TOPIC:

Android Basee Voting System (Evote)

[ABSTRACT 3](#_Toc1158437526)

[INTRODUCTION 4](#_Toc772755780)

[Chapter1: PREAMBLE 6](#_Toc1872781051)

[I.1 Existing System 6](#_Toc163310078)

[I.2 Problem Statement 7](#_Toc268380080)

[I.3 Objective of the project 7](#_Toc948345860)

[I.4 Proposed system 8](#_Toc225240986)

[I.5 Scope of the study 8](#_Toc1759065688)

[Chapter 2: THEORETICAL BACKGROUND 9](#_Toc209649967)

[2.1 Android Operating systeme 9](#_Toc1713814289)

[2.2 SDK and API for Fingerprint Integration 12](#_Toc2026081659)

[3.3 Voting Rules 13](#_Toc1853735981)

[Chapter 3: SYSTEM REQUIREMENT SPECIFICATION 14](#_Toc47881991)

[3.2 Functional Requirements 15](#_Toc1593738759)

[3.3 Non-functional requirements 15](#_Toc403793482)

[3.3.3 User Requirements 17](#_Toc508727454)

[3.3.4 Basic Business Requirements 17](#_Toc1049920671)

[3.4 Hardware requirements 18](#_Toc143590098)

[3.5 Software requirements 19](#_Toc1694641505)

# ABSTRACT

The word "vote" means to affirm a formalised choice in an election. In the political environment of tertiary institutions

 voting allows students to choose the leaders who emerge. The majority of institutions Russia have problems when it comes to voting. Some of them include vote rigging during the election, overcrowded voting centres, inaccessible and unsecured polling arena, inexperienced staff, etc.

Voting in these institutions was found to be limited to methods such as paper ballots, on-site counting, The counting of ballots is time-consuming, leading to delays in the results. In addition, the calculation of results can be biased and time consuming, causing voters to wait for results. This android voting application seeks to solve the above problems

In today's scenario, where everything is speeding up and new ideas and inventions are always appreciated, our mobile app is also a part of it. Evote is more effective and convenient to conduct and manage elections as compared to the traditional manual methods With this application, students in universities, colleges of education, polytechnics ... will be given sufficient time to vote.

The application will be used to assist student users during voting sessions. They will also be trained on how to vote using the application before the time of the election.

Students will also be trained on how to use the application before the election, although very little training is required as the application is easy to use.

The application has a simple and interactive graphical interface for the voting system and maintains its database using the MongoDB Stitch platform. MongoDB is a Backend-as-a-Service - BaaS that allows users to create more powerful, secure and scalable applications. Our App allows users to vote from anywhere at any time, without having to wait in long lines. Election results are automatically calculated and reported instantly, reducing human effort and the risk of error.

INTRODUCTION

Voting is one of the most important ways for individuals to participate in government decision-making. It is a method for voters to actively participate in decision making or express their opinion. In a democracy, a government is chosen through elections. By voting in elections, citizens have the right to choose their representatives, whether it is a local government official or the prime minister of a country. Old voting techniques are the traditional voting methods. Electronic Voting Machines (EVMs) have been used in general elections since 1999 until today. EVMs have replaced paper ballots in a few categories of elections, but there are still a number of scenarios in our daily lives where traditional voting practices like paper ballots are still used. Voting in these typical scenarios can be done through a mobile app-based online voting system. For example, in many colleges, student council, departmental council, staff association, and residence hall elections are conducted using paper ballots. The process of electing officers in club or professional organization elections is still done using the traditional paper ballot process.

The use of paper ballots is often more cumbersome, time consuming, and subject to human bias. A number of factors, such as getting to polling places, long lines, bad weather, traffic, etc., make traditional elections difficult for both voters and poll workers. These factors often lead to a decrease in voter participation in the electoral process.

Online electronic voting is an essential step in the evolution of democracy. It is an ideal medium for elections of associations, councils, clubs, unions, educational institutions and other organizations, etc.

