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BIO-METRIC BASED VOTING MACHINE

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Abstract*: The Arduino platform was used to create a fingerprint voting system. A voter may cast his ballot with ease using this system. To register for this system, a voter has to fill out a registration form with the use of a user id and password, which are saved in this database server. In order to verify this data, the database server will be consulted. If there is a discrepancy in the voter's profile, the system will not let the voter to cast a ballot. Voters will appreciate how much time is saved with this technique. This is the safer option. The user's fingerprint serves as a crucial identifier. The Finger Voting System is simple to use. It offers a straightforward design, instantaneous replies, and a shorter polling cycle. Transporting ballots from the voting place to the counting area is a breeze. Vote tallying is simplified, and fewer people are needed to do the tall*

INTRODUCTION

Electoral systems are the rules that political parties follow to cast and count their votes, and they ultimately determine the outcomes of elections and referendums. Elections are a hallmark of democracies, but they have also been subject to manipulation and motivation by governments. Candidates for public office. This tool may be helpful due to its user-friendliness, the fact that governments set up the voting systems, their dependability, and their precision. While elections that have nothing to do with politics may take place in the corporate world, vote counting is still an important part of every election. Inability to finish the informal and charitable organizations. tally may have an effect on how people feel about

There were a plethora of voting methods to choose from. Paper ballots, punch cards, and Optical Mark Readers are still in use because of the present government's insistence on manually tallying the votes. Only if voting is open, honest, and trustworthy can citizens have faith in the results. trust the electoral process In every voting location, there is a

In certain voting systems, the prime minister, the president, and anybody else on a special list is the only one eligible to cast a ballot at that particular polling place. There are certain countries that elect a governor through electronic vote, whereas others, including Machine is a simple electronic device suitable for usage by legislators and corporate board members alike. collect the ballots and put them away. Voting took place in two distinct ways.

Using a human biometric system like fingerprints, electronic voting systems like the Distance Voting Machine already exist in the globe. Voting is decreasing, both in and out of Presence. Voters who are absent from the polling place cast their ballots using a paper voting mechanism. her casting a ballot at a non-traditional voting location (i.e., online).

Voting was determined by mail or online in every nation.

To that end, we developed a novel voting system. Therefore, safety, privacy, dependability, and a method to better people's lives. Votes might be tallied by hand under the present system, where election data is captured, saved, and tabulated electronically.

II Literature Review:

The existing election system is entirely dependent on paper work, which was incorrectly advocated by Vishal Vilas Natu [1]. hardware that uses electronics. Voter registration requires extra paperwork, and voters must physically cast ballots.

System Proposal: Voter id cards are carried in an offline version of the proposed system's box. There was formerly an Arduino-based electronic fingerprint voting system.In this approach, the voter's fingerprint is verified by the election executive before they cast their vote through electronic machine. Voter ID numbers are accepted, a list of candidates is shown, and a voting interface with confirmation buttons is provided in front of each name, with status and error warnings displayed on the screen.Voters who choose not to use their hands to cast their ballots may nonetheless help authenticate candidates by providing fingerprint data instead. Research into digital technologies and their security is necessary to replace the current, insecure voting system with one that is more reliable, more secure, and more widely applicable. popular among those navigating the immigration procedures.It was reported by Khasawneh, M., et al. for voting on paper ballots. Here, voters might have a specialised group responsible for the ballot-dropping mechanism used in the election offices. Remote from the polling places, servers were hidden in sealed boxes throughout the voting circuits. It was the nation they had the most experience in. As soon as the voting time concludes, certified personnel open the boxes, tally the votes by hand, and begin processing the data using methods such as fingerprint scanning, image analysis, and data transmission. Errors in the counting of votes or in the message sent to voters may occur throughout this procedure, which involves the client and the database creating reports and forwarding them.in some instances people discover methods to cast their ballots several times.

