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VLSI Design and Implementation of Electronic Voting Machine

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ABSTRACT- In place of the ballot papers and boxes that were formerly used in traditional voting systems, an EVM, or electronic voting machine, is used to record votes. The fundamental right to vote, or simply the capacity to cast a ballot, is the cornerstone of democracy. Voters would mark the name of their favourite candidate with a stamp in prior elections, whether they were state or center elections, fold the ballot paper following the instructions, and then place it in the ballot box. This is a time-consuming, difficult, and error-prone operation. This arrangement persisted until computerized voting machines drastically altered the election scene. There is no longer a need for ballot paper, ballot boxes, stamping, etc. The electronic voting machine's ballot unit is a straightforward box. Biometric identifiers are thought to be more trustworthy than conventional token or knowledge-based approaches for person recognition since they cannot be readily lost, faked, or exchanged. Therefore, depending on contemporary technologies, such as the biometric system, the electronic voting system needs to be enhanced. This article offers a thorough analysis of voting devices, problems, and comparisons of various voting processes and biometric EVMs.

I. INTRODUCTION

The technique of building an integrated circuit (IC) using hundreds of thousands of transistors or other devices into The term very large-scale integration (VLSI) refers to a single chip. VLSI was created in the 1970s, during a time when advanced semiconductor and communication technologies were being developed semiconductor and communication. The microprocessor is a VLSI device. The invention of VLSI technology came before the majority of ICs could only accomplish a small number of tasks. The components of an electronic circuit may include a CPU, ROM, RAM, and other glue logic [3]. All of these may be incorporated into a single chip thanks to VLSI. The size of the circuit was one issue. The speed of a complicated circuit like a computer was crucial. The wires connecting the components had to be long if the components were big. The circuit needed some time to process the electric impulses, which fixed the computer.

II. LITERATURE REVIEW

Ashwini Baligatti et al. [1] implemented a new 'free area estimator' that helps improve performance of simulated annealing algorithms. Some of the simulation results have been reported. Near optimal results can be obtained by non-deterministic methods such as simulated annealing. Annealing can be simulated as a stochastic process with several known and un-known variables in the process.

Ojha et al.[2] covers controller, their construction, and a variety of properties. Choosing a microcontroller for a given application is very challenging. The success or failure of any project is mainly determined by the microcontroller unit used. In this article, a short review of the unit is given in terms of making the best choice for a certain application. Many companies produce microcontrollers in large quantities.

Voting is the only requirement for citizens to select their representatives in any vote-based system. Because of this, every step of the process should be carefully considered to ensure that only a just and deserving candidate is selected exclusively on the basis of popular vote. In the past, verdicts were rendered using a poll paper structure, in which voters might support their opponent by simply stamping against their name. However, this method was prone to errors in vote counting and unjustifiable results. Each of these disparities was addressed by the development of electronic voting machines [4]. A simple electronic device called an electronic voting machine is used to automatically record votes rather than using paper ballots that must be operated by hand. Any democracy's foundation is the fundamental freedom to vote.