Our goal is to develop a mobile application that allows users to vote online via their cell phone. The application is developed to improve the voting process and make it more efficient. This application provides a new method of voting and managing elections, which reduces time, cost and human effort.

Our app is developed so that students can vote anytime and from anywhere using Android devices. The goal of the app is to make it easier for voters and election officials to monitor the voting process. The app provides election results accurately and instantly.

The application have a user-friendly login screen interface for voters, where they can log in with their credentials. Each voter's data is stored in a database containing their essential information such as account ID, name, username, password, email address and a voting status that indicates whether the voter has voted or not.

After logging in, voters have access to the voting interface "voting screen" that allows them to select candidates for given positions and securely submit their voting data. Once a voter has submitted their answer, they are not allowed to resubmit it. Thus, the application ensures that there are no false votes in the elections.

The entire voting process is under the control of the system administrator. The administrator must login. After successfully logging in, the administrator has access to the "administration screen" where the options of activating/deactivating voting lines and viewing the results are available.

# Chapter1: PREAMBLE

The Mobile-based online voting system is an online voting technique. In this system, eligible voters of any gender can vote online without visiting a physical polling station.

In mobile BASED ONLINE VOTING SYSTEM a voter can use his voting right online without any difficulty. He has to be registered first for him to vote. Registration is mainly done by the system administrator for security reasons. The system Administrator registers the voters on a special site of the system visited by him only by simply filling a registration form to register voter. User seeking registration are expected to contact the system administrator to submit their details.

After the validity has been confirmed by the system administrator by comparing their details submitted with those in existing databasessuch as those as the Registrar of Persons, the user is then registered as a voter.

After registration, the voter can use his VoterID and Password to log into the system and enjoy services provided by the system such as voting.If invalid/wrong details are submitted, then the useris not registered to vote.

## I.1 Existing System

In existing system of voting, voter go on voting booth on the day of voting. There is no any centralized system, where we can cast our vote from remote location. There is no proper authentication present of an individual. There is manual work involved, so it may generate errors in the system. The Traditional approach is very time consuming and have got manual errors.

## I.2 Problem Statement

**- Expensive and time-consuming:** The process of collecting data and entering it into the database is time-consuming and expensive. For example, time and money must be spent printing data entry forms, preparing registration stations and human resources, and then advertising. printing data entry forms, preparing registration stations and human resources, and then advertising on the days set for the registration process, including educating voters about the need to register. registration, as well as the time spent entering that data into the database.

**- Too much paperwork:** The process involves too much paperwork and paper storage. Paper storage is difficult because paper is getting larger as the population increases.

**- Data entry errors:** Errors are common to all human beings. It is very unlikely that humans are 100% efficient in data entry.

**- Loss of registration forms:** Sometimes registration forms are lost after they have been filled out with the voter's details. In most cases, it is difficult to follow up and as a result many people are not registered, even though they are of voting age and interested in exercising their right to vote.

**- Limited time to consult the register of electors:** This is a very important problem, as not everyone has the time to consult and update the register of electors during the short period of time allotted.

**- More importantly, a number of voters end up being prevented from voting.**

## **I.3 Objective of the project**

Specific objectives of the project include:

- Review the existing/current voting process

- Propose an automated voting system for organization.

- Implementing an automated/online voting system.

- Validating the system to ensure that only legible voters are allowed to vote.

## I.4 Proposed system

This system was proposed to eliminate the difficulty for people to vote in the voting booth. the voting booth. Whenever the notification of the scheduled date is received on the user's Android device, the user can vote from anywhere at any time. To vote, the user must be authorized and the proposed system allows for voter authentication.

During registration, the proposed system will get all the details of the user. In the proposed system advancement in Mobile device is very easy and secure voting. The proposed system provides the specifications and requirements for electronic voting using Mobile platform.