The demographic and biometric data of all Sri Lankan individuals is stored in a single database, which may be altered to skew election results in favour of specific politicians [2]. Lanka. With the goal of relieving pressure on the master database,It was suggested by Viredra Kumar et al. [3] In order to authenticate voters, validate ballots, and tally votes, copies of citizens' personal information held by UIDAI at the district level will be housed in a separate electronic database that will be housed at each district's election office. This new computerised voting method has the potential to be The classic election system and its accompanying database serve as the source for all the subsidiary databases. These are the only persons that are affected by it. Information isSince the data given by UIDAI is dynamic and updated on a regular basis, the suggested method makes advantage of this property.

Whenever it is deemed necessary, sab databases may delete the information.Untraceable electronic mail and digital pseudonyms are topics that David Chaum [4] discussed, along with the idea of retrieving just the data that is important to the voting process and excluding all their useless information.may make use of secret electronic voting by applying for it.

Virendra Kumar Yadav et al. [5] have developed a method that can detect fingerprints. Recently, sweat pores have been used for automatic fingerprint recognition in smart voting using data given by UIDAI. Three computationally intensive steps—registration, verification, and validation—are required to implement the suggested system approach. one-dimensional isotropic pore skeletonization technique The suggested system's steps are shown below.model.

A comparison study was conducted by D. Ashok Kumar, et al. [6].Smart electronic voting system by Andrew Ackerman [14] on fingerprint matching algorithms for electronic voting machines. Human fingerprint research has been conducted before. Two fingerprints must match before a voter may cast a ballot for a particular candidate using electronic voting machines. When it comes to electronic voting machines (EVMs), fingerprint authentication is the safest approach.first procedure After the first year of a person's life, their fingerprints stop changing naturally, and experts can reliably use them to identify them (Jefferson D., et al. [7] reviewed and computer of structure, criticism and security communication in safe voting, second). Fair procedure. The fingerprint-identical twins are developing separate voting systems on the web. In actuality, Accenture has two. And no two persons with the same fingerprint have ever been detected using fingerprint technology for security purposes.

uses.

III MATERIALS AND METHODS

One of the many reasons this voting method uses fingerprints to tally the votes:After the voter has been verified, they will be allowed to vote, and they must select a party using the first of five buttons located around the concept that all parties, citizens, and election buttons go to party select. If the voter chooses a party before the electoral process has been audited, they will be unable to change their vote. Then they pushed at every turn, even before the election had started.Three buttons nested among five others lead to Each voter has just one chance to choose a candidate from among those running in a

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certain political party. If a voter presses party twice, the candidate will not be allowed to cast a ballot. candidate selection button more than once, and If an administrator receives the warning "No Access" after a candidate has been added to the system more than three times using the selection button, all of those candidates will be removed from the system. Votes cannot be bought or sold.not included in the total.

With its major component being an Arduino system, this fingerprint voting machine simplifies matters in Create Complete Report: In order to locate voting locations after casting a ballot. When a user presses the "report" button, the system automatically begins tallying the user's votes and notifying them of the election's outcome. To the person working the polling station counter. With the study project's report generation button and the system's built-in security features, the user may leave the box at home. Only authorised staff have access. Following that and the voter ID. When an election is complete, the fingerprint reader deletes all data and then keeps personal information, such as the voter's name and fingerprints.

user, mailing address, social security number, and cell phoneNumber for contact etc. fingerprint voting system design shown in Figure 2. It plays a role in the system's evolution. At election time, voting places may easily be converted into power units.

When activated, the voting machine shows a "welcome to voting" screen.In the first step, seen in Figure 3, a message appears on the LCD screen, telling voters that the fingerprint voting system they helped design and build is ready to receive their votes. The schematic. method of operation is determined by the user's button presses.

