AI BASED SMART VOTING SYSTEM

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering degree in Computer Science and Engineering

By

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHOOL OF COMPUTING

SATHYABAMA

**INSTITUTE OF SCIENCE AND
TECHNOLOGY(DEEMED TO BE
UNIVERSITY)**

**Accredited with Grade “A” by NAAC| 12B Status by UGC | Approved by
AICTE**

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CHENNAI - 600119**

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **T.KEVIN RICHARD (39110496) and KERTHIK ROSAN M (39110489)** who carried out the Project Phase 2 entitled **"AI Based Smart Voting System"** under my supervision from January 2023 to April 2023.

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Submitted for Viva voce Examination held on________________________

Internal Examiner **External Examiner**

DECLARATION

We, **Kevin Richard and Kerthik Rosan,** hereby declare that the Project Report entitled **"AI Based Smart Voting System"** done by us under the guidance of**Ms. Lavanya G,M.E.,** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in **Computer Science and Engineering**.

Kevin Richard

DATE:

PLACE: Chennai **SIGNATURE OF THE CANDIDATE**

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I wish to express my thanks toall Teaching and Non-teaching staff members of the **Department of Computer Science and Engineering** who were helpful in many ways for the completion of the project.

ABSTARCT

Electronic Voting is the standard means of conducting elections using Electronic Voting Machines, sometimes called "EVMs" in India.The use of EVMs and electronic voting was developed and tested by the state-owned Electronics Corporation of India and Bharat Electronics in the 1990s. They were introduced in Indian elections between 1998 and 2001, in a phased manner. The electronic voting machines have been used in all general and state assembly elections of India since 2014. In India, the voting system generally uses the manual approach where voters queue up in a physical space to cast their votes for their choices. Manual voting system without any doubt does not lead to 100% voting rate. This project primarily focuses to provide the people an authentic scientific community with parties' policy positions, with respect to their constituencies. A web applicationis developed using reactJS that aims to analyse the role of the existing political parties/independents who are contesting in the forthcoming state election. The project also helps the common man to take a survey with the questionnaire to express his/her willingness and views on the current/forthcoming state election. This web application also helps the state government in achieving 100% voting rate in the state elections by providing an e-voting system enabling Face Detectionauthentication. The main motive of this project is to ensure that the voting is donein a safe and secure manner by implementing the concepts of block chain in order to protect the integrity of the votes that has been placed and stored in the database this prevents hackers from trying to change the number of votes for a particular party of group. By using facial recognition by implementing variousalgorithms we can also ensure the integrity of online voting so that there is no duplication of votes in any time of the voting process. .

TABLE OF CONTENTS

ChapterNo

TITLE **Page No**

LIST OF FIGURES

FIGURENO

NAME OF THE FIGURE

PAGENO.

LIST OF ABBREVIATIONS

S.NO	ABBREVATION	EXPANSION
1	EVMs	Electronic Voting Machines
2	RNNS	Recurrent Neural Networks
3	CNN	Convolutional Neural Networks
4	DLT	Distributed Ledger Technology
5	SPOF	Single Point Of Failure
6	JSX	JavaScript XML
7	AI	Artificial Intelligence
8	NIZK	Non-interactive Zero-Knowledge
9	DMVR	Distributed Multi-choice Voting/Ranking
10	API	Application Programming Interface

11	SSPL	Server Side Public License
12	CSS	Cascading Style Sheets

Chapter 1 Introduction

- **GENERAL INTRODUCTION:**

India is a country, divided into states and union territories, with a parliamentary system governed under the Constitution of India, which defines the power distribution among the federal government and the states.

The Election Commission of India is an autonomous constitutional authority responsible for administering Union and State election processes in India. The body administers elections to the Lok Sabha, Rajya Sabha, State Legislative Assembliesin India, and the offices of the President and Vice President in the country.

India is a sovereign, socialist, secular, democratic republic. Democracy runs like a golden thread in the social, economic and political fabric woven by the Constitution given by ‘We, the People of India’ unto ourselves. The concept of democracy as visualised by the Constitution pre-supposes the representation of the people in Parliament and State legislatures by the method of election. The Supreme Court has held that democracy is one of the inalienable basic features of the Constitution of India and forms part of its basic structure. The Constitution of India adopted a Parliamentary form of government. Parliament consists of the President of India and the two Houses — Rajya Sabha and Lok Sabha. India, being a Union of states, has separate state legislatures for each state. State legislatures consist of the Governor and two Houses — Legislative Council and Legislative Assembly — in seven states, namely, Andhra Pradesh, Telangana, Bihar, Jammu & Kashmir, Karnataka, Maharashtra and Uttar Pradesh, and of the Governor and the stateLegislative Assembly in the remaining 22 states. Apart from the above, two out of the seven Union Territories, namely, National Capital Territory of Delhi and Puducherry, also have their Legislative Assemblies.

Election Commission is the federal body of India which is enacted under the provisions of the Constitution, responsible for monitoring and administering all the electoral processes of India. This body is responsible for ensuring elections are free and fair, without any bias. Election Commission ensures the conduct of members pre-elections, during elections, and post-elections are as per the statutory legislation.

- **TECHNOLOGIES USED:**

- **DEEP LEARNING**

Deep learning is a computer software that **mimics the network of neurons ina brain.** It is a subset of machine learning and is called deep learning because it makes use of deep **neural networks.**

Deep learning algorithms are constructed with connected layers.

- The first layer is called the Input Layer
- The last layer is called the Output Layer
- All layers in between are called Hidden Layers. The word deep means the network join neurons in more than two layers.

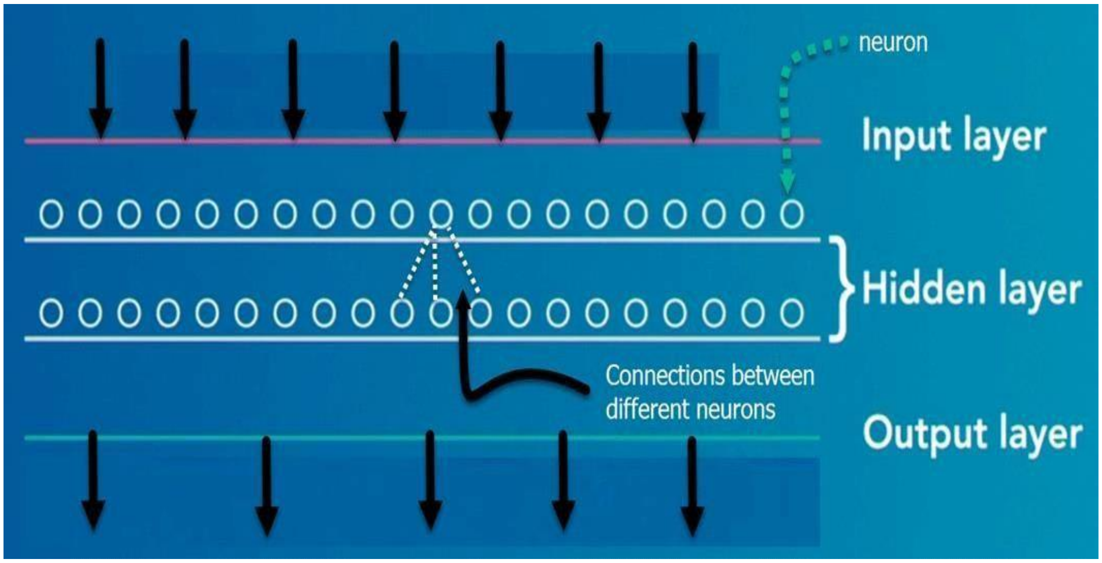


Figure 1.1 Deep Learning Layers

Each Hidden layer is composed of neurons. The neurons are connected to each other. The neuron will process and then propagate the input signal it receives the layer above it. The strength of the signal given the neuron in the next layer depends on the weight, bias and activation function.

The network consumes large amounts of input data and operates them through multiple layers; the network can learn increasingly complex features of the data at each layer.

IMPORTANCE OF DEEP LEARNING

Deep learning is a powerful tool to make prediction an actionable result. Deep learning excels in pattern discovery (unsupervised learning) and knowledge-based prediction. Big data is the fuel for deep learning. When both are combined, an organization can reap unprecedented results in term of productivity, sales,management, and innovation.

Deep learning can outperform traditional method. For instance, deep learning algorithms are 41% more accurate than machine learning algorithm in image classification, 27 % more accurate in facial recognition and 25% in voice recognition.

DEEP LEARNING PROCESS

A deep neural network provides state-of-the-art accuracy in many tasks, from object detection to speech recognition. They can learn automatically, without predefined knowledge explicitly coded by the programmers.

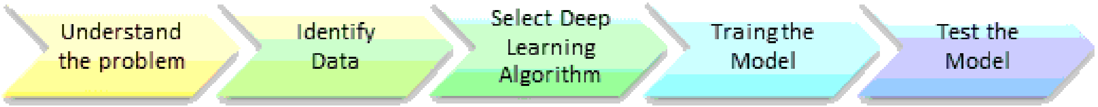


Figure 1.2 Deep Learning Process

To grasp the idea of deep learning, imagine a family, with an infant and parents. The toddler points objects with his little finger and always says the word 'cat.'As its parents are concerned about his education, they keep telling him 'Yes, that is acat' or 'No, that is not a cat.' The infant persists in pointing objects but becomes more accurate with 'cats.' The little kid, deep down, does not know why he can say it is a cat or not. He has just learned how to hierarchies’ complex features coming up with a cat by looking at the pet overall and continue to focus on details such as the tails or the nose before to make up his mind.

A neural network works quite the same. Each layer represents a deeper level of knowledge, i.e., the hierarchy of knowledge. A neural network with four layers will learn more complex feature than with that with two layers.

The learning occurs in two phases.

- The first phase consists of applying a nonlinear transformation of the input and create a statistical model as output.
- The second phase aims at improving the model with a mathematical method known as derivative.

The neural network repeats these two phases hundreds to thousands of time untilit has reached a tolerable level of accuracy. The repeat of this two-phase is called an iteration.

CLASSIFICATION OF NEURAL NETWORKS

Shallow neural network: The Shallow neural network has only one hidden layer between the input and output.

Deep neural network: Deep neural networks have more than one layer. For instance, Google LeNet model for image recognition counts 22 layers.

Nowadays, deep learning is used in many ways like a driverless car, mobile phone, Google Search Engine, Fraud detection, TV, and so on.

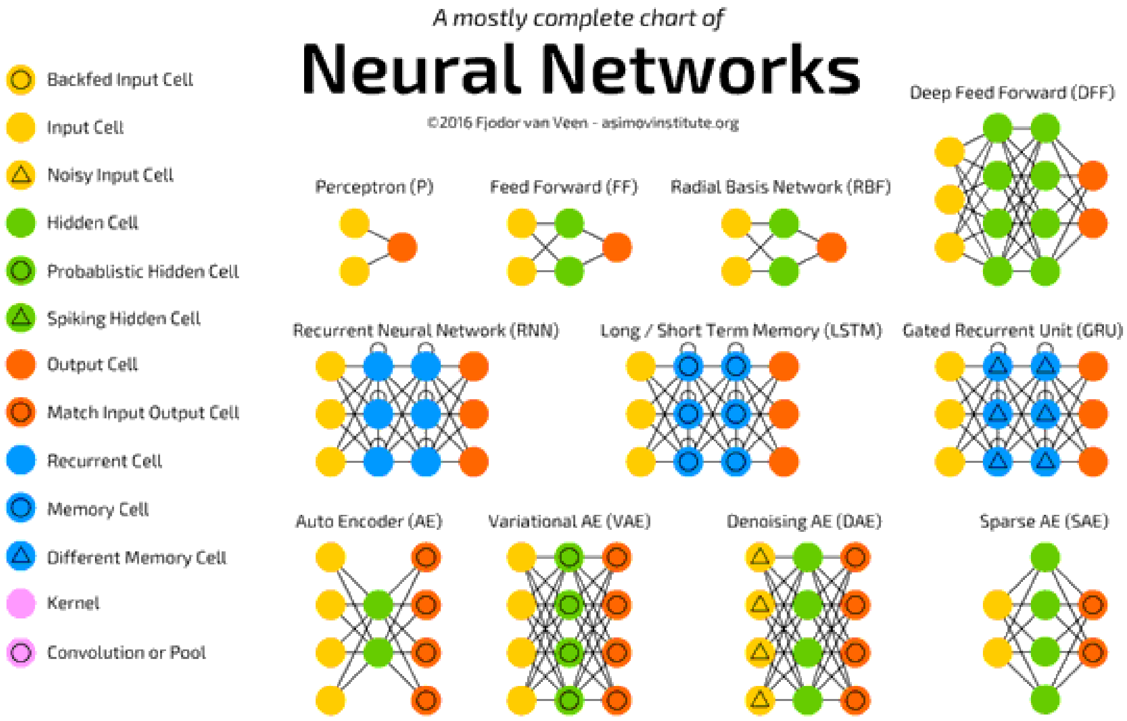


Figure 1.3 Types of Deep Learning Networks

FEED-FORWARD NEURAL NETWORKS

The simplest type of artificial neural network. With this type of architecture, information flows in only one direction, forward. It means, the information's flows starts at the input layer, goes to the "hidden" layers, and end at the output layer. The network does not have a loop. Information stops at the output layers.

RECURRENT NEURAL NETWORKS (RNNS)

RNN is a multi-layered neural network that can store information in context nodes, allowing it to learn data sequences and output a number or another sequence. In simple words it an Artificial neural networks whose connections between neurons include loops. RNNs are well suited for processing sequences of inputs.

The RNN neurons will receive a signal that point to the start of the sentence.

- The network receives the word "Do" as an input and produces a vector of the number. This vector is fed back to the neuron to provide a memory to the network. This stage helps the network to remember it received "Do" and it received it in the first position.
- The network will similarly proceed to the next words. It takes the word "we" and "want." The state of the neurons is updated upon receiving each word.
- The final stage occurs after receiving the word "a." The neural network will provide a probability for each English word that can be used to complete the sentence. A well-trained RNN probably assigns a high probability to "café," "drink," "burger," etc.

Common uses of RNN

- Help securities traders to generate analytic reports
- Detect abnormalities in the contract of financial statement
- Detect fraudulent credit-card transaction
- Provide a caption for images
- Power chatbots
- The standard uses of RNN occur when the practitioners are working with time-series data or sequences (e.g., audio recordings or text).

CONVOLUTIONAL NEURAL NETWORKS (CNN)

CNN is a multi-layered neural network with a unique architecture designed to extract increasingly complex features of the data at each layer to determine the output. CNN's are well suited for perceptual tasks.

