types of data present in the electronic voting system.

A verifiable account such as having some proper details of the people compared to the people who have the improper details led to good voting system. It recommends the necessity to identify the security and some kind of objectives that can be rolled to implement a new voting system that emerged into our life and our society. By using the wireless communication components helps to program the code to the machine using power supply and the Zed board.

Objectives required for the proposed system:

- 1) Button Control
- 2) Mode Control
- 3) Vote Logger

1) **Button Control:** Zed board contains many push buttons on the board to control the input as well as outputs. Using button control, we can set up many things such as Hardware Setup, Software Configuration. We can test the implementation and iteration by using this button controls.

By recognizing the button control in zed board, we can get proper applications and good implementations. And these button controls can have also be work in different things such as Internet of Things, Embedded Systems Etc.

2) **Mode Control:** Mode Control operates different applications through operating mode of zed board. It gives effective result through various movements and observations that can be applicated to the controlling system of zed board.

It can control the logic of code and implementation using the ports such as input ports and output ports. It delivers unique applications and data to the machine that can be aspect through the controllers.

3) **Vote Logger:** The vote logger can be interfaced through programming. It is useful to store the data and captures the data that requires from the people and the votes.

And the process is to provide the uses in Capturing the input, Data Analysis, Data Logging etc. It depends on the process that can be monitored in real-time situations. And it helps to display the results in zed board using the vivado software.

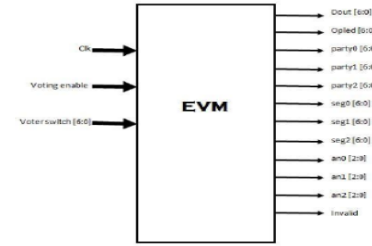


Fig. 1. Schematic of EVM

The fig.1 shows the Schematic of Electronic Voting Machine with input and output signals. It consists of RST, CLOCK and button control as input signals. cand-1, cand-2, cand-3, cand-4, as output signals. led-1, led-2 to enable the display.

IV. METHODOLOGY

The steps involve embedding using a Zed board technique and object detection using either visual data or a method that describes a Verilog-based platform. The EVM system or any other resource, like computer technology, can be used to test its various applications in picture production and processing management. It shows that the RAMs can produce precise results using various techniques. This approach, which is highly distinctive in character, usually incorporates the attributes and uses algorithms to improve the data. Through parallel connections and performances, it affects the Zed board. The configurations that can be destroyed by different kinds of data, including software and hardware iterations.

Through the integration of Verilog values that are unique to the data, mode control, button control, and vote logger are included in RAMs through various optimisations. Additionally, the code is synthesised throughout the entire architecture, allowing data to be exchanged under various capacities. The Election Commission introduces a new system that can be adjusted with various steps such as the controllers. Controllers are the main keys in Zed board for implementing the output accurately. The EVMs cannot be pre-programmed to favor a party or a candidate because the order in which the name of a candidate/party appears on the balloting unit depends on the order of filing of nominations and validity of the candidature,

this sequence cannot be predicted in advance. The process gives us a clear result and idea about the Voting Machine through the program. A vote once recorded in an EVM cannot be tampered with, whereas in the ballot paper system the votes marked and put into the box can be pulled out and destroyed. If vote is casted for party1 then Red LED blinks and the device will add the count to party1, similarly for remaining parties.

GSM based voting - allows the citizens to vote using mobile phones from anywhere in the country. Smart card based voting using RFID- allows voters to use a smart card to verify their identity and authorizes them to cast vote. This feature has been included to exploit the advantages of the UID (Unique Identification) card or the “AADHAAR” scheme which the government proposes to introduce in a few years that will allow each citizen to be uniquely identified based on a single smart card.

V. FLOWCHART

If the RST condition becomes true, then the device gets reset. If the RST condition is false it checks for fingerprints. Whenever the system receives a fingerprint, it will match the fingerprint from the database. According to the information given by the database, the system will decide if the person’s data is registered or not.

There are two parties available for casting the vote, the voter casts his/her vote to their favorable party. If vote is casted for party1 then Red LED blinks and the device will add the count to party1, similarly if the person casts his vote to party2 then Green LED blinks and the device will add the count to party2.