Fingerprint Verification: Voter Arduino Uno, before to voting ballot: Arduino Uno, a kind of micro controller, is used to verify the results of elections. This ATmega328-based PCB is shown in Figure 7. A voter's fingerprint is scanned and compared with the 16 MHz crystal oscillator, USB port, power slot, and ICSP header fingerprints already stored in memory, and the board has 14 verification times to prompt the voter to "Scan your finger" for verification. If there's a reset button, then yes. It has everything you need to support the micro controller and show the message "Cast your vote." on an LCD screen. LCD displays "Did adapter or battery to get started" if fingerprint doesn't match with computer through USB cable or AC-to-DC power supply in previously preserved memory. The Arduino does not match, thus your vote

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cannot be counted. If the voter is unique among all prior boards in that it has never voted before, the FTDI USB-to-serial driver chip will be used during the verification phase of the fingerprint match. Rather, it uses the Atmega8U2 configured as a USB-to-serial red light warning. converter to show the message "Already voted!" on the LCD and provide the fun

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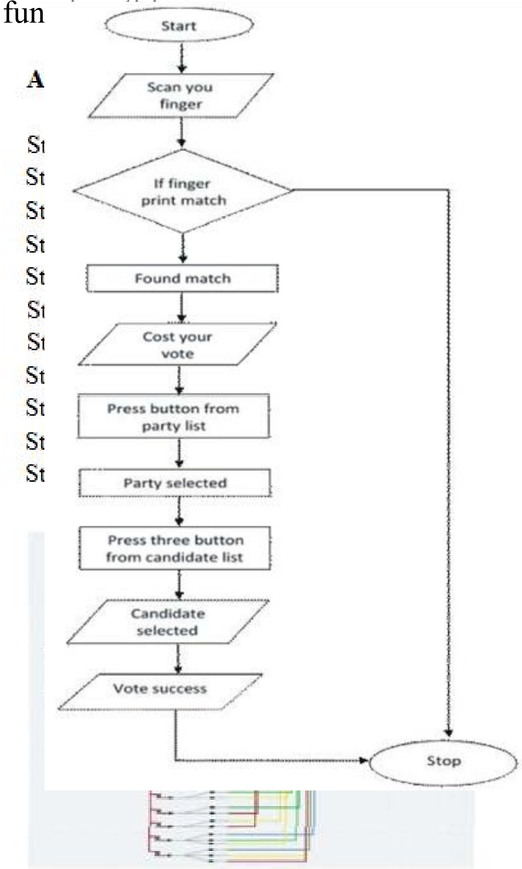