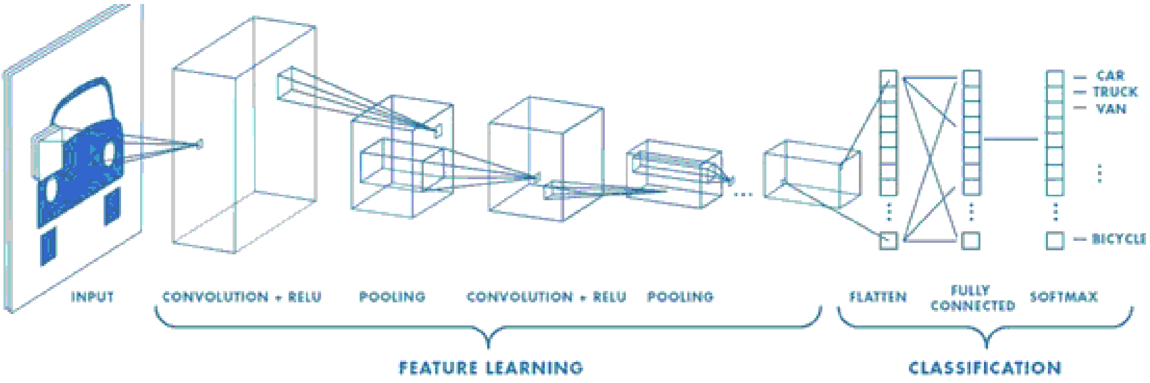
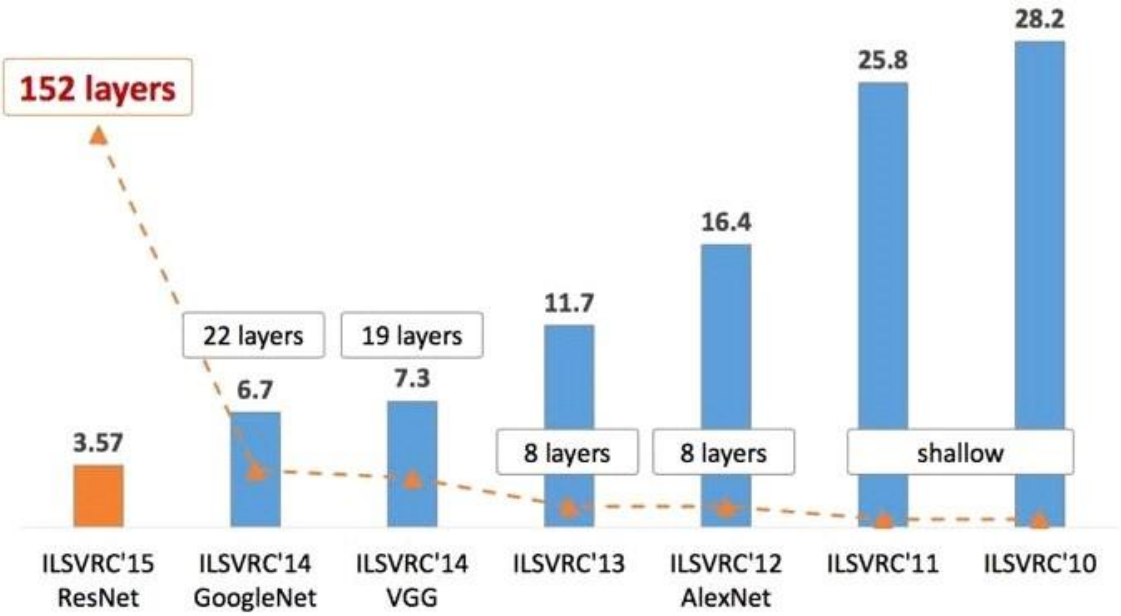


Figure 1.4 CNN

CNN is mostly used when there is an unstructured data set (e.g., images) andthe practitioners need to extract information from it

For instance, if the task is to predict an image caption:

- The CNN receives an image of let's say a cat, this image, in computer term, is a collection of the pixel. Generally, one layer for the greyscale picture and three layers for a color picture.
- During the feature learning (i.e., hidden layers), the network will identify unique features, for instance, the tail of the cat, the ear, etc.
- When the network thoroughly learned how to recognize a picture, it canprovide a probability for each image it knows. The label with the highest probability will become the prediction of the network.



A Convolutional Neural Network (**CNN**, or **ConvNet**) are a special kind of multi-layer neural networks, designed to recognize visual patterns directly from pixel images with minimal pre-processing. The **ImageNet** project is a large visual database designed for use in visual object recognition software research. The ImageNet projectruns an annual software contest, the **ImageNet Large Scale Visual Recognition Challenge (ILSVRC),** where software programs compete to correctly classify and detect objects and scenes.

Figure 1.5 Types of CNN

- **BLOCKCHAIN**

Blockchain is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system. A blockchain is essentially a digital ledger of transactions that is duplicated and distributed across the entire network of computer systems on the blockchain. Each block in the chain contains a number of transactions, and every time a new transaction occurs on the blockchain,a record of that transaction is added to every participant’s ledger. The decentralised database managed by multiple participants is known as Distributed Ledger Technology (DLT). Blockchain is a type of DLT in which transactions are recorded with an immutable cryptographic signature called a hash.

This means if one block in one chain was changed, it would be immediately apparent it had been tampered with. If hackers wanted to corrupt a blockchainsystem, they would have to change every block in the chain, across all of thedistributed versions of the chain. Blockchains such as Bitcoin and Ethereum are constantly and continually growing as blocks are being added to the chain, which significantly adds to the security of the ledger.

For a deeper understanding, the key blockchain features as follows:

- **Decentralized** – a blockchain-powered network excludes the risks of data being kept centrally by storing it across the network.
- **Distributed ledger** is a synchronized database and accessible across various locations and geographies by multiple participants. Each of the computers in the distributed network holds a copy of the ledger to guarantee transparency and prevent a single point of failure (SPOF).
- **Immutable record** – all blockchain networks follow a particular protocol for validating new blocks. Once registered, the data in any block can't be changed without altering all the following blocks, which requires the network's consent.

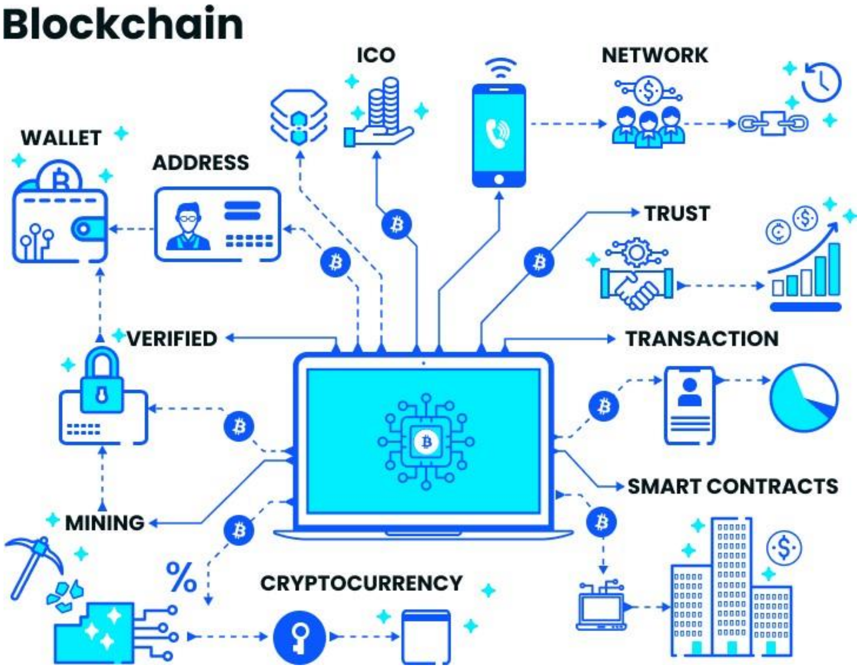


Figure 1.6 Blockchain Technology

- **REACTJS**

ReactJS basically is an open-source JavaScript library which is used for building user interfaces specifically for single page applications. It’s used for handlingview layer for web and mobile apps. React also allows us to create reusable UI components. React was first created by Jordan Walke, a software engineer working for Facebook. React first deployed on Facebook’s newsfeed in 2011 and on Instagram.com in 2012.

React allows developers to create large web applications which can change data, without reloading the page. The main purpose of React is to be fast, scalable, and simple. It works only on user interfaces in application. This corresponds to view in theMVC template. It can be used with a combination of other JavaScript libraries or frameworks, such as Angular JS in MVC.

Features

- **JSX:** JSX stands for JavaScript XML. It is an XML/ HTML like syntax used by React. It extends the ECMAScript so that XML/ HTML like text can co-exist along with JavaScript react code. This syntax is used by the pre-processors like *Babel* to transform HTML like text found in JavaScript files into standard JavaScript objects. With JSX, we can go a step further by again embedding the HTML code inside the JavaScript. This makes HTML codes easy to understand and boosts JavaScript's performance while making our application robust.

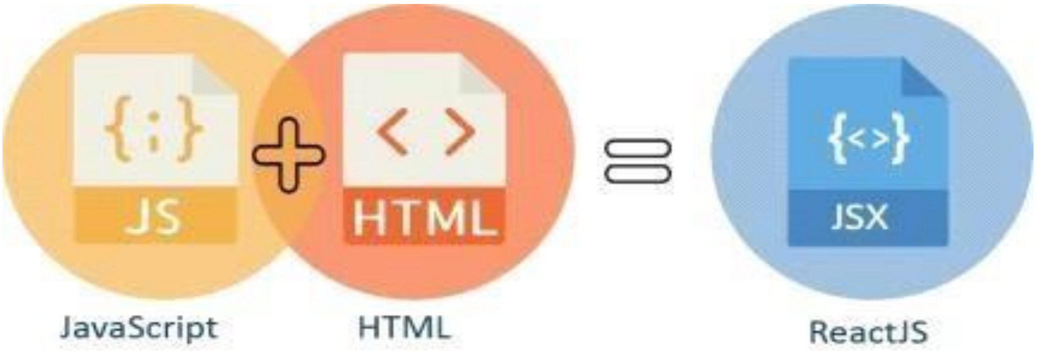


Figure 1.7 React architecture

- **OBJECTIVES OF THE PROJECT:**
  - To develop an effective technological solution to facilitate the citizens in the country to have awareness about their political candidates.
  - To develop a secure solution ensuring 100% voting rate in the country.
- **SCOPE OF THE PROJECT:**
  - It can effectively used by the Election commission of India.
  - It can be used by various other government agencies.

CHAPTER 2

LITERATURE SURVEY

- **INTRODUCTION:**

The following shows survey did for online voting. The most popularof the existing techniques is been discussed as follows.

- **LIST OF SURVEYS:**

- **A Framework to Make Voting System Transparent Using BlockchainTechnology**

A widespread mistrust towards the traditional voting system has made democratic voting in any country very critical. People have seen their fundamental rights being violated. Other digital voting systems have been challenged due to a lackof transparency. Most voting systems are not transparent enough; this makes it very difficult for the government to gain voters' trust. The reason behind the failure of the traditional and current digital voting system is that it can be easily exploited. The primary objective is to resolve problems of the traditional and digital voting system, which include any kind of mishap or injustice during the process of voting. Blockchaintechnology can be used in the voting system to have a fair election and reduce injustice. The physical voting systems have many flaws in it as well as the digital voting systems are not perfect enough to be implemented on large scale. This appraises the need for a solution to secure the democratic rights of the people. This article presents a platform based on modern technology blockchain that provides maximum transparency and reliability of the system to build a trustful relationship between voters and election authorities. The proposed platform provides a framework that can be implemented to conduct voting activity digitally through blockchain without involving any physical polling stations. Our proposed framework supports a scalable blockchain, by using flexible consensus algorithms. The Chain Security Algorithm applied in the voting system makes the voting transaction more secure. Smart contracts provide a secure connection between the user and the network while executing a transaction in the chain. The security of the blockchain based voting system has also been discussed. Additionally, encryption of transactions using cryptographic hash and prevention of attack 51% on the

blockchain has also been elaborated. Furthermore, the methodology for carrying out blockchain transactions during the process of voting has been elaborated using Blockchain Finally, the performance evaluation of the proposed system shows thatthe system can be implemented in a large-scale population.

Pros:

The system ensures anonymity of the voter and security of the ballot.

Cons:

The system does not provide a solution to improve voter awareness.

- **A Smart Contract System for Decentralized Borda Count Voting**

In this article, we propose the first self-tallying decentralized e-voting protocol for a ranked-choice voting system based on Borda count. Our protocol does not needany trusted setup or tallying authority to compute the tally. The voters interact through a publicly accessible bulletin board for executing the protocol in a way that is publicly verifiable. Our main protocol consists of two rounds. In the first round, the voters publish their public keys, and in the second round they publish their randomized ballots. All voters provide Non-interactive Zero-Knowledge (NIZK) proofs to show that they have been following the protocol specification honestly without revealing their secret votes. At the end of the election, anyone including a third-party observer will be able to compute the tally without needing any tallying authority. We provide security proofs to show that our protocol guarantees the maximum privacy foreach voter. We have implemented our protocol using Ethereum’s blockchain as a public bulletin board to record voting operations as publicly verifiable transactions. The experimental data obtained from our tests show the protocol’s potential for the real-world deployment.

Pros:

The system ensures E-voting.

Cons:

The system is not very secure.

- ### Distributed Voting/Ranking with Optimal Number of States per Node

Considering a network with n nodes, where each node initially votes for one (or more) choices out of K possible choices, we present a Distributed Multi-choice Voting/Ranking (DMVR) algorithm to determine either the choice with maximum vote (the voting problem) or to rank all the choices in terms of their acquired votes (the ranking problem). The algorithm consolidates node votes across the network by updating the states of interacting nodes using two key operations; the union and the intersection. The proposed algorithm is simple, independent from network size, and easily scalable in terms of the number of choices K, using only K×2 K−1 nodal statesfor voting, and K×K! nodal states for ranking. We prove the number of states to be optimal in the ranking case; this optimality is conjectured to also apply to the voting case. The time complexity of the algorithm is analyzed in complete graphs. We show that the time complexity for both ranking and voting is O(log(n)) for given votepercentages, and is inversely proportional to the minimum of the vote percentage differences among various choices.

Pros:

The system effectively identifies the voting percentages effectively.

Cons:

The system does not ensure improvement of the voter awareness.

- **E-voting system evaluation based on the Council of Europerecommendations: Helios Voting**

Despite the claimed benefits of e-voting initiatives, wider adoption of e-voting mechanisms and implementation processes is slower than expected. Several technical, social, and cultural challenges hinder generability and applicability of evoting. Amongst them, the evaluation and harmonization of e-voting systems, given different legal and statutory frameworks, is still an important challenge to overcome. Yet, only a few works have addressed this topic in the field. This article aims to

contribute to further understanding this unexplored topic by applying a practical evaluation framework to Helios Voting, one of the most widely used e-voting tools to date. Our framework, strongly based on the technical and security requirements issued by the Council of Europe in 2017, is a valuable source of information for election officials, researchers and voters to understand the strengths and weaknesses of Helios Voting and, as a result, to improve decision-making processes regarding the type and size of elections that can be securely handled by Helios Voting. The ultimate goal of our paper is to conceptually and practically support the gradual, secure and protocolized expansion of e-voting.