## I.5 Scope of the study

It is to study the existing voting system in Organization and make surethat the people's vote counts, for equity in elective positions. This project will also

produce:

- Less effort and less work, as the main cost and purpose is to the creation, management and operation of a secure online voting portal.

- An increasing number of voters, as individuals, will find it easier and more convenient to vote

# Chapter 2: THEORETICAL BACKGROUND

## 2.1 Android Operating systeme

Android is a mobile operating system developed by Google, based on a modified version of the Linux kernel and other free software.

Android is a mobile operating system developed by Google, based on a modified version of the Linux kernel and other open source software, and designed primarily for touchscreen mobile devices such as smartphones and tablets.

mobile touchscreen devices such as smartphones and tablets. In addition, Google has

developed Android TV for TVs, Android Auto for cars, and Wear OS

for wristwatches, each with a specialized user interface. Variants of Android are also used on game consoles, digital cameras, PCs and other electronic devices.

Originally developed by Android Inc., which Google acquired in 2005, Android was unveiled in 2007 and the first commercially available Android device was launched in September 2008. The operating system has since undergone several major releases.

the current version being 12.0 "Android 12", released in October 2021. The main source code of Android source code is known as the Android Open Source Project (AOSP), and is primarily under the Apache license.

Android is also associated with a suite of proprietary software developed by Google, including core applications for services such as Gmail and Google Search, as well as the Google Play app store and digital distribution platform, and the associated development platform. These applications are licensed from Android device manufacturers certified to standards imposed by Google, but the AOSP has been used as the basis for competing Android ecosystems, such as Amazon.com's, Fire OS, which uses its own equivalents

to Google's mobile services.

Android has been the world's best-selling operating system on smartphones since 2011 and on tablets since 2013. As of May 2017, it has over two billion monthly active users, the largest installed base of any operating system, and in 2017, the Google Play

store offers more than 3.5 million apps.

- **Interface:** Android's default user interface is primarily based on direct manipulation, using touch inputs that loosely correspond to real-world actions, such as swiping, tapping, pinching, and reverse pinching to manipulate objects on the screen, as well as the virtual keyboard, Full-size joysticks and physical keyboards are supported via Bluetooth or USB. The response to user input is designed to be immediate and provide a smooth tactile interface, often using the vibration capabilities of the device to provide haptic feedback to the user.

- **Applications:** Applications ("apps"), which extend the functionality of the devices,

are written using the Android Software Development Kit (SDK) and often the Java programming language. Java can be combined with C/C++, as well as a choice of default runtimes that provide better support for C++. The Go programming language is also supported, but with a limited set of applications programming interfaces (API). In May 2017, Google announced support for

Android application development in the Kotlin programming language.

- **Memory management:** Android devices are generally battery powered, Android is designed to manage processes to keep power consumption to a minimum. When an application is not in use, the system suspends its operation. so that, although it is available for immediate use rather than closed, it does not use battery or processor resources. The system will not use the battery or processor(CPU) resources. Android manages the applications stored in memory automatically: when memory is low, the system begins to invisibly and automatically close inactive processes, starting with the oldest processes. Lifehacker reported in 2011 that third-party task destruction applications do more harm than good.

- **Hardware:** Android's main hardware platform is ARM (the ARMv7 and ARMv8-A architectures.) with x86, MIPS and MIPS64, and x86-64 architectures also officially supported in later versions of Android. The unofficial Android-x86 project provided support for x86 architectures before the official support. The MIPS architecture was also supported before Google's. Since 2012, Android devices with Intel processors have started to appear, including phones and tablets. While getting support for 64-bit platforms, Android was first made to run on 64-bit x86, then on ARM64. Since Android 5.0 "Lollipop", 64-bit variants of all platforms are supported in addition to 32-bit variants.