Fig. 2: System Design Schematic diagram

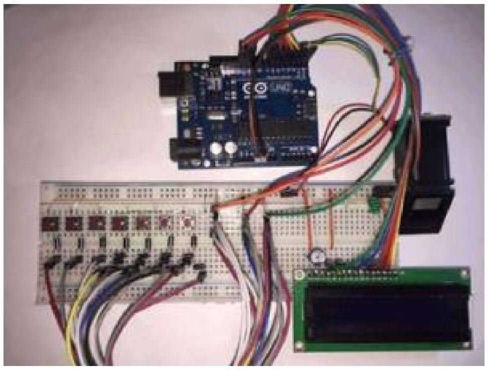

Fig. 3: GUI Design – Beginning step

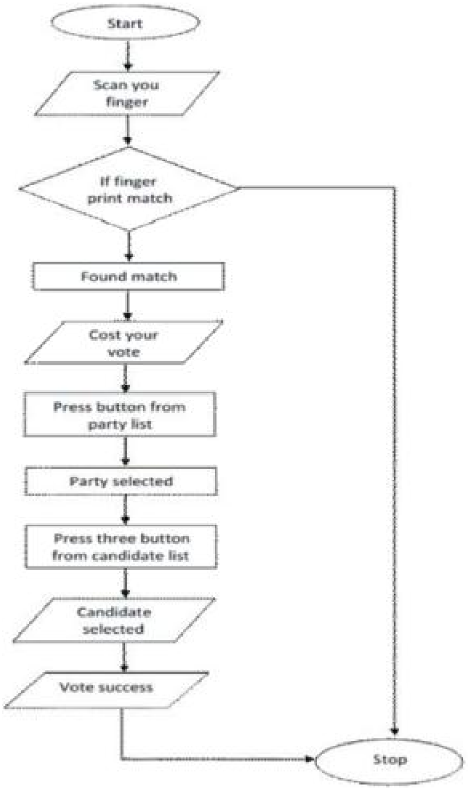

Fig. 4: Flowchart of the Fingerprint Voting System

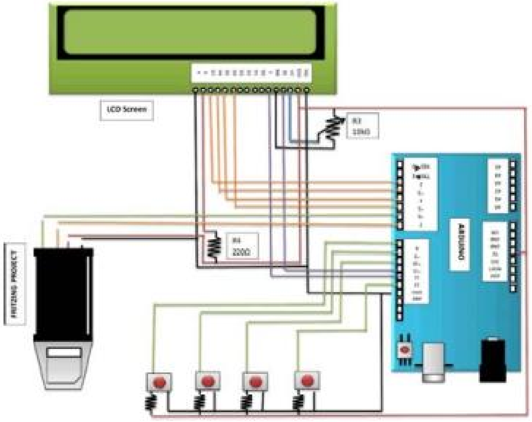

Fig. 5: Circuit diagram

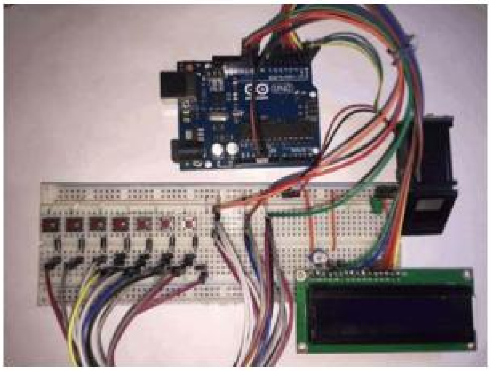

Fig. 6: Complete system – Beginning stage

Fig. 7: Arduino uno R3

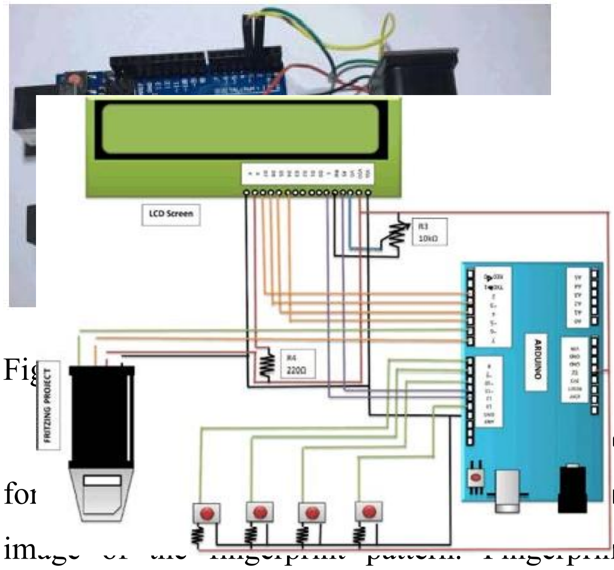

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image of the fingerprint pattern. Fingerprint enrolment and fingerprint matching (the matching can be 1:1 or 1: N). When enrolling, user needs to enter the finger two times. The system will process the two-time finger images, generate a template of the finger based on processing results and store the template. The captured image is called a live scan. This live scan is digitally processed to create a biometric which is stored and used for matching. When matching, user enters the finger on optical sensor and system will generate a template of the finger and compare it with templates of the

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finger library. For 1:1 matching, system will compare the live finger with specific template designated in the Module, for 1: N matching, or searching, system will search the whole finger library for the matching finger. Many technologies have been used including optical, capacities, RF, thermal. This is an overview of some of the more commonly used fingerprint sensor technologies.

LCD Display: In the Figure 9 display has an LED backlight and can display two rows with up to 16 characters on each row. You can see the rectangles foreach character on the display and the pixels that make up each character. The display is just white on blue and is intended for showing text. LCD screen functions as interface between the user and Arduino, which displays messages that features the user to know when to register and to vote and also whether their vote is valid or not.