III. PROPOSED SYSTEM

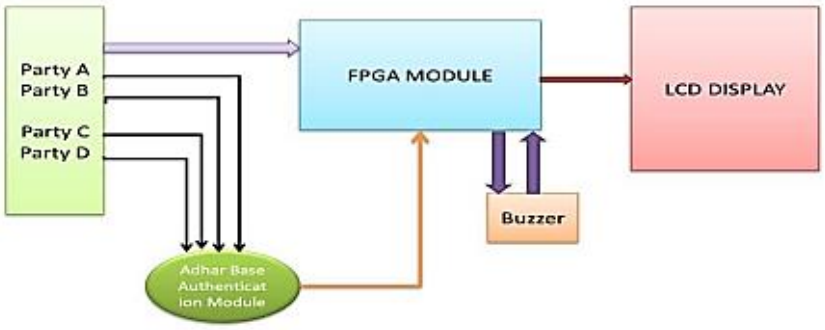


Figure 1: Block Diagram of EVM

In Figure 1 the proposed method uses a finger printer that is Adhaar-based and is a more secure and safe voting mechanism. The old paper-based selection method required a lot of time and was prone to mistakes. The polling of electronic mechanical devices (EVMs) is a quick, easy, and secure technology. From Figure 2 and 3, they proposed digital EVM was developed on the FPGA Artix7 using Verilog HDL. Three steps make up the suggested method [5]. In the first, we count the total number of voters and candidates taking part in the election. Voting enable, which is an active high input signal for the voter to cast his vote using the voter switch input signal, was assigned to make this election process more secure and safe. The traditional paper-based voting process was highly laborious, error-prone, and took a very long time. Polling using an electronic mechanical mechanism (EVM) is a simple, secure way that requires the least amount of your time. Verilog HDL was used in the design of the proposed digital EVM, which was implemented on a Spartan 3 FPGA. The suggested method has three steps, the first of which establishes the total number of voters and candidates running for office. Voting enable, an active high input signal that the voter must utilize while using the voter switch input signal, has been allocated to make this election process more secure and safe. Stage two of the voting process begins when a voter casts a ballot for a particular candidate or party, and the ballot is registered in each candidate's registry[6][8]. The aforementioned strategy can be applied to FPGA because it has the benefit of being reprogrammable numerous times for various jobs, making it very cost-effective by avoiding recurring costs.At last from Figure 4 the election is declared over in stage three once the votes have been counted and verified by comparing them to the voters' registrations of the candidates.

IV. RESULT

The VLSI design and implementation of this Electronic Voting Machine represent a significant advancement in election technology. It combines user-friendliness, efficiency, and robust security measures to ensure fair and transparent elections. The performance evaluation demonstrates its reliability, and the security features mitigate potential threats, making it a valuable asset in modern democracies.

The VLSI design of the Electronic Voting Machine consists of various components, including a microcontroller unit (MCU), memory modules, input interfaces (keypad and/or touch screen), display unit, and secure communication modules. The architecture is optimized for low power consumption and high-speed operation. VLSI design and implementation of electronic voting Machine is shown as the Synthesis report for HDL program and as the simulation result which is shown in below figures 2, 3 and 4.