The minimum RAM requirements for devices running Android 7.1 range from 2 GB for the best hardware, to 1 GB for the most common screen, to an absolute minimum of 512 MB for the least capable 32-bit smartphone. The recommendation for Android 4.4 is to have at least 512 MB of RAM, while for "low RAM" devices, 340 MB is the minimum requirement. which does not include memory dedicated to various hardware components such as the baseband processor. Android 4.4 requires a 32-bit ARMv7, MIPS or x86 processor (the latter two via unofficial ports), as well as a graphics processor compatible with the OpenGL ES 2.0 compatible graphics processor (GPU).

OpenGL ES 1.1, 2.0, 3.0, 3.1 and from the latest major version, 3.2 and since Android 7.0 Vulkan (and version 1.1 available for some devices). Some applications may explicitly require a certain version of OpenGL ES, and a GPU hardware hardware is required to run these applications.

- **Linux kernel:** The Android variant of the Linux kernel has some additional architectural

changes that are implemented by Google outside of the usual Linux kernel development cycle, such as the inclusion of components such as device trees, ashmem, ION, and a different handling of out-of-memory (OOM). Some features that Google contributed back to the Linux kernel, including a power management feature called "wakelocks".

These features, called "wakelocks", were initially rejected by the main kernel developers.

in part because they thought that Google had not shown any intention of maintaining its

own code. Google announced in April 2010 that they would hire two employees to work with the Linux kernel community, but Greg Kroah-Hartman, the current Linux kernel maintainer for the stable branch, said in December 2010 that he was concerned that Google was no longer trying to bring its code changes into the mainstream of Linux. Patrick Brady, an engineer at Google, said at the company's developer conference that "Android is not Linux," Computerworld adding, "Let me make it simple for you, without Linux, There is no Android." Ars Technica wrote that "Although Android is built on top of the Linux kernel, the platform has very little in common with the conventional desktop Linux stack.

- T**echnical security:** Android applications run in a sandbox, an isolated area of the system that does not have access to the rest of the system's resources unless access permissions are explicitly granted by the user when the application is installed.

the application is installed, but this may not be possible for pre-installed applications.

It is not possible, for example, to disable access to the microphone of the pre-installed camera application without completely disabling the camera. This also applies to Android versions 7 and 8.

Since February 2012, Google has been using its Google Bouncer malware scanner to

monitor and analyze the applications available in the Google Play Store. A "Verify Apps" feature was introduced in November 2012, as part of the Android operating system version 4.2 "Jelly Bean", which scans all apps, whether from Google Play and third-party sources, in order to detect malicious behavior. Originally, this analysis was only performed during installation, Verify Apps received an update in 2014 to "constantly" scan apps, and in 2017, the feature was made visible to users via a menu in Settings.

## 2.2 SDK and API for Fingerprint Integration

Large technology companies are focused on creating an ecosystem of integrated services that can communicate with each other and whose data is shared seamlessly with each other. This requires the engagement of a large community of developers to develop applications and services and integrate them with other services. Technology companies are doing their best to persuade developers to build for their ecosystems, so that more and more services can be integrated to grow the ecosystems. They provide training materials, videos, SDKs, APIs, tools and support for developers. The same is true for biometric software Solution companies. Biometric software companies want developers to use their SDKs and APIs to increase their market presence and revenue.

To integrate the fingerprint hardware, developers will need the fingerprint SDK that

which will allow them to access the fingerprint hardware's functionality and the API, which can communicate with other software or services. For example, to integrate the fingerprint hardware with an Android application, a developer must obtain the Android SDK and target the API level. The API level is determined by the versions of Android that the application wants to be compatible with. SDKs and APIs are often available on the website of software/service providers and can be downloaded by anyone. In the field of cloud biometrics, applications embedded with fingerprint sensors need to communicate with remote servers on every request. This communication is made possible by APIs. Biometrics as a Service or Cloud Biometrics providers also provide APIs that can communicate with external services and software.

Some device manufacturers, such as Samsung, provide SDKs and APIs for their devices to securely integrate applications with fingerprint hardware. The user can use Androids or the device manufacturers' APK, as required. Apple also provides iOS SDK

and Touch ID API for fingerprint authentication.