Pros:

The system provides effective evaluation of the current voting mechanisms.

Cons:

The system does not provide an effective technological solution to improve the E-voting.

- **Electronic Voting Using Blockchain And Smart Contracts: Proof OfConcept**

Blockchain technology has been presented as a support for trust needs between transactions in electronic information systems. Its successful use in cryptocurrencies has allowed it to explore its capabilities in commercial, industrial, and service systems, backed by the operational alternatives offered by Ethereum Smart Contracts and the cryptographic security of public and private key. These keysare used as a way to make online transactions anonymously, with the guarantee offered by the Blockchain network that they are executed safely. With the above in mind, this concept can be extended to the electoral processes, thus allowing its application in electronic voting systems, especially when the protocols currently used lack the trust factor between the different social actors. This document presents a proof of concept in which Blockchain and other technologies are applied, to allow interaction as an electronic voting system for the election of unique candidates. This has been achieved through the specification of an architecture designed especially

for electoral processes, from which it is implemented and a simulation is carried outin order to obtain data that generates value, when evaluating Blockchain technology as an alternative to current voting systems.

Pros:

The system presents a proof of concept in which Blockchain and other technologies are applied, to allow interaction as an electronic voting system for the election of unique candidates.

Cons:

The system does not ensure citizen awareness enhancement.

- **Secure Physical Layer Voting**

Distributed wireless networks often employ voting to perform critical network functions such as fault-tolerant data fusion, cooperative sensing, and reaching consensus. Voting is implemented by sending messages to a fusion center or via direct message exchange between participants. However, the delay overhead of message-based voting can be prohibitive when numerous participants have to share the wireless channel in sequence, making it impractical for time-critical applications.In this paper, we propose a fast PHY-layer voting scheme called PHYVOS, which significantly reduces the delay for collecting and tallying votes. In PHYVOS, wireless devices transmit their votes simultaneously by exploiting the subcarrier orthogonality of OFDM and without explicit messaging. Votes are realized by injecting energy to pre-assigned subcarriers. We show that PHYVOS is secure against adversaries that attempt to manipulate the voting outcome. Security is achieved without employing cryptography-based authentication and message integrity schemes. We analytically evaluate the voting robustness as a function of PHY-layer parameters. We extend PHYVOS to operate in ad hoc groups, without the assistance of a fusion center. We discuss practical implementation challenges related to multi-device frequency and time synchronization and present a prototype implementation of PHYVOS on the USRP platform. We complement the implementation with larger scale simulations.

Pros:

The system ensures E-voting effectively.

Cons:

The system does not provide a secure technological solution.

- **Face Segmentor-Enhanced Deep Feature Learning for Face Recognition**

A Face Segmentor-Enhanced Network (FSENet) for face recognition to exploit facial localized property. Most existing methods emphasize the holistic characteristicson entire face images, which have limit discriminative ability due to large intra-class variations and inter-class fine-grain. To address this, we present a face segmentor to parse the face into local components and explore their internal correlations, which strengthens the discriminability to discern identities. Specifically, we introduce asemantic parsing module to assign each pixel with a semantic part label. This modulegenerates a set of parsing maps, where each of them represents the pixel-wise occurrence probability of a certain facial component. We then segment facial regions masked by the parsing maps to achieve local features. We further build the structure correlation of facial part features to boost personalized attribute. We finally incorporate holistic and local information to improve the discriminative power of the face descriptor. Extensive experiments on popular public-domain datasets including labeled Face in the Wild (LFW), youtube Faces (YTF), IARPA IJB-A, IJB-B and IJB- C, and the MegaFace Challenge show that our method achieves promising performance.

Pros:

Cons:

This method achieves promising performance.

The method only focuses on the performance side and not on the attendance

module alone.

- **Deep Cascade Model based Face Recognition: When Deep-layeredLearning Meets Small Data**

Deep cascade model (DCM) based on SRC and NMR with hierarchical learning, nonlinear transformation and multi-layer structure for corrupted face recognition. The contributions include four aspects. First, an end-to-end deep cascade model for small-scale data without back-propagation is proposed. Second, a

multi-level pyramid structure is integrated for local feature representation. Third, for introducing nonlinear transformation in layer-wise learning, soft max vector coding of the errors with class discrimination is proposed. Fourth, the existing representation methods can be easily integrated into our DCM framework. Experiments on a number of small-scale benchmark FR datasets demonstrate the superiority of the proposed model over state-of-the-art counterparts. Additionally, a perspective that deep-layered learning does not have to be convolutional neural network with back- propagation optimization is consolidated.

Pros:

Experiments on a number of small-scale benchmark FR datasets demonstratethe superiority of the proposed model over state-of-the-art counterparts.

Cons:

The results are not reliable, since the face recognition output can easily be corrupted.

- **Cross-view Gait Recognition by Discriminative Feature Learning**

A robust, effective and gait-related loss function, called angle center loss (ACL), is proposed to learn discriminative gait features. The proposed loss function isrobust to different local parts and temporal window sizes. Different from center loss which learns a center for each identity, the proposed loss function learns multiple sub-centers for each angle of the same identity. Only the largest distance betweenthe anchor feature and the corresponding cross view sub-centers is penalized, which achieves better intra-subject compactness. We also propose to extract discriminative spatial temporal features by local feature extractors and a temporal attention model. A simplified spatial transformer network is proposed to localize the suitable horizontalparts of the human body. Local gait features for each horizontal part are extractedand then concatenated as the descriptor. We introduce long-short term memory (LSTM) units as the temporal attention model to learn the attention score for each frame, e.g., focusing more on discriminative frames and less on frames with bad quality. The temporal attention model shows better performance than the temporal average pooling or gait energy images (GEI). By combing the three aspects, we achieve the state-of-the-art results on several cross-view gait recognition benchmarks.

Pros:

The temporal attention model shows better performance than the temporalaverage pooling or gait energy images (GEI).

Cons:

The LSTM requires a lot of resources and time to get trained and become ready for real-world applications.

- **Matching Software-Generated Sketches to Face Photos with a Very DeepCNN, Morphed Faces, and Transfer Learning**

Sketches obtained from eyewitness descriptions of criminals have proven tobe useful in apprehending criminals, particularly when there is a lack of evidence. A very deep convolutional neural network is utilized to determine the identity of a subject in a composite sketch by comparing it to face photos, and is trained by applying transfer learning to a state of-the-art model pre-trained for face photo recognition. 3D morphable model is used to synthesis both photos and sketches to augment the available training data, an approach that is shown to significantly aid performance, and the UoM-SGFS database is extended to contain twice the number of subjects, now having 1200 sketches of 600 subjects. An extensive evaluation of popular and state-of-the-art algorithms is also performed due to the lack of such information in literature, where it is demonstrated that the proposed approach comprehensively outperforms state-of-the-art methods on all publicly available composite sketch datasets.

Pros:

It is demonstrated that the proposed approach comprehensively outperforms state-of-the-art methods on all publicly available composite sketch datasets.

Cons:

The 3D modal requires a lot of memory space for processing.

- **Wasserstein CNN: Learning Invariant Features for NIR-VIS Face Recognition**

Extensive experiments using three challenging NIR-VIS face recognition databases demonstrate the superiority of the WCNN method over state-of-the-art methods. The novel Wasserstein convolutional neural network (WCNN) approach for learning invariant features between near-infrared (NIR) and visual (VIS) face images (i.e., NIR-VIS face recognition). The low-level layers of the WCNN are trained with widely available face images in the VIS spectrum, and the high-level layer is divided into three parts: the NIR layer, the VIS layer and the NIR-VIS shared layer. The first two layers aim at learning modality-specific features, and the NIR-VIS shared layer is designed to learn a modality-invariant feature subspace. The Wasserstein distance is introduced into the NIR-VIS shared layer to measure the dissimilarity between heterogeneous feature distributions. W-CNN learning is performed to minimize the Wasserstein distance between the NIR distribution and the VIS distribution for invariant deep feature representations of heterogeneous face images. To avoid the over-fitting problem on small-scale heterogeneous face data, a correlation prior is introduced on the fully-connected WCNN layers to reduce the size of the parameter space. This prior is implemented by a low-rank constraint in an end-to-end network. The joint formulation leads to an alternating minimization for deep feature representation at the training stage and an efficient computation for heterogeneous data at the testing stage.

Pros:

Cons:

It is implemented by a low-rank constraint in an end-to-end network.

This model cannot be used for recognizing faces from infrared images.

- **Unconstrained Face Recognition Using A Set-to-Set Distance Measureon Deep Learned Features**

A novel Set-to-Set (S2S) distance measure to calculate the similarity between two sets with the aim to improve the accuracy of face recognition in real-world situations such as extreme poses or severe illumination conditions. Our S2S distance adopts the CNN-average pooling for the similarity scores computed on all the mediain two sets, making the identification far less susceptible to the poor representations (outliers) than traditional feature-average pooling and score-average pooling. Furthermore, we show that various metrics can be embedded into our S2S distance framework, including both predefined and learned ones. This allows to choose the appropriate metric depending on the recognition task in order to achieve the best results. To evaluate the proposed S2S distance, we conduct extensive experiments on the challenging set-based IJB-A face dataset, which demonstrate that our algorithm achieves the state of-the-art results a dis clearly superior to the base lines including several deep learning based face recognition algorithms.

Pros:

Algorithm achieves the state of-the-art results a clearly superior to the base lines including several deep learning-based face recognition algorithms.

Cons:

The algorithm is very slow in performance.

- **Simultaneous Feature and Dictionary Learning for Image Set Based FaceRecognition**

A SFDL method to learn discriminative features and dictionaries simultaneously from raw face pixels so that discriminative information from facial image sets can be jointly exploited by a one-stage learning procedure. To better exploit the nonlinearity of face samples from different image sets, we propose a deep SFDL (D-SFDL) method by jointly learning hierarchical non-linear transformationsand class-specific dictionaries to further improve the recognition performance. Extensive experimental results on five widely used face datasets clearly show thatour SFDL and D-SFDL achieve very competitive or even better performance with the state-of-the-arts.

Pros:

Extensive experimental results on five widely used face datasets clearly show that our SFDL and D-SFDL achieve very competitive or even better performance withthe state-of-the-arts.

Cons:

The SFDL (D-SFDL) method used is very expensive in terms of time.

- **Face Verification via Learned Representation on Feature-Rich VideoFrames**

Abundance and availability of video capture devices such as mobile phones and surveillance cameras has instigated research in video face recognition which is highly pertinent in law enforcement applications. While the current approaches have reported high accuracies at equal error rates, performance at lower false accept ratesrequires significant improvement. A novel face verification algorithm which startswith selecting feature-rich frames from a video sequence using discrete wavelet transform and entropy computation. Frame selection is followed by representation learning based feature extraction where three contributions are presented: (i) deep learning architecture which is a combination of stacked de-noising sparse auto

encoder(SDAE)and deep Boltzmann machine (DBM), (ii) formulation for joint representation in an auto encoder, and (iii) updating the loss function of DBM by including sparse and low rank regularization. Finally, a multilayer neural network is used as classifier to obtain the verification decision.

Pros:

Cons:

Begins the face recognition using a video sequence.

The performance at lower false accept rates requires significant improvement.

- **Discriminative Deep Metric Learning for Face and Kinship Verification**

A new discriminative deep metric learning (DDML) method for face and kinship verification in wild conditions. DDML method to train a deep neural network tolearn a set of hierarchical nonlinear transformations to project face pairs into thesame latent feature space, under which the distance of each positive pair is reduced and that of each negative pair is enlarged, respectively. To better use the commonality of multiple feature descriptors to make all the features more robust for face and kinship verification, we develop a discriminative deep multi-metric learning (DDMML) method to jointly learn multiple neural networks under which the correlationof different features of each sample is maximized, and the distance of each positive pair is reduced and that of each negative pair is enlarged, respectively.

Pros:

The algorithm jointly learns multiple neural networks under which the correlation of different features of each sample is maximized.

Cons:

The deep metric learning (DDML) method cannot handle more than 2 samplesat a time.

- **CONCLUSION:**

From the above reference papers, we can conclude that the following are the major disadvantages:

- The existing system does not provide a solution to improve voter awareness.
- It does not ensure citizen awareness enhancement.
- The system does not provide an effective technological solution to improve the E-voting.
- The results are not reliable, since the face recognition output can easily be corrupted.

- **EXISTING SYSTEM**

CHAPTER 3 PROPOSED SYSTEM

Artificial intelligence (AI) has demonstrated huge potential in a variety of real-world applications. However, some significant considerations like fairness, transparency and trustworthiness are still challenging when applying AI to trust- oriented applications such as E-voting. E-voting plays a significant role in democratic societies, which requires voters and initiators have strong mutual trust. In this paper, we aim to facilitate the consolidation of AI ecosystems by developing a blockchain- based traceable self-tallying e-voting system. We take advantage of an event- oriented linkable group signature and a homomorphic time-lock puzzle to balance theanonymity and accountability, and the voting scale and efficiency of an e-voting system. The proposed e-voting protocol supports additional functions like multi- choice and self-tallying. We prove that the proposed protocol satisfies anonymity, time-bounded privacy, linkability and full-traceability. We also evaluate the time costof off-chain operations and the gas cost of on-chain operations, which show the proposed e-voting protocol is practical and can be adopted in real-world applications.

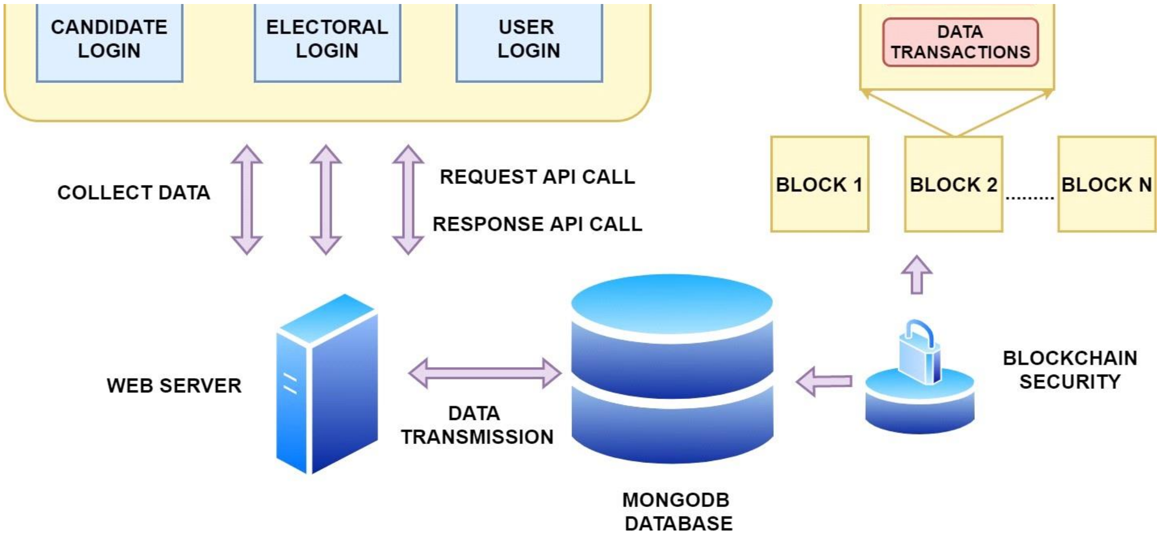
- **DISADVANTAGES OF EXISTING SYSTEM**
  - There is a threat of misinformation while randomly researching on internet about the political parties or about the election.
  - The system does not focus on improving awareness of the voter of candidates contesting in their locality.

