



# Xilinx Based Electronic Voting Machine using FPGA

P.P.M. Prasad<sup>1</sup>  
manohar.padyala@gmail.com

Koda Kalyan<sup>2</sup>  
[kalyankoda2003@gmail.com](mailto:kalyankoda2003@gmail.com)

Gutti Naga Tejaswini<sup>3</sup>  
guttinagatejaswini@gmail.com

Shaik RizwanaBanu<sup>4</sup>  
rizwanabanushaik13@gmail.com

Shaik Muzamilahamad<sup>5</sup>  
Shaikmuzamil789@gmail.com

<sup>1</sup>Assistant Professor, <sup>2,3,4,5</sup> UG Students  
<sup>1,2,3,4,5</sup> Dept. of ECE, Bapatla Engineering College, Bapatla  
Andhra Pradesh, India

## Abstract:

To prevent election tampering, electronic voting machines are essential in a democratic society. Voting was formerly conducted using ballot sheets in the antiquated manner, which leaves plenty of room for fraud. In this work, we have examined a digital electronic voting system that is created with the Xilinx tool's VHDL coding. There is an enable switch available to initiate the voting process. In the electoral process, four candidates—Button 1(Party1), Button2(Party 2), Button 3(Party 3) and Button4(Party 4) —are taken into consideration. V switch is a 2-bit signal that voters use to select a contestant to support. Voting will not take place until enable is activated, as indicated by the invalid signal that appears if a voter attempts to cast a ballot without enable engaged. Since it can be repeatedly reprogrammed for different tasks based on their requirements, which helps to reduce expenditure, the above-proposed method can be implemented on an FPGA board for real-time applications ranging from university level elections to Assembly and Lok Sabha elections.

**Keywords:** VHDL, EVM, FPGA, XILINX

## 1. INTRODUCTION:

Authority management voting and linkable ring signatures are features of a decentralized 3-layer control system. suggested by [4]. This promotes ballot privacy by allowing voters to choose between voting system efficiency and proxy node control. [5] has unveiled a safe online voting platform with a cryptographic database (DB). Data processing, analysis, and integrity are made safer when data is stored on the cloud. Malicious voting process administration can be prevented, and intruders can be located. This voting system method ensures data security, integrity, and confidentiality. For the purpose of counting student employment, [6] introduces the multilayer perceptron with Bayesian methodologies. It uses J48 algorithms from the ML category, which include random forests and decision trees, to count the number of student jobs.

Better accuracy and construction time are obtained.

To address issues of validity, confidentiality, and integrity, authors in [7] suggested an online electronic voting system. It assists with procedures of blind signatures and prevents election tampering. For e-governance

and e-voting, authors have suggested a block chain mechanism in [8]. The peace engineering technique it uses is exploratory and qualitative.

## 2. TECHNOLOGIES USED:

In this project, we are developing an Intelligent Transport System (ITS) application for the Electronic Voting Machine using Field Programmable Gate Arrays (FPGA) and Verilog. There are numerous applications for FPGA. Since the introduction of the FPGA, the field of programmable logic has expanded significantly. Because custom chips are easier to make and maintain, their use has altered. FPGA integration using every technology used In this project, we are developing an Intelligent Transport System (ITS) application for the Electronic Voting Machine using Field Programmable Gate Arrays (FPGA) and Verilog. FPGA has a wide range of applications. Since the introduction of the FPGA, the field of programmable logic has expanded significantly.

### 2.1 FPGA:

Field-Programmable Gate Array is the acronym for FPGA. The name "field-programmable" refers to this sort of integrated circuit because it can be altered by a user after it is manufactured. Field-Programmable Gate Array is the acronym for FPGA. The name "field-programmable" refers to this sort of integrated circuit because it can be altered by a user after it is manufactured. Reconfigurability is one of the main benefits of FPGAs. FPGAs are ideal for prototyping, rapid development, and applications where flexibility is vital since they can be reprogrammed as needed, in contrast to application-specific integrated circuits (ASICs), which are created for specific functions and cannot be modified once manufactured. Additionally, FPGAs are well-known for their high performance and parallel processing characteristics, which make them ideal for jobs demanding low latency and high throughput.