It's also displays "welcome" messages initially and "place your finger" message during enrolment, "identifying" message when controller is comparing the data base whether the user is valid were not, if valid displays "please vote" message, if not displays "no access" message and finally displays the result with party name with their respective number of votes.

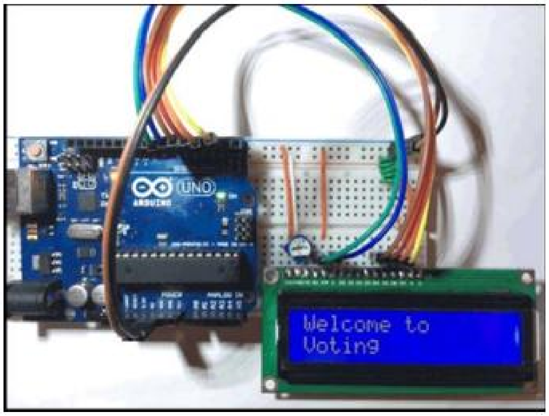

Fig. 9: LCD display

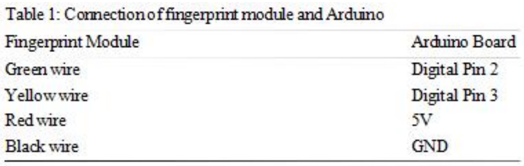

Table 1: Connection of fingerprint module and Arduino

Fingerprint Module	Arduino Board
Green wire	Digital Pin 2
Yellow wire	Digital Pin 3
Red wire	5V
Black wire	GND

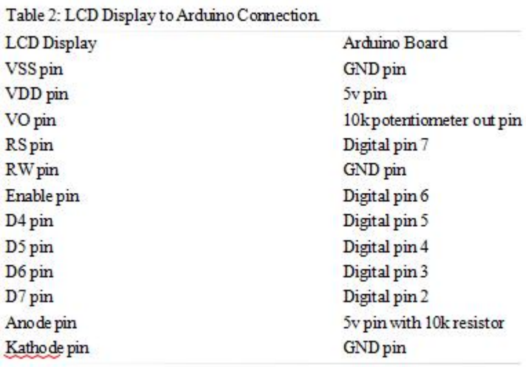

Table 2: LCD Display to Arduino Connection

LCD Display	Arduino Board
VSS pin	GND pin
VDD pin	5v pin
VO pin	10k potentiometer out pin
RS pin	Digital pin 7
RW pin	GND pin
Enable pin	Digital pin 6
D4 pin	Digital pin 5
D5 pin	Digital pin 4
D6 pin	Digital pin 3
D7 pin	Digital pin 2
Anode pin	5v pin with 10k resistor
Kathode pin	GND pin

IV RESULT AND DISCUSSION

First enrol the voter's finger and save the fingerprint by given id.

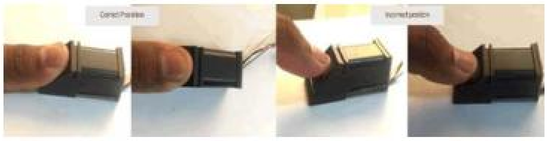

Fig. 10: Place the finger in fingerprint module

Figure 10 shows how to place finger on fingerprint module. The first two images were explained correct position and another two were wrong position of the fingerprint scanning.

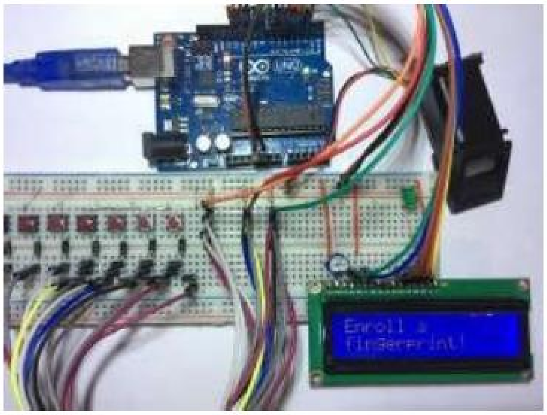

Fig. 11: Fingerprint enrolling

In this time voter ask to user to get an id to save their fingerprint. After given id voter place their finger on fingerprint module to scan, during the enrolling voter place their finger in two times (Figure 11), in first time image take and convert, then second time check the fingerprint with first scan (Figure 12), if fingerprint matched save the fingerprint in given id. Otherwise “Fingerprint did not match” message displayed on LCD.