- **PROPOSED SYSTEM**

Electronic Voting is the standard means of conducting elections using Electronic Voting Machines, sometimes called "EVMs" in India. The use of EVMs andelectronic voting was developed and tested by the state-owned Electronics Corporation of India and Bharat Electronics in the 1990s. They were introduced in Indian elections between 1998 and 2001, in a phased manner. The electronic voting machines have been used in all general and state assembly elections of India since 2014. In India, the voting system generally uses the manual approach where voters queue up in a physical space to cast their votes for their choices. Manual voting

system without any doubt does not lead to 100% voting rate. This project primarily focuses to provide the people an authentic scientific community with parties' policy positions, with respect to their constituencies. A web application is developed using reactJS that aims to analyse the role of the existing political parties/independents who are contesting in the forthcoming state election. The project also helps the common man to take a survey with the questionnaire to express his/her willingness and views on the current/forthcoming state election. This web application also helps the state government in achieving 100% voting rate in the state elections by providing an e-voting system enabling Face Detection authentication.

- **ADVANTANGES OF PROPOSED SYSTEM**
  - Enhances citizen awareness of the candidates in their locality.
  - Ensures 100% voting rate in the country.
  - Provides a secure technological solution for citizens to cast their votes.
  - Secures the data stored in the database using blockchain.
  - Immediate results.

- 

SYSTEM ARCHITECTURE

Figure 3.1 Proposed System Architecture

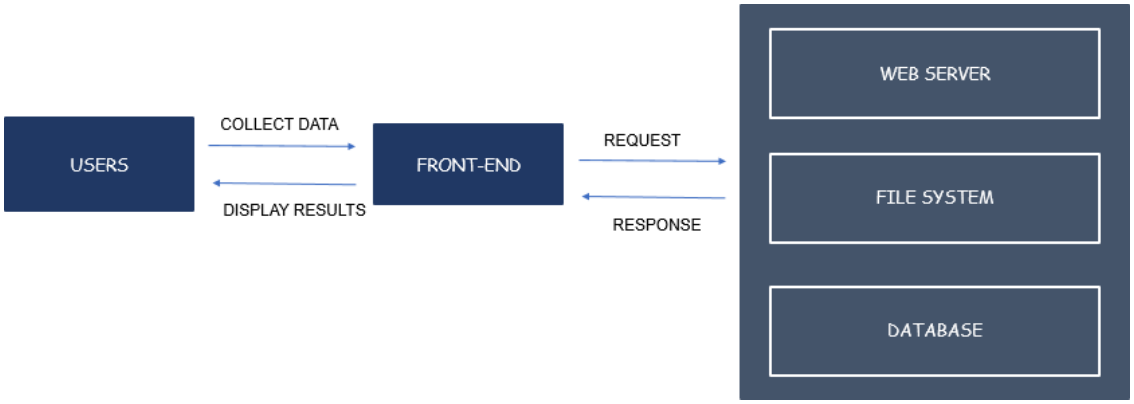


Figure 3.2 Web Architecture

- **WORKING**

In this project, we primarily focuses to provide the people an authentic scientific community with parties' policy positions, with respect to their constituencies.A web application is developed using reactJS that aims to analyse the role of the existing political parties/independents who are contesting in the forthcoming state election. Face detection and recognition algorithms are used to effectively identify authentic users when voting during Election Day using the application. For face detection, Haar cascade is used and for face recognition SVM algorithm is used. Then, we developed the API (Application Programming Interface) using the javascript framework nodeJS to effectively integrate the web application with the database. NodeJS is used for API development and mongoDB is used for database setup. Blockchain integration at the backend for data security which will secure the data withutmost security eliminating data hacking. The project also helps the common man to take a survey with the questionnaire to express his/her willingness and views on the current/forthcoming state election. This web application also helps the state government in achieving 100% voting rate in the state elections by providing an e- voting system enabling Face Detection authentication.

CHAPTER 4
SYSTEM ANALYSIS

- **MODULE DESCRIPTION:**
  - Face Detection
  - Face Recognition
  - Node API Generation
  - Mongodb Generation
  - Web Application Development
  - Blockchain Integration

- **Face Detection**

For Face Detection module, here we are using Haar cascade algorithm.

It is an Object Detection Algorithm used to identify faces in an image or a real time video. The algorithm uses edge or line detection features proposed by Viola and Jones in their research paper "Rapid Object Detection using a Boosted Cascade of Simple Features" published in 2001. The algorithm is given a lot of positive images consisting of faces, and a lot of negative images not consisting of any face to train on them. The repository has the models stored in XML files, and can be read with the OpenCV methods. These include models for face detection, eye detection, upper body and lower body detection, license plate detection etc.

The first contribution to the research was the introduction of the haar features. These features on the image makes it easy to find out the edges or the lines in the image, or to pick areas where there is a sudden change in the intensities of thepixels.

The darker areas in the haar feature are pixels with values 1, and the lighter areas are pixels with values 0. Each of these is responsible for finding out one particular feature in the image. Such as an edge, a line or any structure in the image where there is a sudden change of intensities. For ex. in the image above, the haar feature can detect a vertical edge with darker pixels at its right and lighter pixels at itsleft.

The objective is to find out the sum of all the image pixels lying in the darker area of the haar feature and the sum of all the image pixels lying in the lighter area ofthe haar feature. And then find out their difference. Now if the image has an edge separating dark pixels on the right and light pixels on the left, then the haar value will be closer to 1. This is just one representation of a particular haar feature separating avertical edge. Now there are other haar features as well, which will detect edges in other directions and any other image structures. To detect an edge anywhere in the image, the haar feature needs to traverse the whole image.

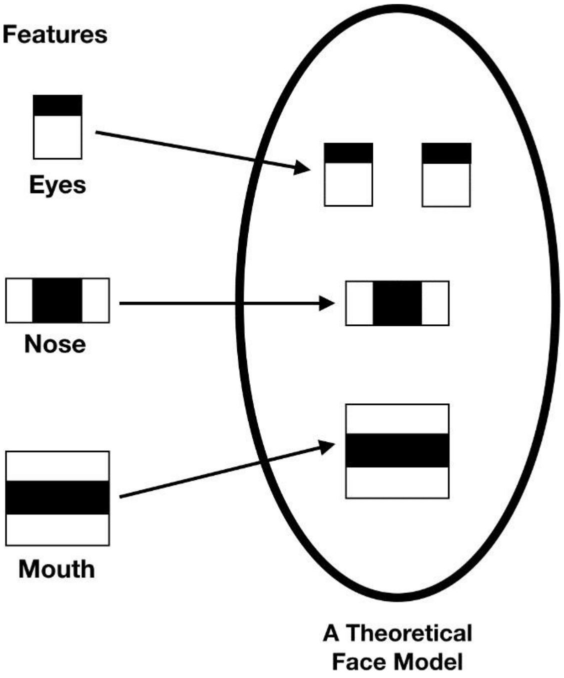


Figure 4.1 Haar cascade

- **Face Recognition**

For Face Recognition module, here we are using SVM algorithm.

“Support Vector Machine” (SVM) is a supervised machine learning algorithm that can be used for both classification and regression challenges. However, it is mostly used in classification problems. In the SVM algorithm, we plot each data item as a point in n-dimensional space (where n is a number of features we have) with thevalue of each feature being the value of a particular coordinate. Then, we perform classification by finding the hyper-plane that differentiates the two classes very well. SVM's are used in applications like handwriting recognition, intrusion detection, face detection, email classification, gene classification, and in web pages.

The goal of the SVM algorithm is to create the best line or decision boundary that can segregate n-dimensional space into classes so that we can easily put the new data point in the correct category in the future. This best decision boundary is called a hyperplane. SVM chooses the extreme points/vectors that help in creating the hyperplane. These extreme cases are called as support vectors, and hence algorithm is termed as Support Vector Machine.

SVM can be of two types:

- **Linear SVM:** Linear SVM is used for linearly separable data, which means if a dataset can be classified into two classes by using a single straight line, then such data is termed as linearly separable data, and classifier is used called as Linear SVM classifier.
- **Non-linear SVM:** Non-Linear SVM is used for non-linearly separated data, which means if a dataset cannot be classified by using a straight line, then such data is termed as non-linear data and classifier used is called as Non- linear SVM classifier.

SVMs are helpful in text and hypertext categorization, as their application can significantly reduce the need for labeled training instances in both the standard inductive and transductive settings. Some methods for shallow semantic parsing are based on support vector machines. The SVM algorithm has been widely applied inthe biological and other sciences. Permutation tests based on SVM weights have been suggested as a mechanism for interpretation of SVM models. Support-vector machine weights have also been used to interpret SVM models in the past.

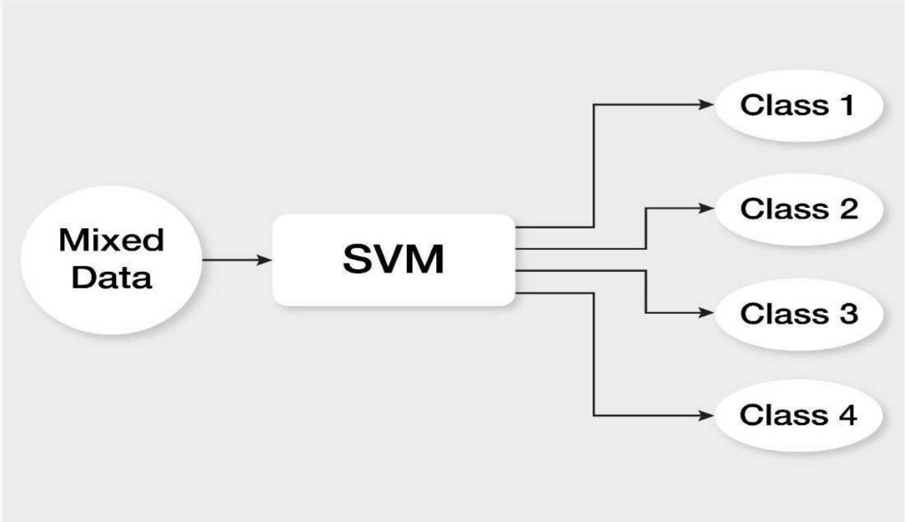


Figure 4.2 SVM algorithm

- **Node API Generation**

In this project we develop the API (Application Programming Interface) using the javascript framework nodeJS.

Node.js is an open-source, cross-platform, back-end JavaScript runtime environment that runs on the V8 engine and executes JavaScript code outside a web browser. Node.js lets developers use JavaScript to write command line tools and for server-side scripting running scripts server-side to produce dynamic web page content before the page is sent to the user's web browser. Consequently, Node.js represents a "JavaScript everywhere" paradigm, unifying web-application development around a single programming language, rather than different languagesfor server-side and client-side scripts.

Though .js is the standard filename extension for JavaScript code, the name "Node.js" does not refer to a particular file in this context and is merely the name of the product. Node.js has an event-driven architecture capable of asynchronous I/O. These design choices aim to optimize throughput and scalability in web applications with many input/output operations, as well as for real-time Web applications (e.g., real-time communication programs and browser games).

The Node.js distributed development project was previously governed by the Node.js Foundation, and has now merged with the JS Foundation to form the OpenJS

Foundation, which is facilitated by the Linux Foundation's Collaborative Projects program. Corporate users of Node.js software include GoDaddy, Groupon, IBM, LinkedIn, Microsoft, Netflix, PayPal, Rakuten, SAP, Walmart, Yahoo!, and Amazon Web Services.

Node JS is an open-source JavaScript tool built on Google Chrome’s JavaScript Engine. It’s used to build scalable network applications using an event- driven, non-blocking I/O model, which makes it fast and light on resources. It allows developers to use a single language (JavaScript) on both the server-side and the Client-Side. Node.js also provides a rich library of various JavaScript modules which simplifies the development of web applications using Node.js to a great extent.

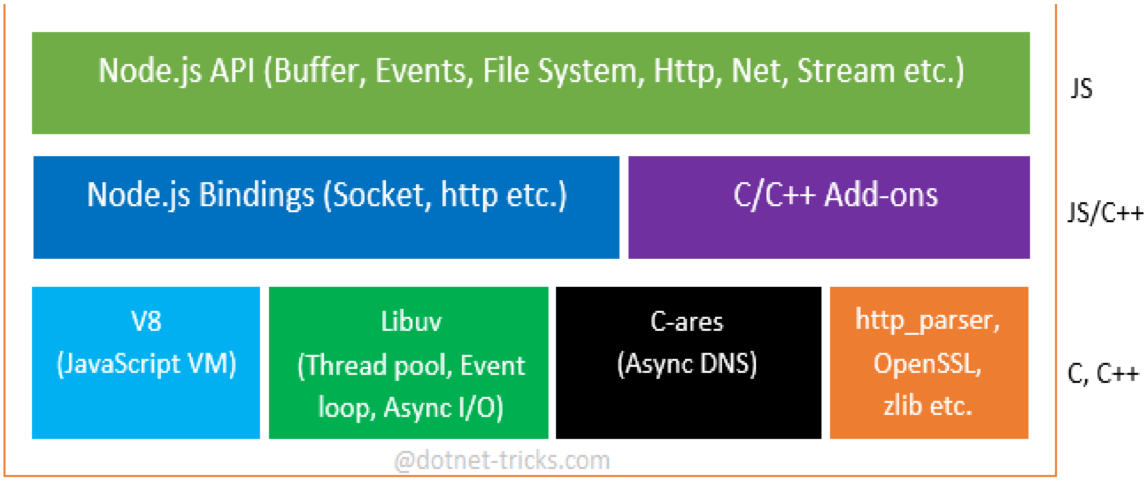


Figure 4.3 Node API integration

- **Mongodb Generation**

MongoDB is a source-available cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with optional schemas. MongoDB is developed by MongoDB Inc. and licensed under the Server Side Public License (SSPL).

