

# Design and Implementation of High Secure Biometric Electronic Voting Machine Using FPGA

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**Abstract**— This paper represents the electronic voting machine through biometric .Since elections are introduced the system for conducting elections were upgraded.The electronic voting machine(EVM) eased the process of elections.The designing of high secure biometric electronic voting machine on Xilinx ISE 14.7 in Verilog language,and it also performed through FPGA board in real time application.This kind of system comprises of 3 stages, in the first stage we take the list of voters to be participated in the election for fingerprints acquisition to give voting them. In the second stage the voting will start hence then voters comes and cast their vote to respective party which makes voting process becomes more safe and secure. In the stage three the polled votes which are registered, are compared among all the parties participating in the elections after then results will be announced at the end of election .The above methodology will be implementing in both software as well as hardware using FPGA board used for daily required applications ranges from community halls election to the university elections as well as assembly elections, as this board has the advantage of programming N no.of time according to tasks required as well as to the requirements which reduces in the expenditure.

**Keywords:** Fingerprint module,xilinx ISE 14.,numato Spartan 6 FPGA(field programmable gate array), Verilog,electronic voting machine(EVM)

## I. INTRODUCTION

The time elections introduced in india where elections are part of democracy. There should be a proper rigid system to conducting elections, in that process ballot system was came into existence.This ballot system is the first system to adopt. Ballot paper system is a manual

and paper based system, which requires some physical work. In this all the party symbols are printed on the paper where every party will be allotted a box on the paper to vote. Here there are chances of mistake can happen on the paper. In a particular area there will be literate and illiterate people. Therefore mistakes like giving a vote in between the two boxes which is generally not considered in an account.so,illiterates who doesnot have a proper idea about how to vote a party then these kind of problem arises whereas the problem by literates like striking off the paper and tearing a paper which will be tough for the polling officer to understand whether vote has to be considered or not hence respective figure shows below



Figure 1:Ballot paper

In some parts of the world Still they are using ballot system till now,best example for this statement is united states of america which is generally called as superpower in the world, still there is no using of the electronic voting

system machine in their country hence problem of misusing and many things which are involved in the ballot system , present situation was overtaken because As technology also rapidly growing therefore system was also upgraded by replacing the manual based which paper based system to the machine based system called electronic voting machine. This system is machine which is preprogrammed to behave in a desired manner according to the requirements of the system or elections.generally elections has to be safe and secure which is important. The problem in ballet was overcrossed by Electronic Voting Machine.most are aware about machine therefore Electronic Voting Machine have eased the process and save time also.we see in the place of elections through Electronic voting machine system regarding hacking of votes or the rigging Of vote of individual persons,through evm paper system system replaced by the manual based system which is very fast and secure at the same time.still there are some problems with electronic voting machine continuing that is they are prone to hacking of the machines,through this the voters who coming to vote for participating candidates will loose their trst and belief on the election process.In this evm are also misusing the voting process.It shows exact output i.e vote for that person who is polling the vote in the polling booth,but the end of the result everything goes wrong and even there are chance to vote in the place of other hence there is no security the machine which are using in the polling booth for conducting the elections and results are takes lot of time



Figure2:Electronic voting machine

Here are also there are chanceses of doing some

unwanted action Which really trespassing the safe and secure elections and indirectly creating inhibition in the mind of local people regarding elections.

## II. METHODOLOGY

Within the proposed system we are going to use FPGA, where all the opposite hardware components (fingerprintmodule,LED's, LCD screen) are assemble with FPGA.Our proposed methodology is adding an a fingerprint to high security to evm which we want to implement in software as well as hardware

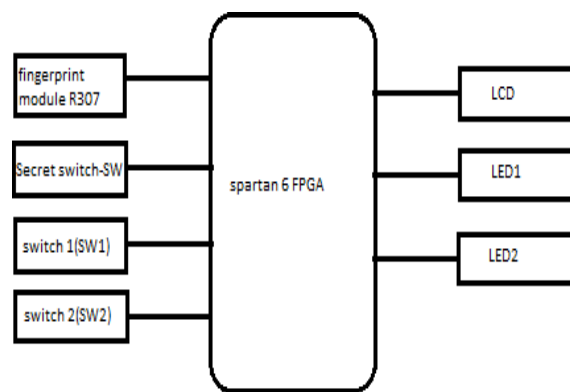


Figure 3: Block diagram

First we take all the fingerprints in our particular area. Through this we could achieve the misuse of vote and Invalid vote at same time. According to flow chart above if fingerprint is authori zed then access for can be releaved and display on the LCD if fingerprint is not matches then it doesnt give Voting access. A person came and gave fingerprint which wvas stored Already hence he or she can vote because it is authorised For example,if a person entered the polling booth and gave fingerprint bt he she did not casted their vote so in that regard the fingerprint which has been will not last for long period of time that others can come and vote on other fingerprint that cannot be happened here because after their fingerprint is given they should vote in the stipulated time period which we can set respect to the application therefore wve have given around five second of time.If that time exceeds then he she cannot rote.after that even if he tries to keep another time his that fingerprint cannot be authorised hence in this our project