Then the voter is checked valid or not to vote casting.

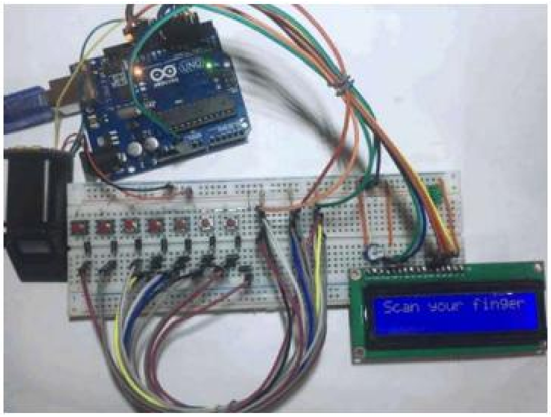

Fig. 12: Fingerprint scan

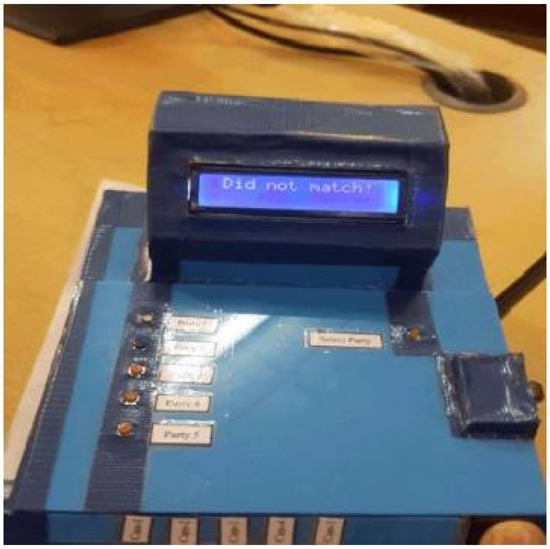

Fig. 13: Finger not matches

In this step voters select a party to their preference from the party list, (Figure 15, 16) if select a party then cannot change to select another party.

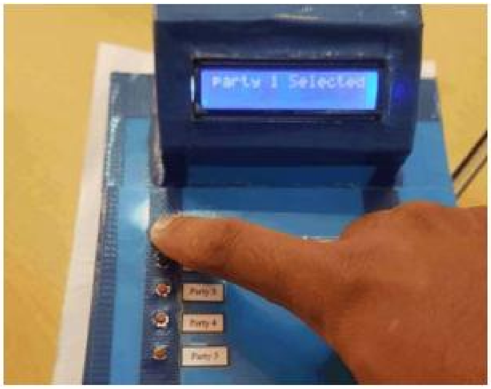

Fig. 16: Vote casting with party selection

After select party, voters cast their three preferential votes to the candidates from the selected party (Figure 17).

If press party list button more the one time, it's not allowed to poll vote and cannot select more than 3 candidates from the candidate list.

V Conclusion

In total, this system overcomes most of the problems faced during the voting period by the paper ballot system. The efficiency of this system depends upon the web interface, its usability. This will surely ensure a safer voting method which is very much what is required for a healthy growth of a developing nation.

In this paper, the proposed Fingerprint based voting system which is better and faster than previous systems. The new system prevents access to illegal voters, provides ease of use, transparency and maintains integrity of the voting process. The system also prevents multiple votes by the same person and checks eligibility of the voter. It also allows a person to vote from anywhere provided that the voter is within electoral limits.

Fingerprint based voting system has provided chance to avoid invalid votes, It reduce the polling time, Easy to carrying to polling center from the polling box, Reduce the staff of voting center, It provide easy and accurate counting without any troubles, Provisioning of voting preventive measures.

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