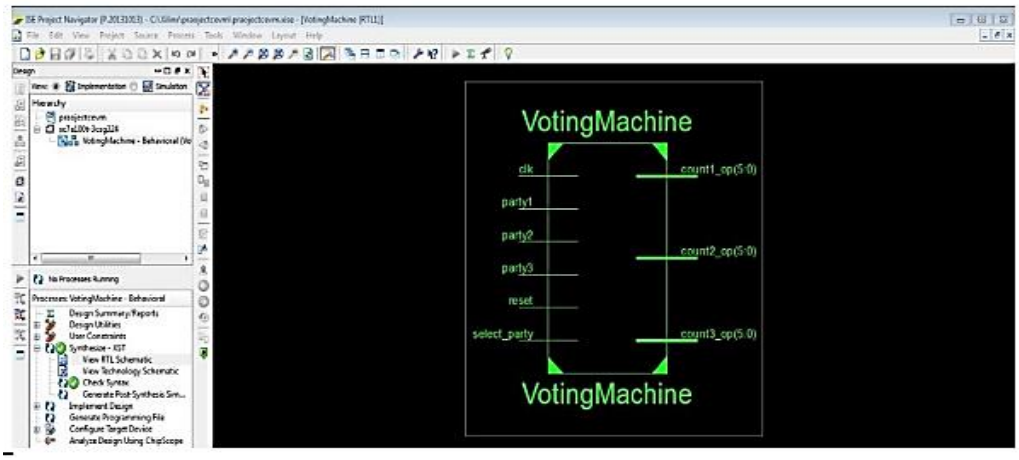


Figure 2: Synthesis report for HDL program

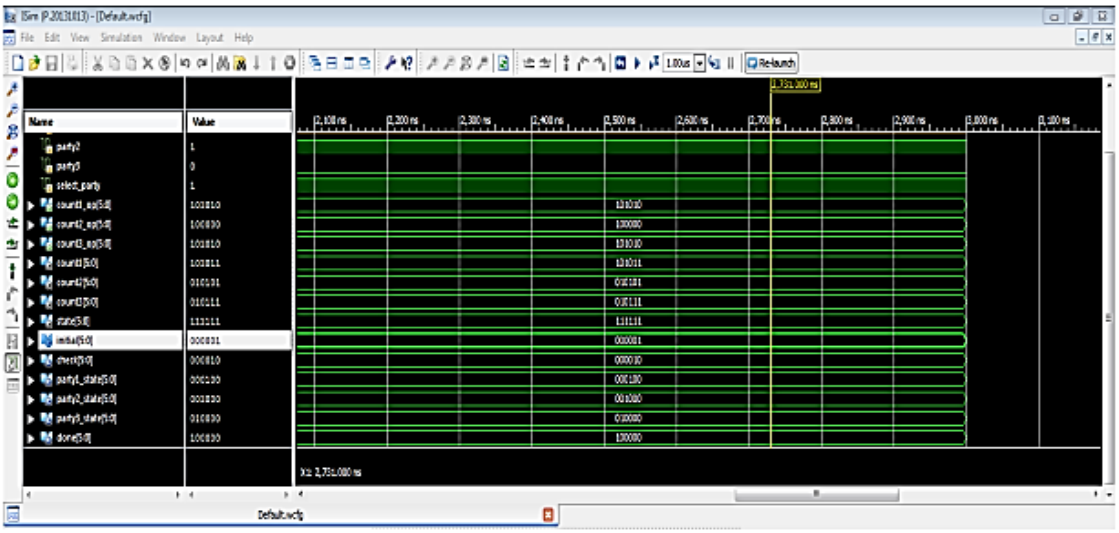
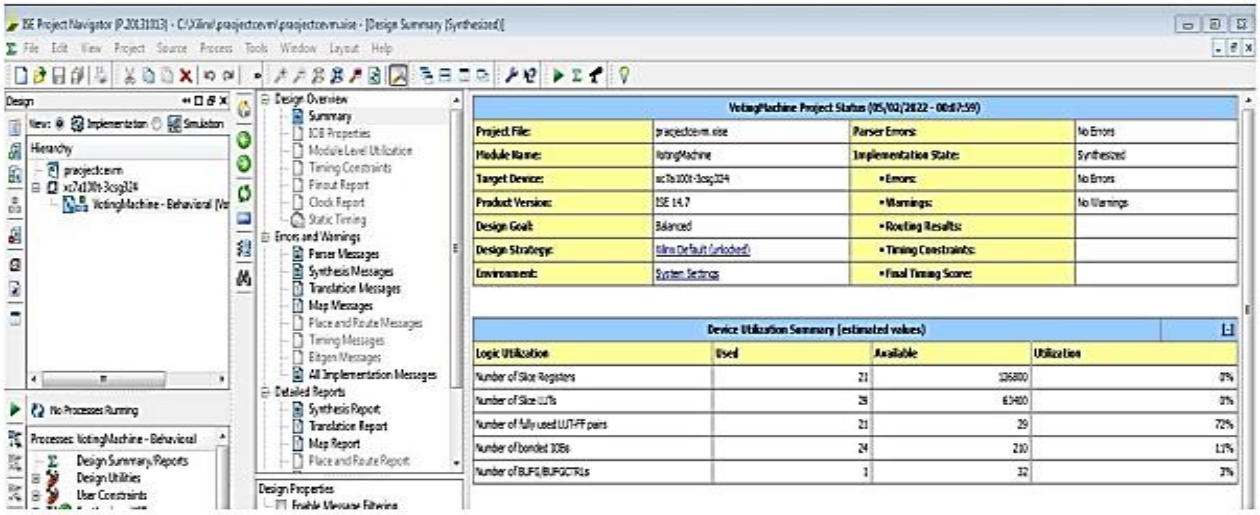


Figure 3: Simulation result for electronic voting machine using HDL



VotingMachine Project Status (05/02/2022 - 00:07:59)			
Project File:	projectcevm.xise	Parser Errors:	No Errors
Module Name:	VotingMachine	Implementation State:	Synthesized
Target Device:	xc7a100t-3csg324	• Errors:	No Errors
Product Version:	ISE 14.7	• Warnings:	No Warnings
Design Goal:	Balanced	• Routing Results:	
Design Strategy:	Xilinx Default (unlocked)	• Timing Constraints:	
Environment:	System Settings	• Final Timing Score:	

Device Utilization Summary (estimated values)			
Logic Utilization	Used	Available	Utilization
Number of Slice Registers	21	126800	0%
Number of Slice LUTs	28	63400	0%
Number of fully used LUT-FF pairs	21	29	72%
Number of bonded IOBs	24	210	11%
Number of BUFG/BUFGCTRLs	1	32	3%

Figure 4: Result and analysis for the CLK analysis for the party voting timing cycle

V. CONCLUSION

The Xilinx-based electronic voting equipment complied with election regulations, enrolling all eligible voters and candidates in the first round, [8]letting the voter choose a party of his choosing in the second round, and confirming the results in the third round. The outcome of the election is determined in the final phase, which compares all of the valid votes cast for the various parties. The simulated design can now be implemented on any FPGA board, we can claim with confidence. It is one of the most reliable and secure voting systems. One of the most crucial elements of the project is the EVM's security area, where each voter will have his or her own voting card and the password will be their finger print. Adhar-based biometrics are coupled with the system to prevent fraudulent voting and rigging. The computer will scan the voter's identification, and if it determines that they are eligible to vote, the poll worker will let them cast their ballot.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest

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