Database is a physical container for collections. Each database gets its own set of files on the file system. A single MongoDB server typically has multiple databases. Collection is a group of MongoDB documents. It is the equivalent of an RDBMS table.

A document is a set of key-value pairs. Documents have dynamic schema. Dynamic schema means that documents in the same collection do not needto have the same set of fields or structure, and common fields in a collection's documents may hold different types of data.

MongoDB supports field, range query, and regular-expression searches. Queries can return specific fields of documents and also include user-defined JavaScript functions. Queries can also be configured to return a random sample of results of a given size. Fields in a MongoDB document can be indexed with primary and secondary indices or index.

MongoDB provides high availability with replica sets. A replica set consists of two or more copies of the data. Each replica-set member may act in the role of primary or secondary replica at any time. All writes and reads are done on the primary replica by default. Secondary replicas maintain a copy of the data of the primary using built-in replication. When a primary replica fails, the replica set automatically conducts an election process to determine which secondary should become the primary. Secondaries can optionally serve read operations, but that data is only eventually consistent by default.

MongoDB scales horizontally using sharding. The user chooses a shard key, which determines how the data in a collection will be distributed. The data is split into ranges (based on the shard key) and distributed across multiple shards. (A shard is a master with one or more replicas.) Alternatively, the shard key can be hashed to mapto a shard – enabling an even data distribution. MongoDB can run over multiple servers, balancing the load or duplicating data to keep the system up and running in case of hardware failure.

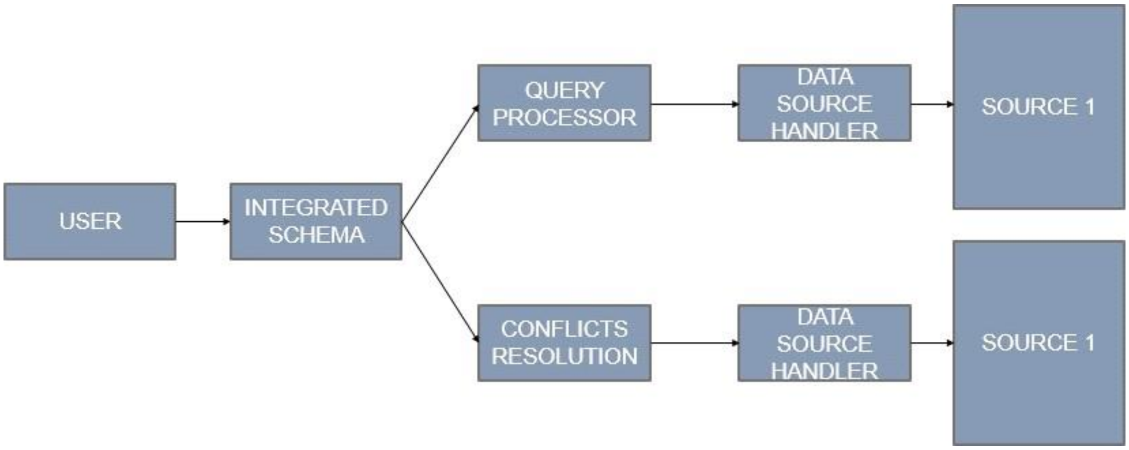


Figure 4.4 MongoDB integration

- **Web Application Development**

Web application development is the creation of application programs that reside on remote servers and are delivered to the user’s device over the Internet. A web application (web app) does not need to be downloaded and is instead accessed through a network. An end user can access a web application through a web browsersuch as Google Chrome, Safari, or Mozilla Firefox. A majority of web applicationscan be written in JavaScript, Cascading Style Sheets (CSS), and HTML5.

Web application development will typically have a short development life-cycle lead by a small development team. Front-end development for web applications is accomplished through client-side programming. Client refers to a computer

application such as a web browser. Client-side programming will typically utilize HTML, CSS and JavaScript. HTML programming will instruct a browser how todisplay the on-screen content of web pages, while CSS keeps displayed information in the correct format. JavaScript will run JavaScript code on a web page, making some of the content interactive.

Server-side programming powers the client-side programming and is used to create the scripts that web applications use. Scripts can be written in multiple scripting languages such as Ruby, Java and Python. Server-side scripting will create a custom interface for the end-user and will hide the source code that makes up the interface. A database such as MySQL or MongoDB can be used to store data in web application development.

React is a JavaScript library for building user interfaces. React is used to build single-page applications. React allows us to create reusable UI components. Lots of people use React as the V in MVC. React abstracts away the DOM from us, offeringa simpler programming model and better performance. React can also render on the server using Node, and it can power native apps using React Native. React implements one-way reactive data flow, which reduces the boilerplate and is easierto reason about than traditional data binding.

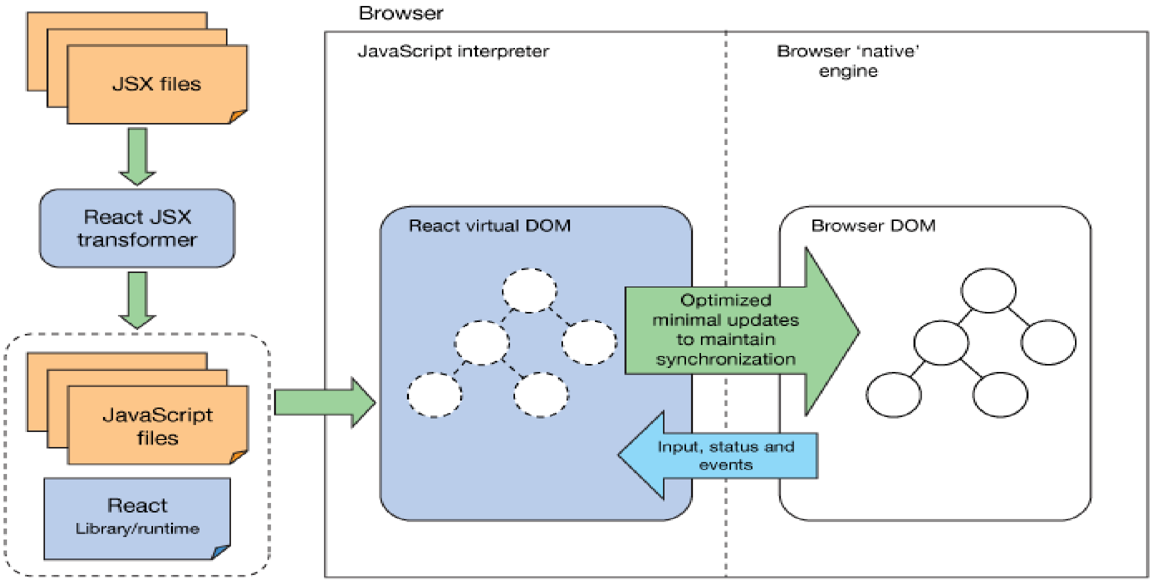


Figure 4.5 Web application development

- **Blockchain Integration**

Blockchain is integrated at the backend for data security which willsecure the data with utmost security eliminating data hacking.

Blockchain for Integration is a powerful technology which creates an immutable record of transactions that can be used to optimize business processes, enhance security, and maintain trust between stakeholders. It reduces costs by removing middlemen and ensuring that transactions are quickly and accurately fulfilled.

A blockchain is essentially a digital ledger of transactions that is duplicated and distributed across the entire network of computer systems on the blockchain. Each block in the chain contains a number of transactions, andevery time a new transaction occurs on the blockchain, a record of that transaction is added to every participant’s ledger. The decentralised database managed by multiple participants is known as Distributed Ledger Technology (DLT). Blockchain is a type of DLT in which transactions are recorded with an immutable cryptographic signature called a hash.

This means if one block in one chain was changed, it would be immediately apparent it had been tampered with. If hackers wanted to corrupta blockchain system, they would have to change every block in the chain, across all of the distributed versions of the chain. Blockchains such as Bitcoin and Ethereum are constantly and continually growing as blocks are being added to the chain, which significantly adds to the security of the ledger.

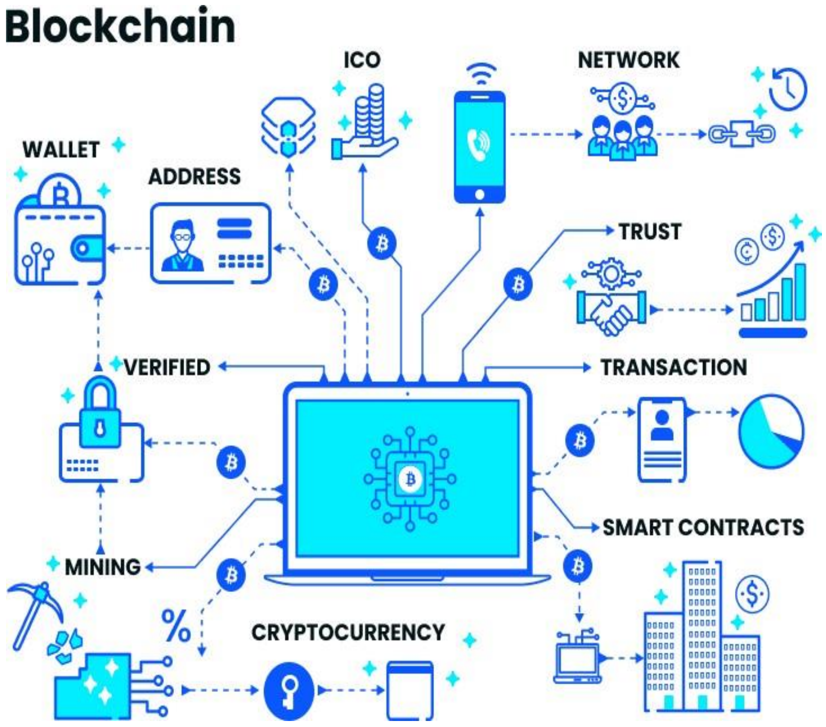


Figure 4.6 Blockchain integration

CHAPTER 5

SOFTWARE DESCRIPTION

The purpose of the Software Requirement Specification is to produce the specification of the analysis task and also to establish complete information about the requirement, behavior and also the other constraint like functional performance andso on. The main aim of the Software Requirement Specification is to completely specify the technical requirements for the software product in a concise and in unambiguous manner.

- **VISUAL STUDIO**

In this project the Microsoft visual studio is used as an IDE.

Visual Studio Code combines the simplicity of a source code editor withpowerful developer tooling, like IntelliSense code completion and debugging.

First and foremost, it is an editor that gets out of our way. The delightfully frictionless edit-build-debug cycle means less time fiddling with our environment, and more time executing on our ideas.

Visual Studio Code supports macOS, Linux, and Windows - so we can hit the ground running, no matter the platform.

At its heart, Visual Studio Code features a lightning fast source code editor, perfect for day-to-day use. With support for hundreds of languages, VS Code helpsus be instantly productive with syntax highlighting, bracket-matching, auto- indentation, box-selection, snippets, and more. Intuitive keyboard shortcuts, easy customization and community-contributed keyboard shortcut mappings let us navigate our code with ease.

For serious coding, we'll often benefit from tools with more code understanding than just blocks of text. Visual Studio Code includes built-in support for IntelliSense code completion, rich semantic code understanding and navigation, and code refactoring.

And when the coding gets tough, the tough get debugging. Debugging is often the one feature that developers miss most in a leaner coding experience, so we made it happen. Visual Studio Code includes an interactive debugger, so we canstep through source code, inspect variables, view call stacks, and execute

commands in the console.

VS Code also integrates with build and scripting tools to perform common tasks making everyday workflows faster. VS Code has support for Git so we canwork with source control without leaving the editor including viewing pending changes diffs.

Customize every feature to our liking and install any number of third-party extensions. While most scenarios work "out of the box" with no configuration, VS Code also grows with us, and we encourage us to optimize our experience to suit ourunique needs.

VS Code includes enriched built-in support for Node.js development with JavaScript and TypeScript, powered by the same underlying technologies that drive

Visual Studio. VS Code also includes great tooling for web technologies such as JSX/React, HTML, CSS, SCSS, Less, and JSON.

Architecturally, Visual Studio Code combines the best of web, native, and language-specific technologies. Using Electron, VS Code combines web technologies such as JavaScript and Node.js with the speed and flexibility of native apps. VS Code uses a newer, faster version of the same industrial-strength HTML- based editor that has powered the “Monaco” cloud editor, Internet Explorer's F12 Tools, and other projects. Additionally, VS Code uses a tools service architecture thatenables it to integrate with many of the same technologies that power Visual Studio, including Roslyn for .NET, TypeScript, the Visual Studio debugging engine, and more.

Visual Studio Code includes a public extensibility model that lets developers build and use extensions, and richly customize their edit-build-debug experience.

- **PYTHON**

In this project python is used as a programming language for development.

In technical terms, Python is an object-oriented, high-level programming language with integrated dynamic semantics primarily for web and app development. It is extremely attractive in the field of Rapid Application Development because it offers dynamic typing and dynamic binding options.

Python is relatively simple, so it's easy to learn since it requires a unique syntax that focuses on readability. Developers can read and translate Python code much easier than other languages. In turn, this reduces the cost of program maintenance and development because it allows teams to work collaboratively without significant language and experience barriers.

Additionally, Python supports the use of modules and packages, which means that programs can be designed in a modular style and code can be reused across a variety of projects. Once a module or package is developed by an user, it can be scaled for use in other projects, and it's easy to import or export these modules.

One of the most promising benefits of Python is that both the standard library and the interpreter are available free of charge, in both binary and source form. There is no exclusivity either, as Python and all the necessary tools are available on all major platforms. Therefore, it is an enticing option for developers who don't want to worry about paying high development costs.