fig 1-spartan 6 FPGA

## 3. RELATED WORK:

It is emulated in Xilinx and provides a memory-efficient solution to replace the paper ballot mechanism in[1]. This method allows for the casting of more votes in the shortest amount of time and makes voting storage simple because it uses a digital system. The password protects the entire process, ensuring that everything runs smoothly. Three stages of the voting process are involved in the electronic voting system that the authors introduced in [2]. The voting process consists of three steps: registering to vote, gathering contestants' votes, and tallying and announcing the results. As a result, the procedure is simple, safe, and secure. Additionally, it simplifies the voting process by storing votes digitally and in a more private manner [15], [16].

Contributing to the block chain for electronic e-voting is a hybrid structure with a bloom filter and Merkle hash tree called [3]. For large-scale electronic voting systems, it is helpful because of its great efficiency and minimal overhead. A summary of the voting systems in several nations is provided by the writers in [9]. The weaknesses in electronic voting systems are found through examination conducted on a global scale.

The primary goals are voter verification and system security against abusers. A consortium for open voting is suggested by [10]. It provides ballot confidentiality and voter privacy while aiding in the voting system's recording process. It also has a significant impact on the political culture around full or partial voting system privacy. A voting mechanism based on Aadhar

is suggested by [11]. It is made for the Arduino platform and offers privacy and security during the online electoral voting procedure for Indian elections. [12] created an electronic voting machine that uses a microcontroller to improve security and privacy in democratic voting systems, especially in Bangladesh. To evaluate the improved performance of the established electronic voting system, a cost analysis is conducted. [13] proposes the use of an arm9 microcontroller and fingerprint technology to create an electronic voting machine. It supports digital recording, saving, and processing in electronic voting systems since it is easy to use and reasonably priced. [14] is the designer of the Arduino-based smart voting system. Voters will be able to cast ballots using their biometric fingerprints, and an LCD display will provide both the voter and the electronic voting system with voting transparency. The literature review on electronic voting is displayed in below.

#### 4. LITERATURE SURVAY:

TIMER DEEPIKA URANEJA et al., 2014 Digital password systems, electronic voting machines memory-efficient, do away with the paper voting mechanism, Voting by digital means[1].K. Gurucharan et al., 2019, Three-stage voting procedure, electronic voting machine Simple, secure, safe, and time-efficient elections for the Lok Sabha, universities, and assemblies[2].Sanjay Kumar and others, 2011.Voting machine with electronic capabilities voting procedures in different nations, Genuine user, protected against fraudsters, voting on a global scale[9].Paul Diponkar et al., 2013, Microcontroller-based electronic voting apparatus Analysing costs Voting procedure in democracy[12].M. Sudhakar et al., 2015, Biometric-based electronic voting machine, arm 9 easy to use, economical, efficient ,digitally captured, saved, and processed[13].Priya V. Kiruthika et al. (2017) dependable, smart electronic voting system built on an Arduino platform openness of the voting process [14].Block chain enabled electronic voting, Shufan Zhang et al., 2019 hash tree, Merkle ,bloom filter, Superior effectiveness, minimal overhead, extensive e-

voting[3].Blockchain technology, Patricia Baudier et al., 2021 Investigative, qualitative methodology, Electronic voting, e-governance, peace engineering[8].Chenchen Li and colleagues, 2021, Voting by authority management (AMV),Three-layer, decentralized control architecture Efficiency and proxy nodes are traded off. Preserve the confidentiality of voting records[4].Sridhar Vemula et al., Safe electronic voting, 2021 encrypted data honesty, security, and privacy Safeguard against malevolent administrators[5].Saqib Malik Najmus et al., 2018online electronic voting protocol, completing votes for properties, legitimacy, privacy, and fairness Blind signature convention[7].Xu Lin, 2020, Minimum optimization, Accuracy, prediction, time, and multilayer perception Student jobs[6].In 2004, Arthur M. Keller and associates coalition with open voting straight recording in the voting apparatus, Voter privacy and ballot secrecy Political culture: total privacy, partial privacy. R. Murali Prasad, et al. (2016) Arduino-based design, Aadhar-based voting, Time-saving and secure, India has an online voting method[11].