is secure and safe and flow chart provides use complete understanding about the fingerprint module. The main operation done by field programmable gate array i.e. FPGA we have used mmato spartan 6 in this project so it can programme multiple times for different required tasks. According to the block diagram, the inputs are fingerprint module (R307) and pushbuttons for the number of party we allot in the elections that many number of buttons we can use. Respective are at the output section.

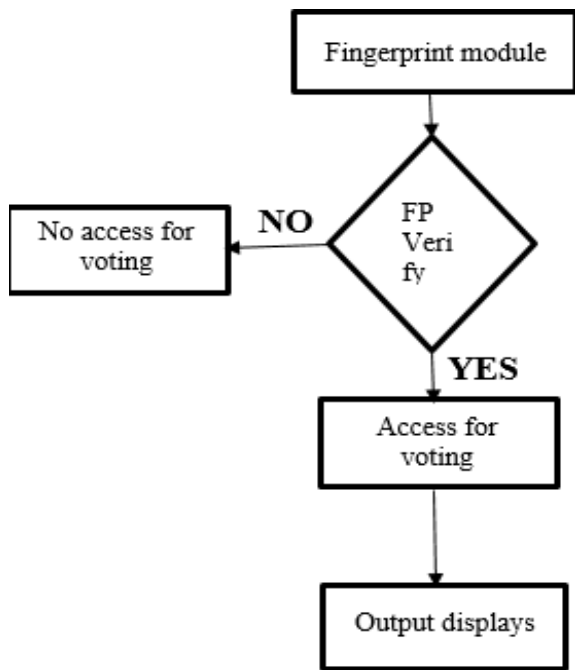


Figure 4: Flow chart of proposed system

whereas the outputs are the LCD and LED's. Interfacing a fingerprint module with field gate array board through the aurdino uno since this FPGA board has not serial port connection therefore through the programmable aurdino commmication was establish we cam do directly interfacing but because of cost factor that fpga not used It becomes very cost effective. In this fpga which is using m this project, mmato spartan 6 is the fpga model this fpga board has no serial port we have establish a connection through aurdino uno which is used for the purpose of commmication not to implement the entire project through this controller the main functionality is implemented on the FPGA itself since this fpga doesn't

take fingerpnt data can directly therefore sending fingerprint data through the aurdino contro- -ller hence when casting a vote, after giving the fingerprint they can get access for voting based on only authorization if not authorized they are unknown that mean they belong other place. after then he she has to poll the vote but here for example person has given and did not poll vote then there is chance of entering another person to accomplish the voting process instead of that person vote therefore time was set about five seconds after that his her voting duration completes. therefore objectives- data secure, miss lusing of votes i.e. hacking rigging, instant results, reduced manual power are attained through this project.

### III. RESULTS

The below figures are the simulation results of High secured biometric electronic voting machine and In this project there is a fingerprint module (R307) and below figure represents the fingerprint module transmitter i.e. UART communication.

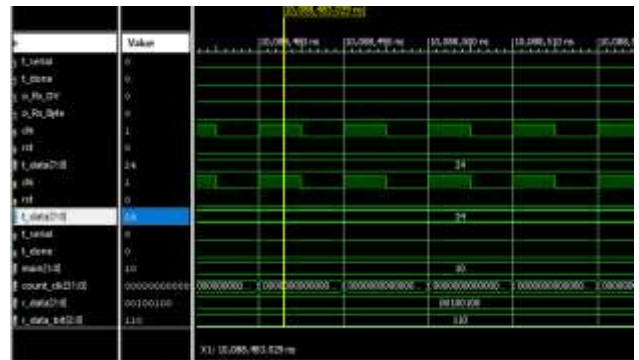


Figure 5: Output waveform of fingerprint transmission.