CHAPTER 6

RESULTS AND DISCUSSIONS

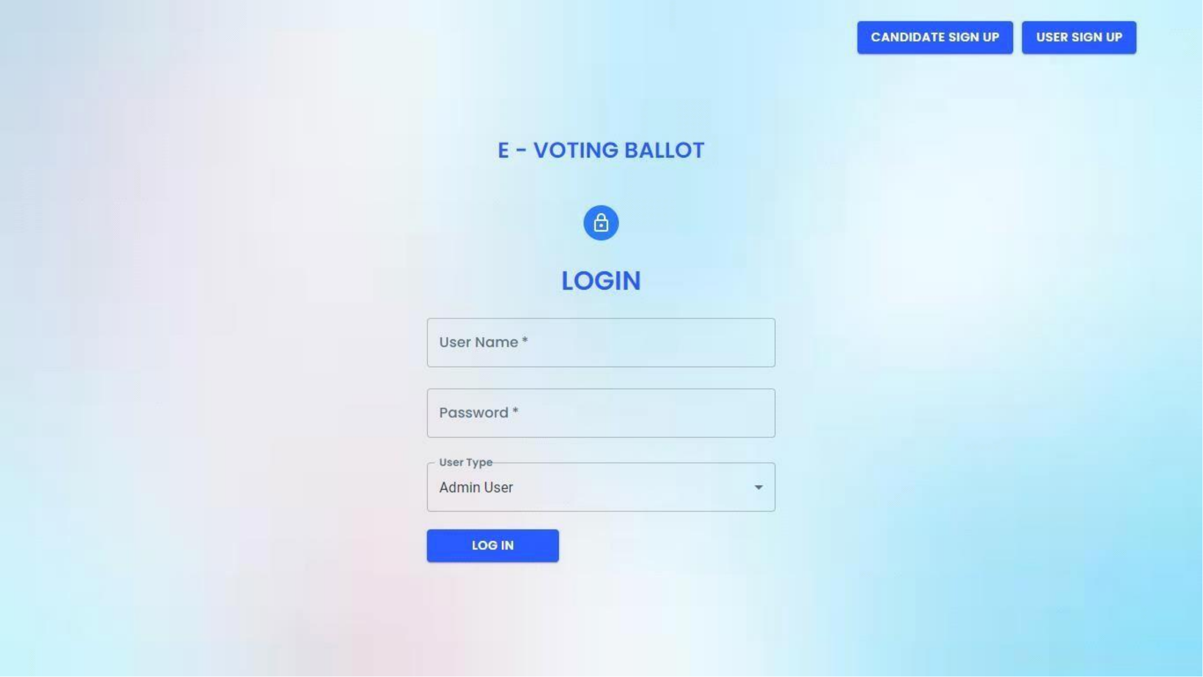
- **INTRODUCTION**

This chapter discusses about the practical results obtained while implementingthe project.

- **RESULTS OBTAINED**

To begin with, testing of the trained model, we can split our project into modules of implementation that is done.

A web application using a javascript framework reactJS is developed for boththe candidate and also the general public to register themselves.

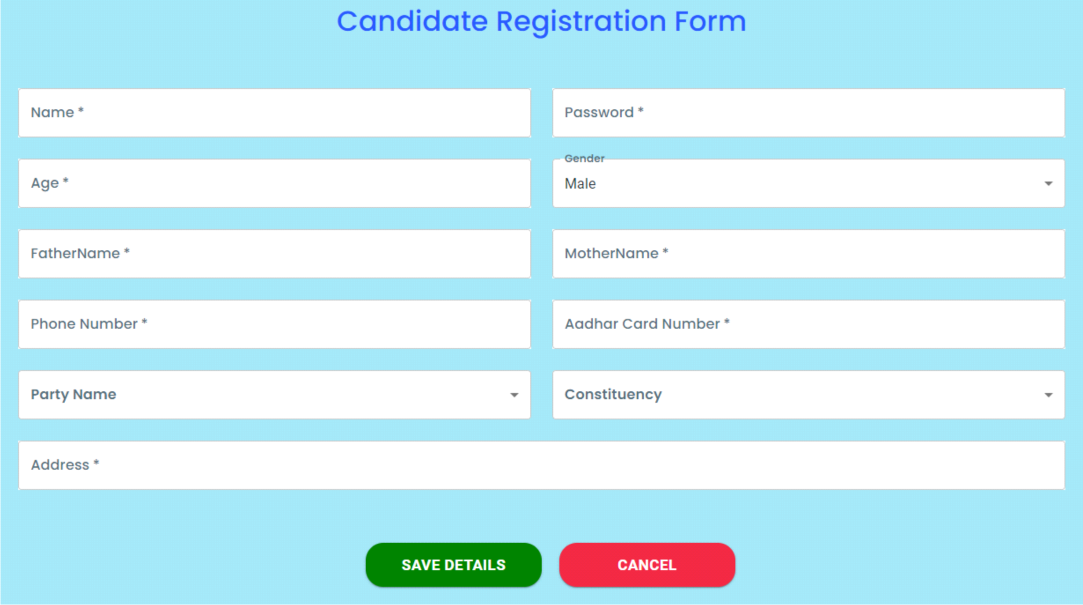


User Type
Admin User

The login page can be shown in the below figure.

Figure 6.1 Login page

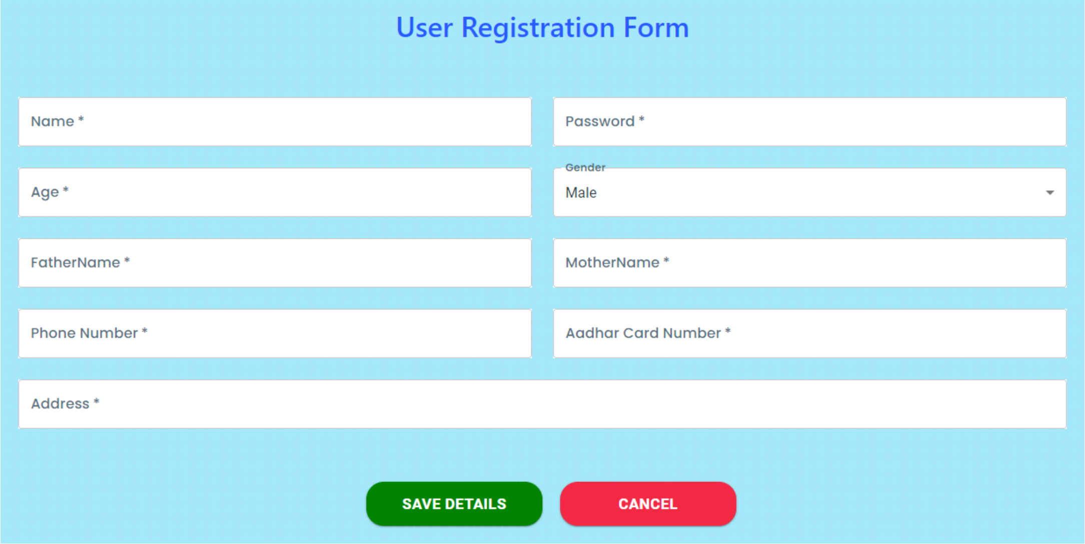
The candidate registration form can be shown in the below figure.



Gender
Male

Figure 6.2 Candidate registration form

The user registration form can be shown in the below figure.



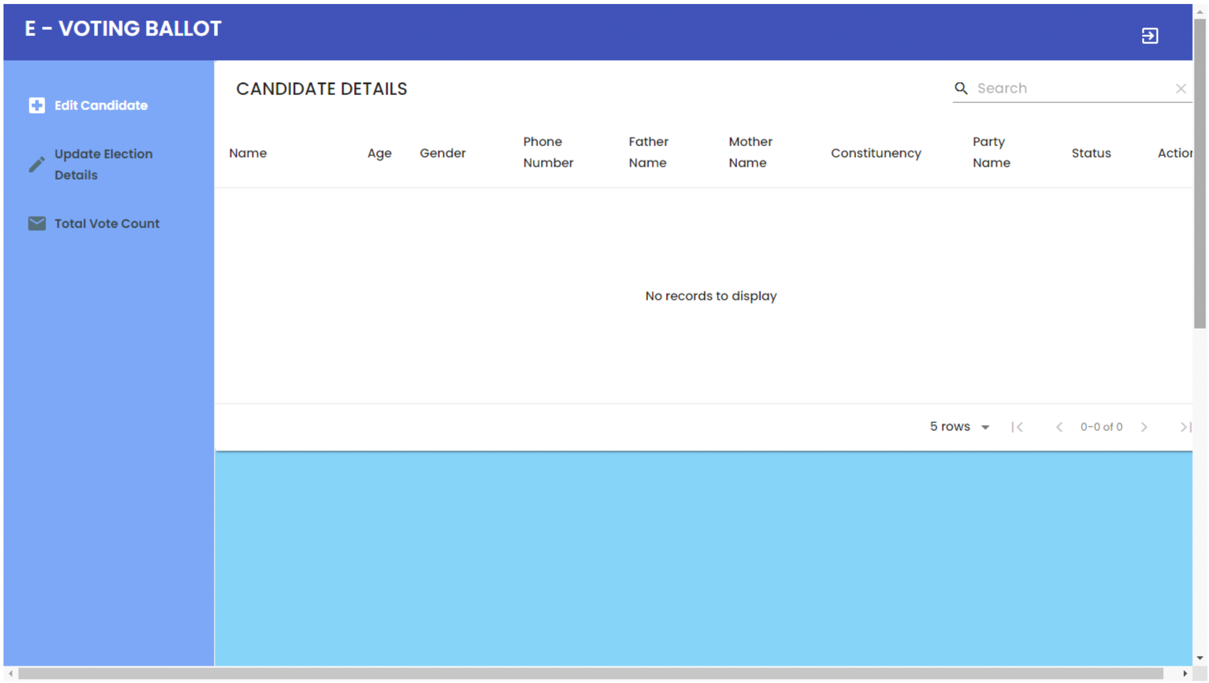
User Registration Form

Gender: Male

Figure 6.3 User registration

formThe admin home screen can be shown in the below

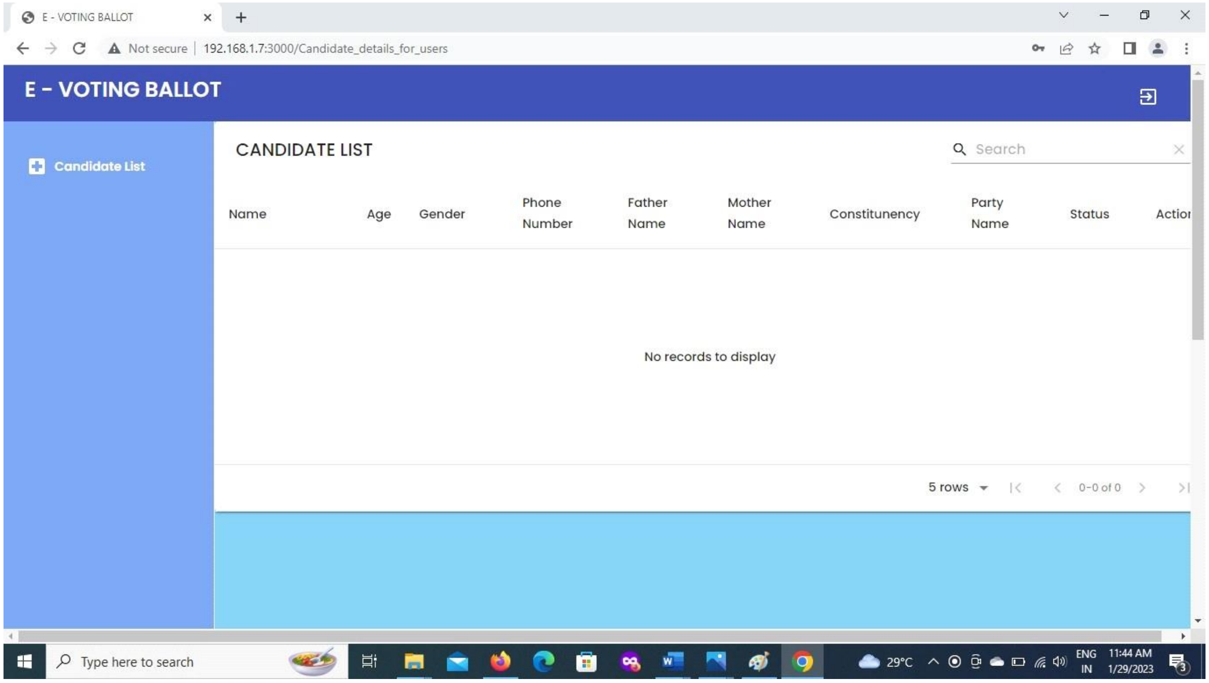
figure.



Name	Age	Gender	Phone Number	Father Name	Mother Name	Constituency	Party Name	Status	Actior

No records to display

Figure 6.4 Admin home screen



Name	Age	Gender	Phone Number	Father Name	Mother Name	Constituency	Party Name	Status	Actior

No records to display

The user home screen with candidate list can be shown in the below figure.

Figure 6.5 User home screen with candidate

listThe candidate home screen can be shown in the below figure.

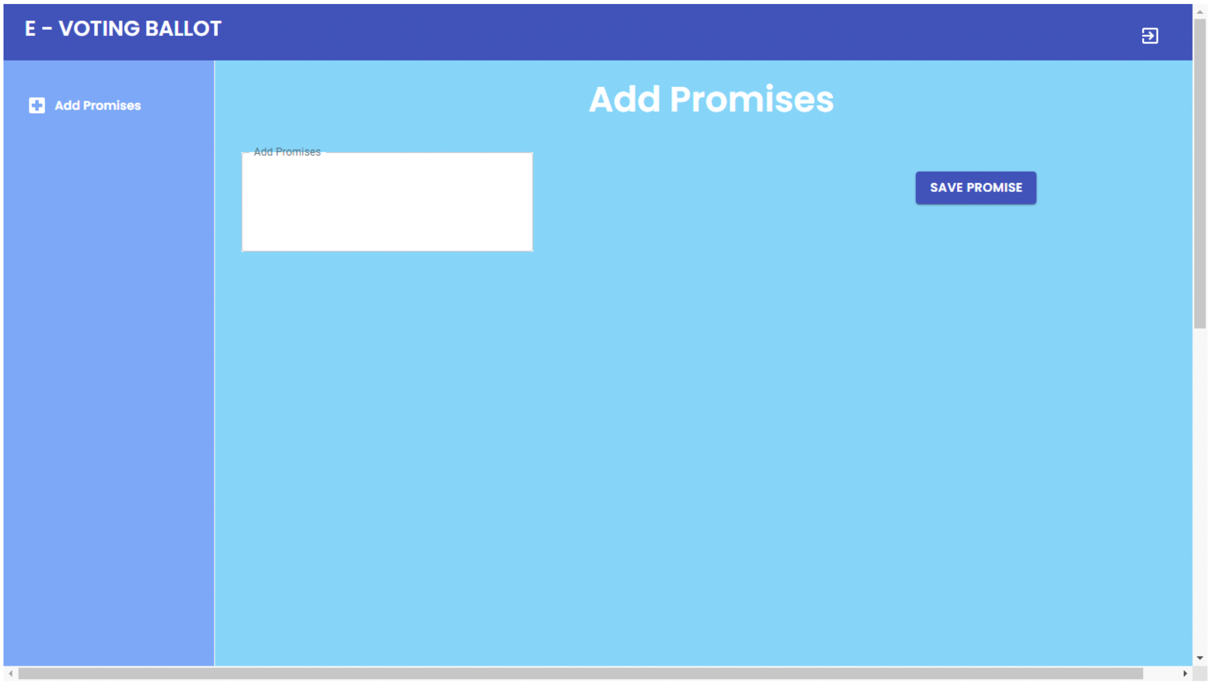
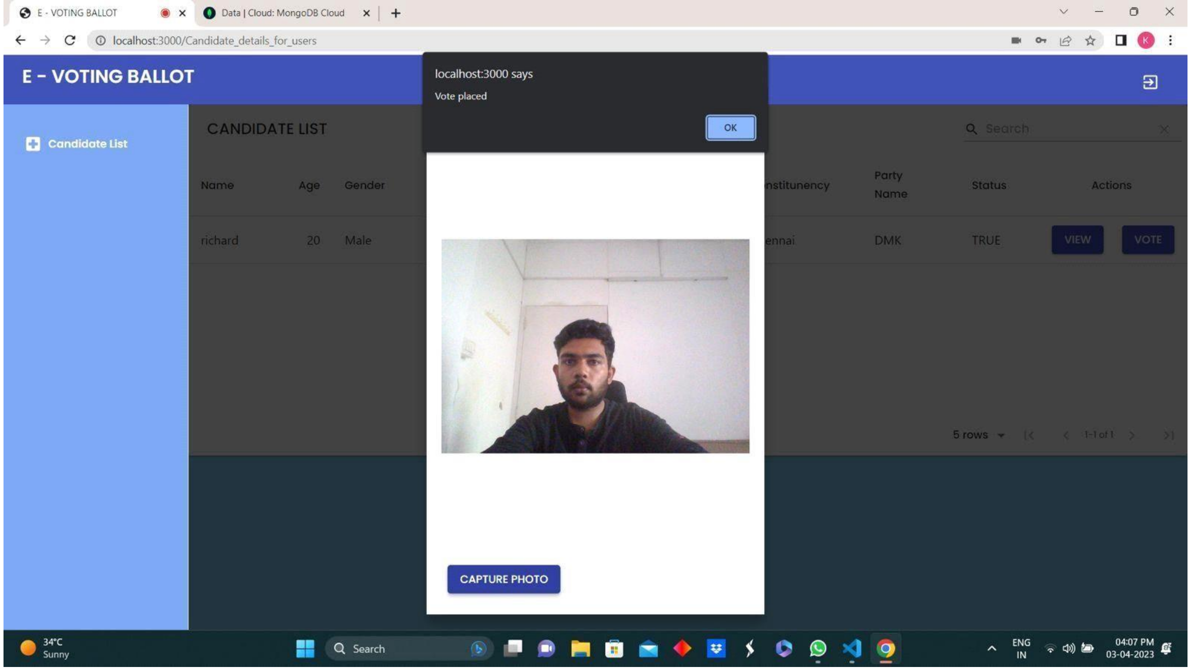