#### 5. ELETRONIC VOTING MACHINE

In a democracy, electronic voting machines are essential to preventing voting system manipulation. Electronic voting machines are essential for protecting voter privacy, maintaining election integrity, tallying votes, and doing away with paper ballots.

In our work, the voting procedure is taken into consideration with four contestants, designated by buttons 1, 2, 3, and 4, which store the votes of party 1, party 2, party 3, and party 4 accordingly. Enable the clk throughout voting process. There is a mode for read and write the votes for the election. When we press the mode button it considered for a read mode and when we leave the mode Button it taken as a write mode. For suppose we can vote any one of the candidates so we can press or ON themode Button to read the votes. Then we select to vote our candidate of the party by pressing the selected Buttons respectively. For i wanted to vote party of contestant 4 so i can press button4 to vote at. we can check or write the votes by leave the mode button then we can count the votes. These outputs are showing by led lights.

and we can restart the election by reset mode to start the election as it is.

**6. RESULT:**

VHDL is used to code electronic voting machines, and Xilinx is used to run simulations. The RTL schematic for the electronic voting system is displayed in Fig. 2. The complete procedure is to be activated by the Clk signal.

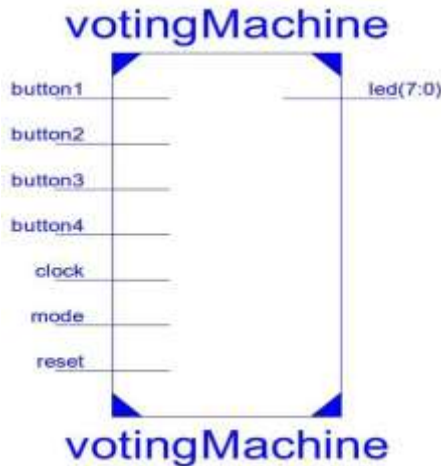


FIG 2. Block diagram of EVM

To facilitate the voting process, enable the mode. Button 1 represents party 1 (contestant 1), button 2 represents party 2 (contestant 2), button 3 represents party 3 (contestant 3), and button 4 represents party 4 (contestant 4). We consider 4 candidates for the position. Both reading and writing data to the screen are done in mode. Throughout the election, use that button to enter read mode. When the button is left in place, the write mode representing the votes appears. During the simulation process, outputs are displayed using LEDs.

Voting is possible in Fig. 3 since Venable is high from 2 seconds. reset is 10 from 2 seconds, therefore button 2 voting can be completed in 1 second, and button 2 for party 2 with no vote count has a value of 1 from 1 second. Clk first on condition during election. The other candidates in that election do not receive enough votes based on the data from a basic simulation.



FIG 3. Output Waveform

electronic voting machine circuit schematic, as displayed below.

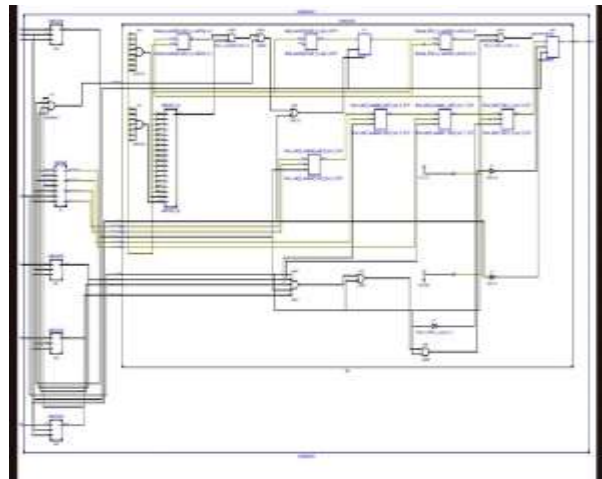


FIG 4. Schematic diagram

**7. CONCLUSION:**

In order to preserve integrity throughout the entire process, electronic voting machines are essential for elections at the college, panchayat, state, national, and international levels. We have taken into consideration four candidates, each of whose voters are kept in a separate register. The total number of votes cast for each candidate is also tallied and kept for later examination in the election system. Elections at all levels can therefore be conducted safely and securely thanks to this procedure.

**8. REFERENCE:**

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