## 3.3 Voting Rules

- **Majority Rule:** The most common way to count all votes is the majority rule.

The majority rule is to take the alternative preferred by the majority of voters.

Rank it first, and place the other one second. With only two alternatives, this works

perfectly. However, when there are more than two options in the vote, the very famous Condorcet's paradox can potentially occur and cause inconsistencies.

- **Positional Voting:** Positional voting is another common voting system. Being

different from the constitution of a ranking list with pairwise comparison and aggregation of majority rule votes, it produces a group ranking directly from the individual ranking. In this type of system, each alternative receives a weight based on its position in the preference list. For example, in a voter ranking with k alternatives, the first ranked alternative receives a weight of k-1, the second ranked alternative receives a weight of k-2, and so on. Then the last ranked alternative will receive a weight of zero. The aggregation of all the weights assigned to each alternative and ranking the alternatives according to the aggregated weights produces the group ranking list.

# Chapter 3: SYSTEM REQUIREMENT SPECIFICATION

This chapter describes the requirements. It specifies the hardware and software configuration that are necessary for the proper functioning of the application. The Software Requirements Specification (SRS) is explained in detail, which includes overview of dissertation as well as the functional and non-functional requirements of this thesis.

An SRS document describes all the data, functional and behavioral requirements of the software being produced or developed. The SRS is a fundamental document that forms the basis of the software development process. It is the complete description of the behavior of a system to be developed. It does not only list the requirements of a system, but also the description of its main characteristics. Requirements analysis in systems and software engineering, includes the tasks that allow to determine the need or requirements for a new or modified product, taking into account the possibly conflicting requirements of different stakeholders, such as beneficiaries or users. Requirements analysis is critical to the success of a development project. Requirements must be documented, measurable, testable, linked to identified inputs, and defined at a level of detail sufficient for system design.

The SRS functions as a blueprint for the execution of a project. The SRS is often referred to as the "parent" document, because all subsequent project management documents, such as design specifications, statements of work, software architecture, test and validation plans, and documentation plans, are linked to this document.

It is important to note that an SRS contains only functional and non-functional requirements.

Thus, the purpose of preparing the SRS document is to

- Facilitate communication between the customer, the analyst, the system developers

the maintainers.

- To serve as a contrast between the buyer and the supplier.

- Provide a solid foundation for the design phase.

- To support the system test facilities.

- To support the management and control of the project.

- To control the evolution of the system.

## 3.2 Functional Requirements

Functional requirements define a function of a software system and how the system should behave when presented with specific inputs or conditions. This can include

calculations, data manipulation and processing, and other specific functionality. In

this system, the functional requirements are as follows

- The input test case must not have compile-time and run-time errors.

- The application must not stop working when kept running, even for a long time.

- The application shall work as expected for each set of test cases provided.

- The application shall generate output for a given input test case and input parameters.

input parameters.

- The application shall generate services on demand.

## 3.3 Non-functional requirements

Non-functional requirements are requirements that do not directly concern

the specific function performed by the system. They specify the criteria that

can be used to judge the functioning of a system rather than specific behaviors. They

emergent properties of the system such as reliability, response time, and occupancy. Non-functional requirements arise from user needs, due to budget constraints, organizational policies, the need for interoperability with other software and hardware systems or due to external factors such as:

- Product requirements

- organizational requirements

- User requirements

- Basic business requirements

In systems engineering and requirements engineering, a non-functional requirement

is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. It is to be distinguished from functional requirements which define specific behavior or functions. The implementation plan for

non-functional requirements is detailed in the system architecture. Basically, functional requirements define what a system is supposed to do and non-functional requirements define how a system is supposed to be. Functional requirements are typically found in the form of system shall do requirements , an individual action of part of the system,

perhaps explicitly in the sense of a mathematical function, a black box description

input, output, process and control functional model or IPO Model. In contrast, nonfunctional requirements are in the form of system shall be requirement, an overall

property of the system as a whole or of a particular aspect and not a specific function.