Figure 6.6 Candidate home screen

Then, it will check whether the vote has been registered, if registered the vote has been placed and the below figure can be seen as follows:



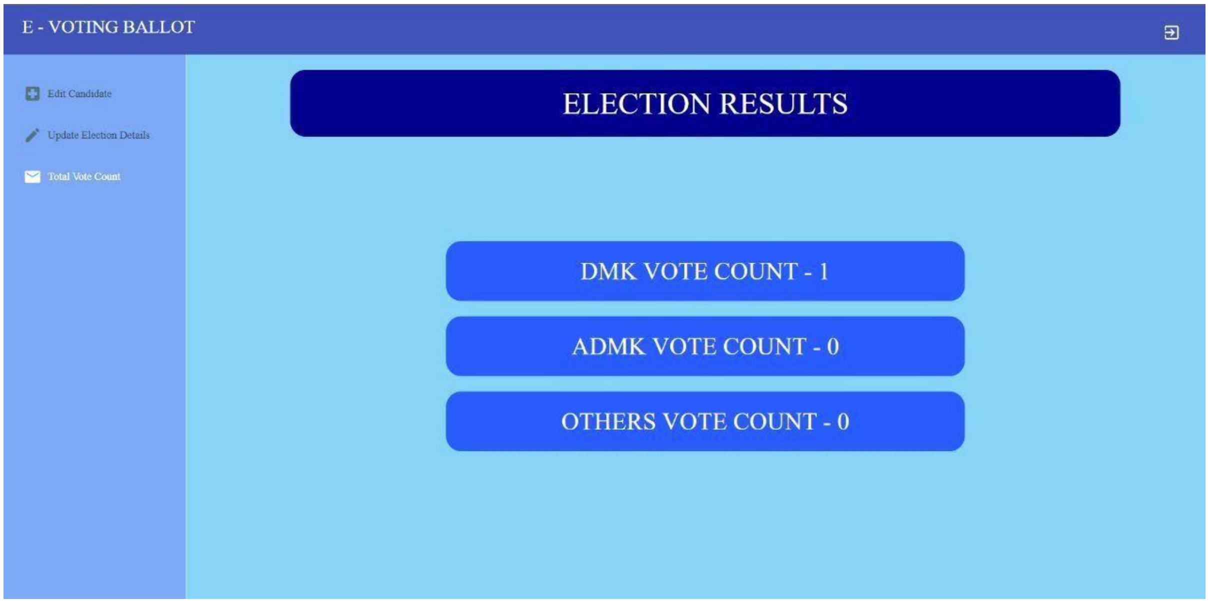
localhost:3000 says

Vote placed

Name	Age	Gender	nstituency	Party Name	Status	Actions
richard	20	Male	ennai	DMK	TRUE	VIEW VOTE

Figure 6.7 Vote placed

The end results of the election can be viewed as seen in the image below:



ELECTION RESULTS

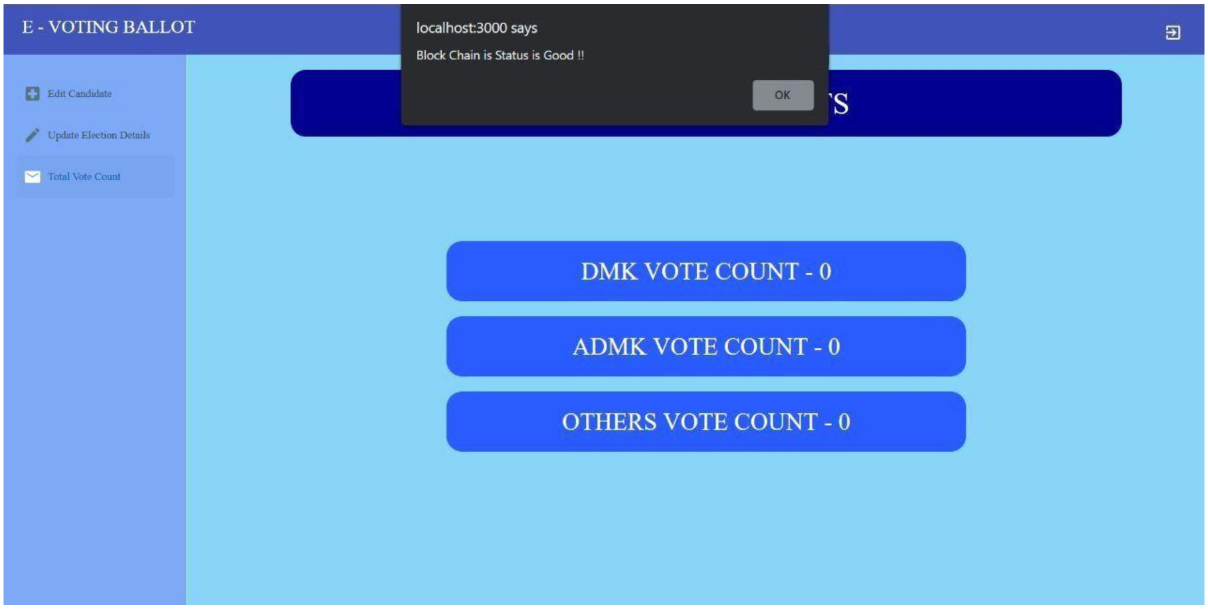
DMK VOTE COUNT - 1

ADMK VOTE COUNT - 0

OTHERS VOTE COUNT - 0

Figure 6.8 Election results

If the backend data is secure, the block chain status will be good and the below figure can be seen as follows:



localhost:3000 says

Block Chain is Status is Good !!

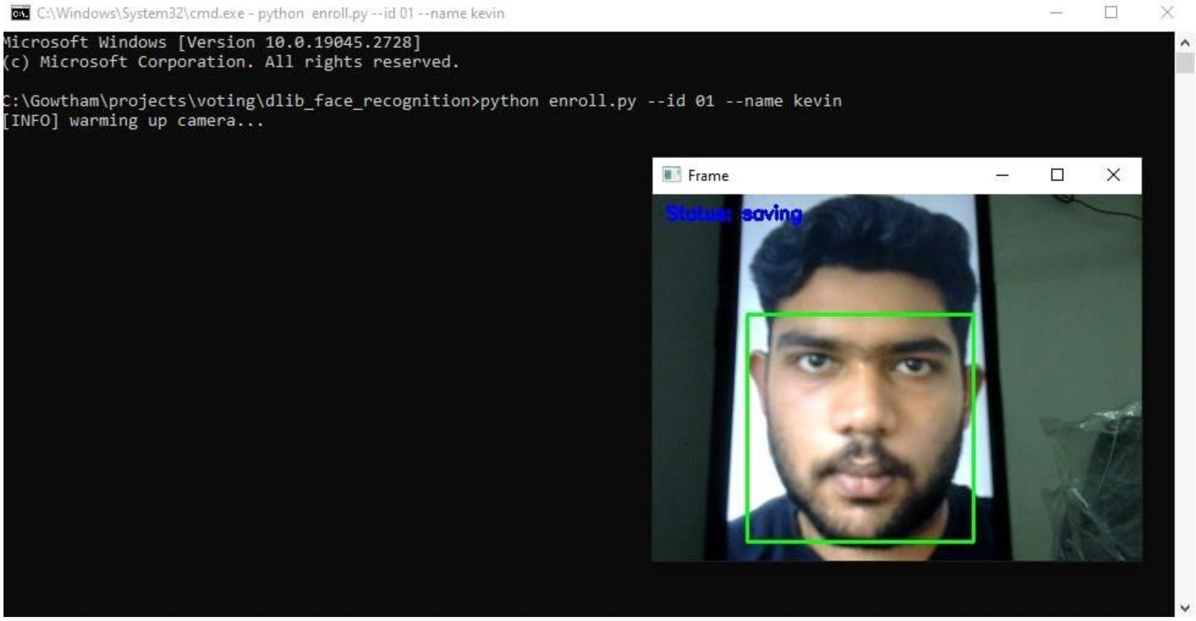
DMK VOTE COUNT - 0

ADMK VOTE COUNT - 0

OTHERS VOTE COUNT - 0

Figure 6.9 Block chain status is good

Enrolling the face images in dataset with unique id and it can be shown in the belowfigure.

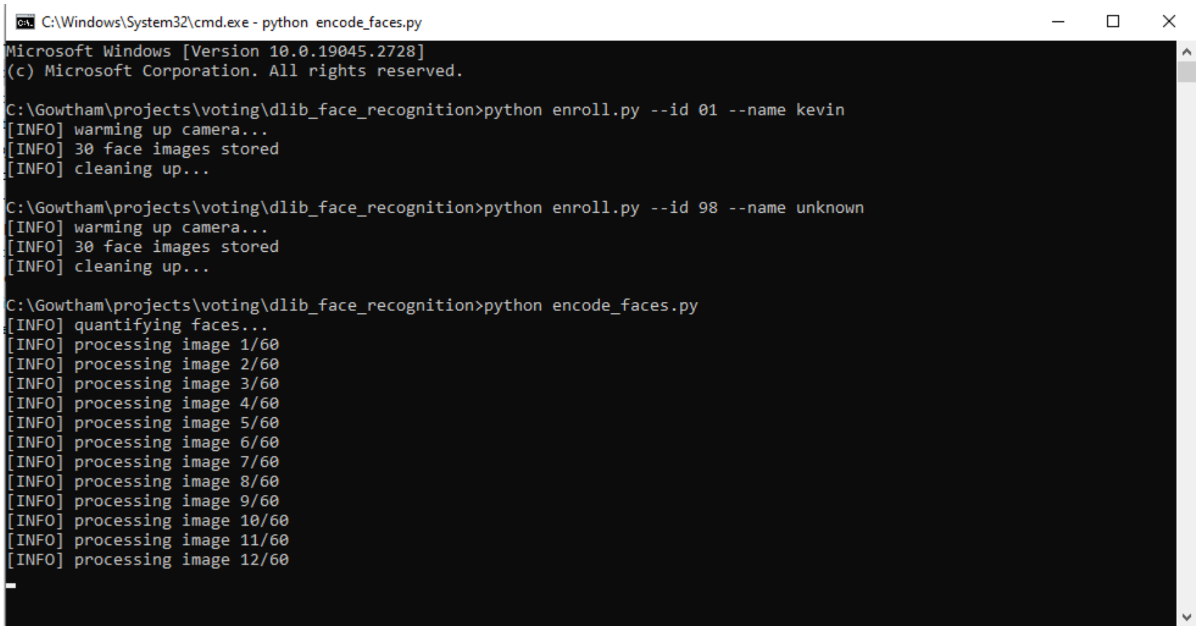


C:\Windows\System32\cmd.exe - python enroll.py --id 01 --name kevin
Frame
Status: saving

```
Microsoft Windows [Version 10.0.19045.2728]
(c) Microsoft Corporation. All rights reserved.

C:\Gowtham\projects\voting\dlib_face_recognition>python enroll.py --id 01 --name kevin
[INFO] warming up camera...
```