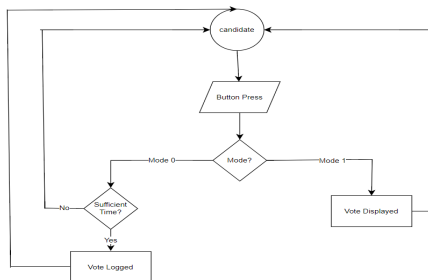


Fig. 2. Flow Chart of Proposed System

The Fig.2 shows the flowchart of present electronic voting system that involves the data that creates the accuracy and time. It says about the mode control as well as vote logger. If the inputs are proper, then it moves to the other candidate or else it remains there. With the features of mobile voting and smart card voting the proposed system is cited to increase the percentage of vote count recorded in India. There is no chance that a vote for one candidate to be transferred to another candidate.

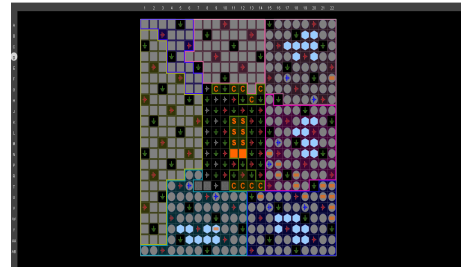


Fig. 3. After Running Synthesis

The Fig.3 shows the synthesis after running the system. And it shows the design of the zed board.

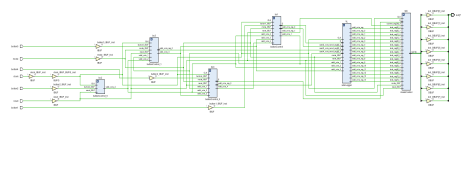


Fig. 4. Schematic View

The Fig.4 shows the schematic view of the base system. It says about the zed board synthesis that can be implement using gates.



Fig. 5. Zed board before simulation

The Fig.5 shows that the zed board before simulation. It reminds that the system is ready to program with requirements.

The policy of ONE PERSON- ONE VOTE, with no possibility of duplication has been strictly implemented. There is no chance for a vote to disappear. The system can easily aid in reliable recounts. The system supports voter verifiability. A remarkable fact is that it preserves voter anonymity at the same time. In addition we propose these possible enhancements in future.

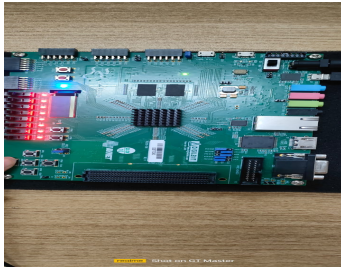


Fig. 6. Candidate while voting (Voting List)

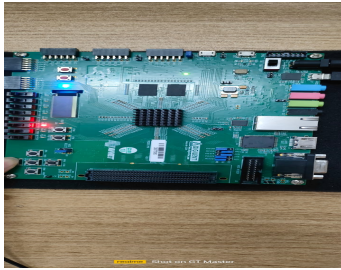


Fig. 7. Candidate after voting

The Fig.6 and Fig.7 shows that inputs that contain depletion of zed board platform is to organize the voting procedures with dependability and accurate that varies from real time monitoring on their ballots that can be handle through the integrity of the system and it can be composed of the process which can be understand and health system with increase of tools. It can be used in flexibility, scalability, and processing through information required. For the project requirement, patterns are the most important source to classify through various ways.

VI. CONCLUSION:

The Hardware that accelerates the given process indicates through various sections such as control over stings, and the control the procedure. It can be utilized and enabled by the EVM that can be work as automatic ways in such as efficient and appropriate. The machine uses in different cases and makes task as easy process.

The capabilities that can be organized the main theme of the project such as Zed board and the uses by the mainly composed in many ways. It can be useful through industry automation and the main resource with more consumption and less integrity. In accordance of the software system, it is very essential through the codes and data network in case of establishment of members required for the voting system in different cases.

With these three stages such as i) Button control, ii) Vote logger, iii) Mode control can be an efficient voting system is developed to avoid malpractices and rigging of votes. In our future work we will extend this module by proposing a system.

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