Here every fingerprint has unique id therefore at the input after giving the fingerprint (FP) that FP id is 24, which is highlighted which is t-data containing that persons unique id and that id has to be transmitted to FPGA where FPGA is the receiver using the uart communication. the uart communication means the fingerprint data which is stored in the unique and the unique id sends the data bit by bit that is when that bit by bit data completes then that fingerprint id will be accepted by the receiver .

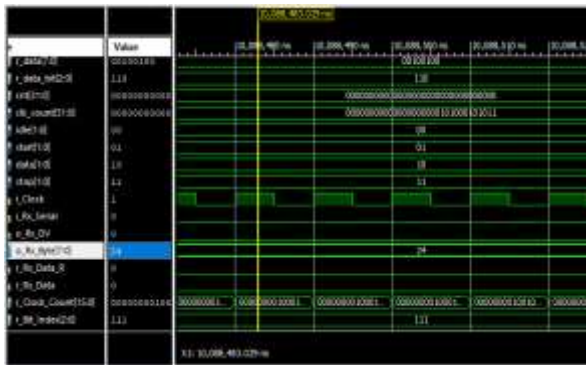


Figure 6: Output waveform of fingerprint receiver.

After the transmitter transmits the data then the FPGA is a receiver and Receives the data only for the authorized user. here o-rx-byte parameter is holding a value of 24 which is same value of transmitter.



Figure 7: Output waveform of voting starts t\_data value is 31 which is transmitted and received perfectly at o\_rx\_byte same value and switch1=0 and switch2=0 which results in led1=led2=0 which means no vote has polled.

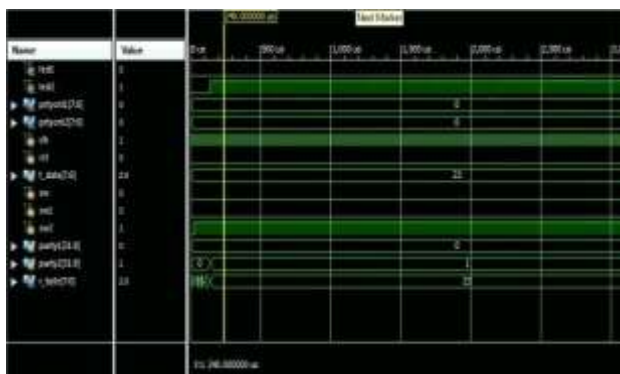


Figure 8: Output waveform of party2 voted Another fingerprint id value is 23 it means another new person has enter to vote and he polled vote to party2 i.e switch2 and respective led2 goes high which indicates person has polled to party2.

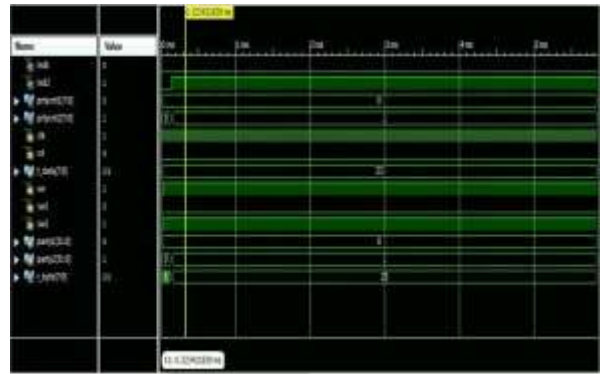


Figure 9: Output waveform of displaying count fingerprint id value is 23 and he polled vote to party2 i.e switch2 and respective led2 goes high which indicates person has polled to party2 and another parameter sw=1 which means whatever the count has stored with respect to parties polled by the voters are displayed on this parameter high else no count is displayed.

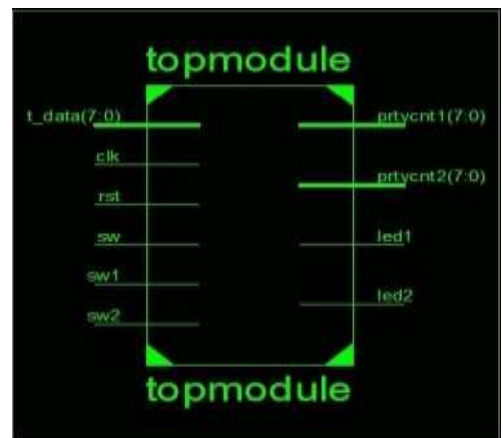


Figure 10: Schematic diagram

Parameters	Description
t_data	This is fingerprint data which is coming from fingerprint module
Sw	This is a secret switches which displays
Sw1	This indicates switch1 party1 switch
Sw2	This indicates switch2 party2 switch
Rst	This is reset the device on any interrupt from external



	environment
Clk	This is clock which gives clock pulses around 50MHz
Partycnt1	Count displays on LCD of party1
Partycnt2	Count displays on LCD of party2
Led1	LED glows when switch1 is high
Led2	LED glows when switch2 is high



Figure 11 : output of vote for party1

After the fingerprint authorization he/she gets the voting access therefore the vote has been polled to the party1 switch and its respective orange led has become high which indicates that they have polled to correct party only, which is like verification.

