APPLICATION OF IOT TOOLS IN FINGERPRINT VOTING SYSTEM.

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Abstract: *The research paper presents the design and implementation of a fingerprint-based electronic voting system using the Arduino Uno microcontroller and DY50 fingerprint module. The primary goal is to improve the security, efficiency, and reliability of elections by leveraging biometric technology. Traditional paper-based voting systems are prone to errors, manipulation, and time-consuming processes, whereas this digital solution ensures authenticity, prevents fraudulent activities, and simplifies the voting procedure.*

By utilizing unique biometric data, such as fingerprints, the system effectively registers, verifies, and authorizes voters, thereby eliminating the possibility of duplicate votes. The proposed system stores and processes vote counts in EEPROM memory and delivers the results on an LCD display. While offering significant improvements in election management, the system also faces challenges related to hardware vulnerabilities, software glitches, and the need for extensive voter education.Key words:Fingerprint voting system, Internet of Things, biometric authentication, Arduino Uno, DY50 fingerprint module, electronic voting, election security, digital voting, EEPROM memory, microcontroller, biometric technology.

Forums allow the people to vote for their delegates and share their opinion for how they want to be ruled. The validity of democracy as a whole is dependent on the authenticity of the election mechanism. The election process must be beneficial in preparingfor a wide variety of fraudulent activities, as well as transparent and

straightforward, so that citizens and politicians can accept election results.To achieve this, the form of governance based on the concept of majority decision making is the preferable choice since it is distinguished by a legitimate, honest, fair to everyone, and subsequently efficient election system. Numerous individuals use paper ballots to elect their legislators in conventional voting systems. For a long time, this strategy has been employed. This approach necessitates the voter's actual presence in order to select one of the candidates in confidence and then place the paper in the voting box, but it has various drawbacks. Voters, for example, must go to a polling location and stand in line to vote, and in certain situations, voters are exposed to pressure by officials. Furthermore, this system is extremely subject to fraud and changes in the number of votes cast.

Additionally, collecting the voting papers and transporting them to the main center is challenging. Most notably, there is the possibility of error during the counting of votes, in addition to the high expense of the procedure and time required.The interconnecting of physical objects—cars, buildings, and other things—embedded with electronics, software, sensors, actuators, and network connectivity that allows these things to gather and share data is known as the internet of things (IOT). The IOT makes it possible for objects to sense or be controlled remotely over current network infrastructure. This opens up possibilities for a more direct integration of the physical world into computer-based systems, which reduces the need for human intervention while also improving efficiency, accuracy, and economic benefit.

The raspberry pi and Arduino may be used to help create an Internet of Things infrastructure where we can customize the hardware with software and control the devices via the internet.The internet of things ecosystem may be developed using the Raspberry Pi and Arduinoplatform. Numerous benefits have been brought to the voting process by the fingerprint electronic voting system. It helps make voting

considerably more successful and efficient by, for example, lowering the cost of printing ballots and hiring more workers. The digital voting device has evolved into a useful instrument for elections. It enables faultless voting and has therefore gained popularity. It guarantees people's right to vote. It prevents any form of fraud or illegitimate votes. Such a techniqueis also more cost effective because the resulting human spend is reduced. It is also handy for the voter since he just needs to touch one key, which corresponds to one of his choices. The whole mix of mechanical, electromagnetic, or electronic equipment used to specify votes, cast and count votes, record or display results of an election, and preserve and create any audit trail material is referred to as a voting machine. The early voting machines were mechanical, but electronic voting machines are becoming more popular. A election process would include the procedures and supporting documents used to identify motherboard chipsets and versions of such components; test the system during its development and maintenance; keep records of system errors or defects; determine specific changes made after initial certification; and make any materials available to the voter (such as notices, instructions, forms, or paper ballots). A voting machine has traditionally been described by the method used to cast votes and further classified by the place where the system tabulates the results.In this project, we employed fingerprints for voter registration or identification. Because each person's thumb imprint is unique, it aids in mistake reduction. As needed, a database comprising the fingerprint pictures of all voters is established. This technique use precise coding to detect illegal votes and vote repetition. As a result of the use of this fingerprint-based EVM technology, elections might be rendered fair and free of rigging. Furthermore, elections would no longer be a time-consuming and costly task.Technical ResearchThe second sort of literature study is technical research, which demonstrates in-depth technical research linked to this subject. This includes the software, programming languages, algorithms, and user interface in order to aid in the selection of the most appropriate component of this project to fulfill the desired

aim of creating and implementing the fingerprint voting system.Electronic voting system equipment's There are several biometric tapes that may be utilized for electronic voting systems, including eye recognition, voice recognition, and fingerprint recognition.

Many studies have been conducted on different sorts of biometric recognition, however the fingerprint will be the most effective for the voting system. The literature listed below depicts software and languages that can aid in the construction of a fingerprint voting system.Fingerprint classificationsFingerprints have been divided into three distinct classifications based on their visual pattern: loops, arches, and whorls. Each fingerprint type is further classified into smaller subcategories. The arch fingerprint is the earliest type of fingerprint. Only 5% of people have his kind of fingerprint, which is classified into two types: plain arch and tented arch. The loop fingerprint is the second most common form of fingerprint, accounting for 60% of all fingerprints. It is further classified into two types: radial loops and ulnar loops. The third form of fingerprint is known as whorl, and it is found in 35% of persons. This kind is further classified into plain whorls, center pocket whorls, double loop whorls, and accidentical whorls. The images below depict many types of fingerprints.

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