The systems’ overall properties commonly mark the difference between whether the

development project has succeeded or failed.

3.3.1 Product Requirements

- **Portability**: Since the system is designed to work with Android, the system is

portable.

- **Accuracy**: It follows a well-defined set of procedures and rules to calculate the data.

and rigorous testing is also done to confirm the accuracy of the data.

- **Ease of use**: The front-end is designed to provide an interface that allows the user to interact easily.

- **Modularity**: The complete product is broken down into many modules and well-defined interfaces are developed to explore the benefits of the product's flexibility.

- **Robustness**: This software is developed in such a way that the overall performance is optimized and the user can expect to get results in a limited time with maximum relevance and accuracy

Whereas quality of evolution implies testability, maintainability, extensibility or scalability.

3.3.2 Organizational Requirements

**Process standards:** IEEE standards are used to develop the application which is the

standard used by most standard software developers around the world. This step is the first step in moving from the problem to the solution domain. In other words, starting from what is needed, the design leads us to work on how to satisfy the needs.

### 3.3.3 User Requirements

The user requirements document (URD) or user requirements specification is a document usually used to software engineering that specifies the requirements user expects

from software to be constructed in software project. Once the required information

is completely gathered it is documented in a URD, which is meant to spell out exactly

what the software must do and is part of the contractual agreement. A customer cannot demand functionality that is not in the URD, while the developer cannot claim that the product is ready if it does not meet an element of the URD. The URD can be used as a

guide for planning costs, schedules, milestones, testing, etc. The explicit nature of the URD allows clients to show it to various stakeholders to ensure that all necessary features are described. The formulation of a URD requires negotiation to determine what is technically and economically feasible. Preparing a URD is one of those skills that falls between science and economic feasibility. The preparation of a URD is one of the skills that lies between science and art, which requires both technical software skills and interpersonal skills.

### 3.3.4 Basic Business Requirements

The operational requirement is the process of linking strategic goals and objectives to tactical goals and objectives. It describes the milestones, conditions for success, and explains how, or what part of a strategic plan will be implemented in a given operational period. in the case of a strategic plan, a given operational period, in the case of a business application, fiscal year, or other budget term.. An operational plan is the basis and justification for an annual operating budget request. Therefore, a five-year strategic plan generally requires five operational plans funded by five operating budgets. Operational Plans should define the activities and budgets of each part of the organization for the next 1-3 years. They link the strategic plan to the activities that the organization and the resources needed to carry them out. An operational plan draws directly from the organization's and program's strategic plans to describe agency and program missions and goals, program objectives, and program activities. Like a strategic plan, an operational plan answers four questions:

- Where are we now?

- Where do we want to be?

- How do we get there?

The customers are those who perform the eight primary functions of systems engineering, with particular emphasis on the operator as a key customer. Operational requirements define the basic need and, at a minimum, are related to the following points:

- **Mission profile or scenario**: describes the procedures used to accomplish the mission objective. It also helps determine the effectiveness or efficiency of the system.

- **Performance and related parameters**: It indicates the critical parameters of the system to accomplish the mission.

- **Usage Environments**: It provides a brief overview of the system usage. Determines the appropriate environments for effective system operation.

- **Operational Life Cycle**: Defines the life cycle of the system

## 3.4 Hardware requirements

- Processor: 800MHz Intel Pentium III or equivalent

- Memory: 512 MB

- Disk space: 750 MB of free disk space

For mobile:

- Operating device: Android.

- RAM: 512 MB minimum.

- Internal storage: 1 GB.

- Internet access: Yes.

- Sensors: Fingerprint device

## 3.5 Software requirements

- Operating system: Windows 10 and Ubuntu.

- Coding language: Java or Dart.

- Tools: Eclipse and Netbeans IDE.

- Library support: SDK, JDK, NDK.