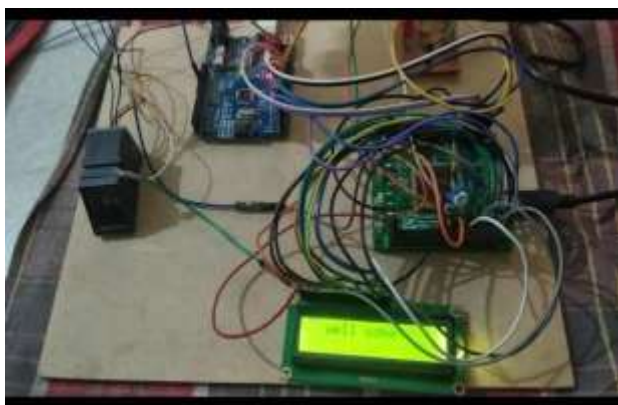


Figure 9:Hardware kit

Hardware kit switch on when power supply is given and operation has started to vote the parties.

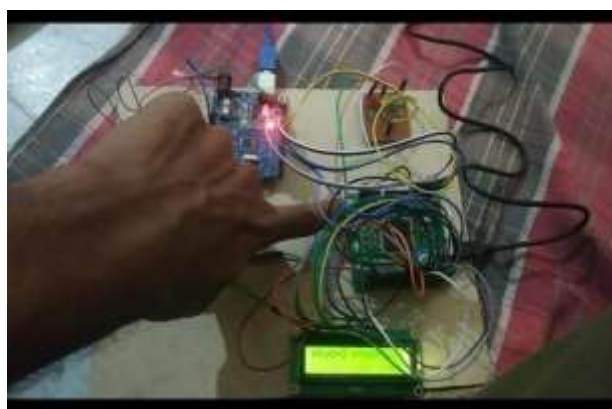


Figure 12 : displaying result

After all the voters polls their vote for the parties ,by pressing the secret switch the output displays to which party how many votes were polled .

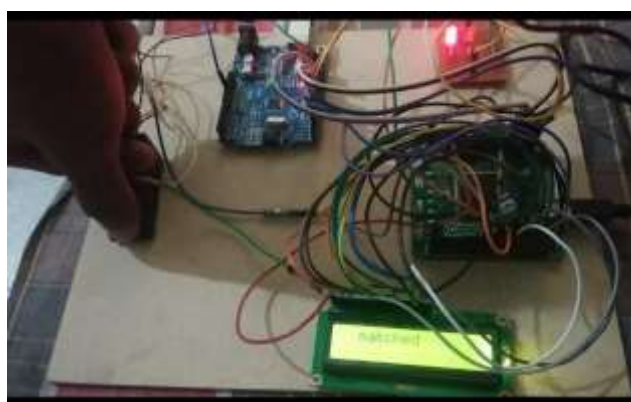


Figure 10 : output of authorization

Now person has given the fingerprint and it is matched with the original fingerprint which was stored already therefore it is showing matched as well as red led indication also.

## IV. CONCLUSION

This type of system is much useful which avoid the misusing of the vote and data secure as well as it reduceses the manual work and instant result can be declared. Campare to other electronic voting machine,our project is a step ahead campare to other where our project is fingerprint is advanced thing added in this project therefore we build a fingerprint based electronic voting where matching on fingerprint would give access to switch and candidate can caste his vote freely.There will no unauthorized people can cast their freely.hence this project has eased election process very much and it is safe and secure.

## V. FUTURE SCOPE

This method of voting helps to make voting process more secure.so therefore the future scope of this project can be improved by increasing storage of capacity of fingerprint module can be expanded by using 1megabyte for the capacity there is a flash memory fingerprint module. An external memory device can be used to save the fingerprint picture which can then be accessed for comparison later.For added security and database storage, a smart card reader module is expected to be added to the existing module. Additional biometric such as facial recognition, iris recognition and other biometries can be added to make it more user pleasant for illiterates.

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