Figure 6.10 Enrolling faces

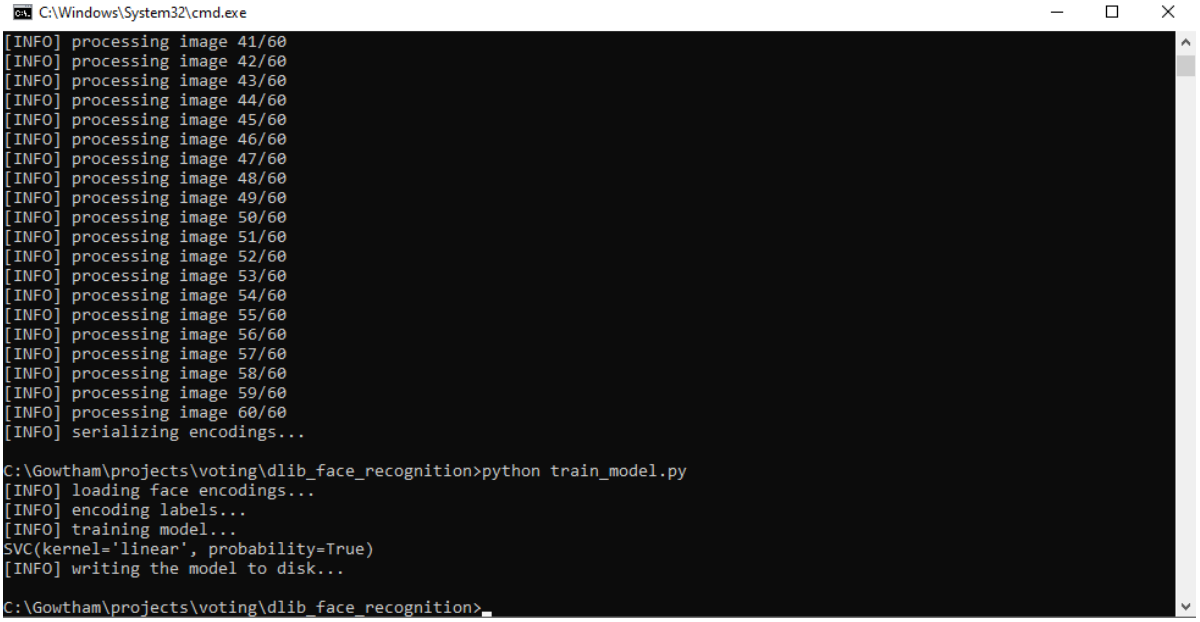
Getting face encodings for the enrolled images in the dataset and it can be shown in the below figure.



```
Microsoft Windows [Version 10.0.19045.2728]
(c) Microsoft Corporation. All rights reserved.

C:\Gowtham\projects\voting\dlib_face_recognition>python enroll.py --id 01 --name kevin
[INFO] warming up camera...
[INFO] 30 face images stored
[INFO] cleaning up...

C:\Gowtham\projects\voting\dlib_face_recognition>python enroll.py --id 98 --name unknown
[INFO] warming up camera...
[INFO] 30 face images stored
[INFO] cleaning up...

C:\Gowtham\projects\voting\dlib_face_recognition>python encode_faces.py
[INFO] quantifying faces...
[INFO] processing image 1/60
[INFO] processing image 2/60
[INFO] processing image 3/60
[INFO] processing image 4/60
[INFO] processing image 5/60
[INFO] processing image 6/60
[INFO] processing image 7/60
[INFO] processing image 8/60
[INFO] processing image 9/60
[INFO] processing image 10/60
[INFO] processing image 11/60
[INFO] processing image 12/60
```

Figure 6.11 Encoding face embedding

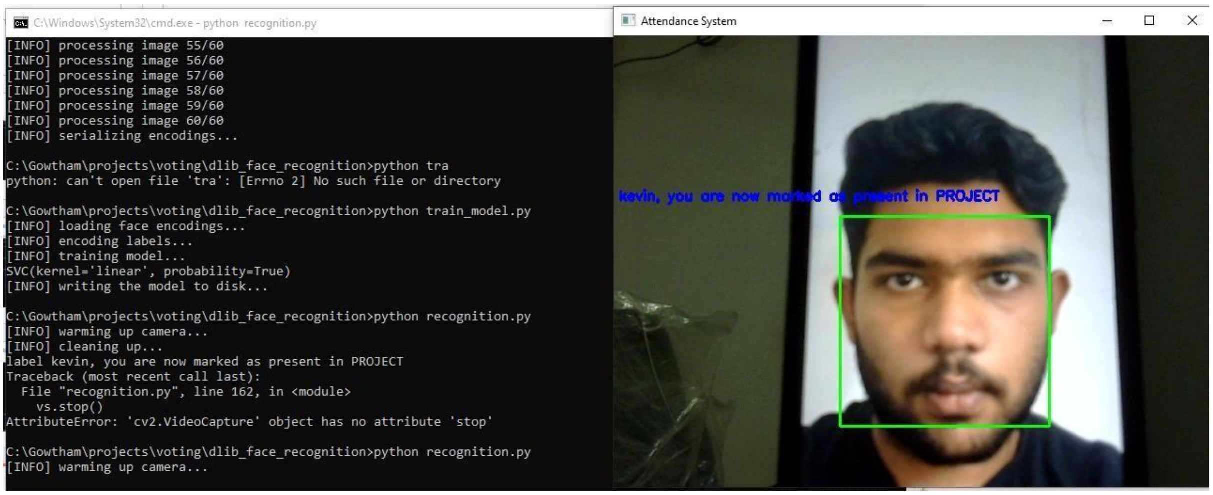
Then, train the extracted encodings and its labels using SVM algorithm and it can be shown in the below figure.



```
[INFO] processing image 41/60
[INFO] processing image 42/60
[INFO] processing image 43/60
[INFO] processing image 44/60
[INFO] processing image 45/60
[INFO] processing image 46/60
[INFO] processing image 47/60
[INFO] processing image 48/60
[INFO] processing image 49/60
[INFO] processing image 50/60
[INFO] processing image 51/60
[INFO] processing image 52/60
[INFO] processing image 53/60
[INFO] processing image 54/60
[INFO] processing image 55/60
[INFO] processing image 56/60
[INFO] processing image 57/60
[INFO] processing image 58/60
[INFO] processing image 59/60
[INFO] processing image 60/60
[INFO] serializing encodings...

C:\Gowtham\projects\voting\dlib_face_recognition>python train_model.py
[INFO] loading face encodings...
[INFO] encoding labels...
[INFO] training model...
SVC(kernel='linear', probability=True)
[INFO] writing the model to disk...

C:\Gowtham\projects\voting\dlib_face_recognition>
```

Figure 6.12 Training faces embedding using SVM

Recognizing faces using the trained SVM model and it can be shown in the below figure.



C:\Windows\System32\cmd.exe - python recognition.py
Attendance System
kevin, you are now marked as present in PROJECT

```
[INFO] processing image 55/60
[INFO] processing image 56/60
[INFO] processing image 57/60
[INFO] processing image 58/60
[INFO] processing image 59/60
[INFO] processing image 60/60
[INFO] serializing encodings...

C:\Gowtham\projects\voting\dlib_face_recognition>python tra
python: can't open file 'tra': [Errno 2] No such file or directory

C:\Gowtham\projects\voting\dlib_face_recognition>python train_model.py
[INFO] loading face encodings...
[INFO] encoding labels...
[INFO] training model...
SVC(kernel='linear', probability=True)
[INFO] writing the model to disk...

C:\Gowtham\projects\voting\dlib_face_recognition>python recognition.py
[INFO] warming up camera...
[INFO] cleaning up...
label kevin, you are now marked as present in PROJECT
Traceback (most recent call last):
  File "recognition.py", line 162, in <module>
    vs.stop()
AttributeError: 'cv2.VideoCapture' object has no attribute 'stop'

C:\Gowtham\projects\voting\dlib_face_recognition>python recognition.py
[INFO] warming up camera...
```

Figure 6.13 Face recognition

CHAPTER 7

CONCLUSION & FUTURE WORK

- **CONCLUSION:**

This project has been successfully developed a web application for safe online ballot system which helps the state government in achieving 100% voting rate in the state elections by providing an e-voting system enabling Face Detection authentication. A web application using a java script framework react JS is developedfor both the candidate and also the general public to register themselves. By this project we effectively enable the general public to know about their candidates. Thus,this project provides an affordable and efficient means to enable the general public tosecurely cast their vote.

- **FUTURE WORK:**

In the coming future, we review the application of the project to extensively by the Election Commission of India. In the election commission of India, they are more chance to develop or convert this project in many ways. Thus, this project has an efficient scope in coming future where votes can be cast securely online increasing voter turnout and enhances citizen awareness of the candidates in their locality.

APPENDIX

- ## Source Code

```
from flask import Flask,
app,request from imutils.video
```

```
import VideoStreamfrom datetime
import datetime
from datetime import
dateimport numpy as
np import dlib
import argparse
from base64 import
b64decodeimport imutils
import
time
import
cv2
import
pickle
from imutils import
face_utilsimport
urllib.request
import
urllib.parse
import string
import
random
import time
from datauri import
DataURIfrom  flask
import jsonify
from flask_cors import CORS,
cross_originimport glob
import json
from project.utils import Conf
from imutils.video import
VideoStreamfrom datetime import
datetime
from datetime import
datefrom tinydb
import TinyDBfrom
tinydb import where
import
face_recognition

import numpy
as npimport
argparse
import  imutils
import pickle
impor
t  time
impor
t cv2
from imutils import face_utils
# construct the argument parser and parse the arguments
ap = argparse.ArgumentParser()
ap.add_argument("-c", "--conf",
default="config/config.json",help="Path to the input
configuration file")
args =
vars(ap.parse_args())#
load the configuration
file conf =
Conf(args["conf"])
prevPerson = None
```

```
curPerson = None
consecCount = 0
db = TinyDB(conf["db_path"])
studentTable = db.table("student")
attendanceTable =
db.table("attendance")
recognizer = pickle.loads(open(conf["recognizer_path"],
"rb").read())le = pickle.loads(open(conf["le_path"], "rb").read())
# print("[INFO] warming up
camera...")# vs =
VideoStream(src=0).start()
#
time.sleep(2.
0)        global
result_flag
unknown_fla
g = 0
process_flag = 0
# initialize previous and current person to
NoneprevPerson = None
curPerson = None
# initialize consecutive recognition count
to 0consecCount = 0

imagecount=0
app = Flask(
name_)cors =
CORS(app)
app.config['CORS_HEADERS'] = 'Content-
Type'face_flag = 0
```

```
@app.route('/voting',
methods=['GET','POST'])@cross_origin()
def login():
if request.method ==
'POST':imagecount=0
result =
process(request.json['uri'])
return result
def process(uri):
global
row_count,names_flag,imagecount
data_uri = uri
header,encoded =
data_uri.split(",",1)data =
b64decode(encoded)
f = open("image.png",
"wb")f.write(data)
row_cou
nt=0
names_fl
ag=0
namess=
[]
encoding
=[]
frame =
cv2.imread("image.png")h, w,
_ = frame.shape
img = cv2.cvtColor(frame,
cv2.COLOR_BGR2RGB)img = cv2.resize(img,
(640, 480))
```

```
img_mean = np.array([127, 127,
127])img = (img - img_mean) /
128
img = np.transpose(img, [2, 0,
1]) img = np.expand_dims(img,
axis=0)rgb=
img.astype(np.float32)
rgb = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB)

boxes =
face_recognition.face_locations(rgb,
model=conf["detection_method"])
for (top, right, bottom, left) in boxes:
# draw the face detections on the frame
cv2.rectangle(frame, (left, top), (right, bottom),(0, 255, 0),
2)# calculate the time remaining for attendance to be taken
# check if atleast one face has been
detectedif len(boxes) > 0:


encodings = face_recognition.face_encodings(rgb, boxes)
preds = recognizer.predict_proba(encodings)[0]
j = np.argmax(preds)
curPerson =
le.classes_[j]
name =
studentTable.search(where(
curPerson))[0][curPerson][0]
return
{"success":"true","id":curPerson}
else:
return {"success":"false"}
```

```
if__name___== '_main___':
app.run(host='0.0.0.0',
port=5000)
import React, { useState, useEffect } from
"react";import {
ThemeProvi
der,
makeStyles,
createMuiTh
eme,
} from "@material-
ui/core/styles";import axios
from "axios";
import "react-responsive-
modal/styles.css"; import Colors from
"../Configuration/Colors";const theme =
createMuiTheme({ typography: {
fontFamily: ["Poppins-Medium"],

},
});
const useStyles = makeStyles((theme) =>
({root: {
...theme.typography.button,
backgroundColor:
theme.palette.background.paper,padding:
theme.spacing(1),
},
paper
: {
heigh
t: 50,
width: 140,
},
modal: {
backgroundColor: theme.palette.background.paper,
},
}));
export default function App() {
const [flag, setflag] = useState(true);
const [loader, setloader] = useState(0);
const [open, setOpen] =
useState(false);
const [DMKCOUNT, setDMKCOUNT] = useState(0);
const [ADMKCOUNT, setADMKCOUNT] =
useState(0);
const [OTHERSCOUNT, setOTHERSCOUNT] =
useState(0);useEffect(() => {
if (flag) {
const options = {
url:
"http://localhost:5008/checkchainvalidity",
method: "GET",
headers: {
"Content-Type": "application/json",
},
};
// console.log(options)

axios(options).then((response)
=> {if (response.data == true) {
alert("Block Chain is Status is Good
!!");const options = {
```

```
url:
"http://localhost:5008/election_day_api",
method: "GET",
headers: {
"Content-Type": "application/json",
},
};
// console.log(options)
axios(options).then((response) => {
// console.log
(response.data[0].date)const
totalvote = {
date: response.data[0].date,
};
const options = {
url:
"http://localhost:5008/vote_total_count",
method: "POST",
headers: {
"Content-Type": "application/json",
},
data: JSON.stringify(totalvote),
};
// console.log(options)
axios(options).then((response)
=> {console.log(response.data);
var DMK_VOTE_COUNT =
response.data.filter((item) => item.party_name
== "DMK"
);
var ADMK_VOTE_COUNT =
response.data.filter((item) => item.party_name
== "ADMK"
);

var OTHERS_VOTE_COUNT =
response.data.filter((item) => item.party_name ==
"Others"
);
setDMKCOUNT(DMK_VOTE_COUNT.length);
setADMKCOUNT(ADMK_VOTE_COUNT.length);
setOTHERSCOUNT(OTHERS_VOTE_COUNT.lengt
h);
});
// setaccident_data(response.data)
//
setData(response.data
)setflag(false);
});
} else {
alert("Block Chain is been hacked !!");
}
});
}
}, [flag, open,
loader]);return (
<ThemeProvider theme={theme}>
<center>
<
h
1
```

```
st
yl
e
=
{
{
textAlign:
"center",
color:
"white",
padding: 20,
backgroundColor:
"darkblue",borderRadius:
20,
width: "80%",
margin: 20,
fontFamily: "Poppins-SemiBold",
}}
>
ELECTION RESULTS

</h1>
</center>
<center>
<div style={{ marginTop: "10%" }}>
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{
textAlign:
"center",
color:
"white",
padding: 20,
backgroundColor:Colors.primaryD
ark,borderRadius: 20,
width: "50%",
margin: 20,
fontFamily: "Poppins-SemiBold",
}}
>
DMK VOTE COUNT - {DMKCOUNT}
</h2>
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{
{
textAlign:
"center",
color:
"white",
padding: 20,
backgroundColor:Colors.primaryD
ark,borderRadius: 20,
width: "50%",
margin: 20,
fontFamily: "Poppins-SemiBold",
}}
>
ADMK VOTE COUNT - {ADMKCOUNT}
</h2>
<h2

style={{
textAlign:
"center",
color:
"white",
padding: 20,
backgroundColor:Colors.primaryD
ark,borderRadius: 20,
width: "50%",
n: 20,
fontFamily: "Poppins-SemiBold",
}}
>
OTHERS VOTE COUNT - {OTHERSCOUNT}
</h2>
</div>
</center>
</ThemeProvider>
);
}
```
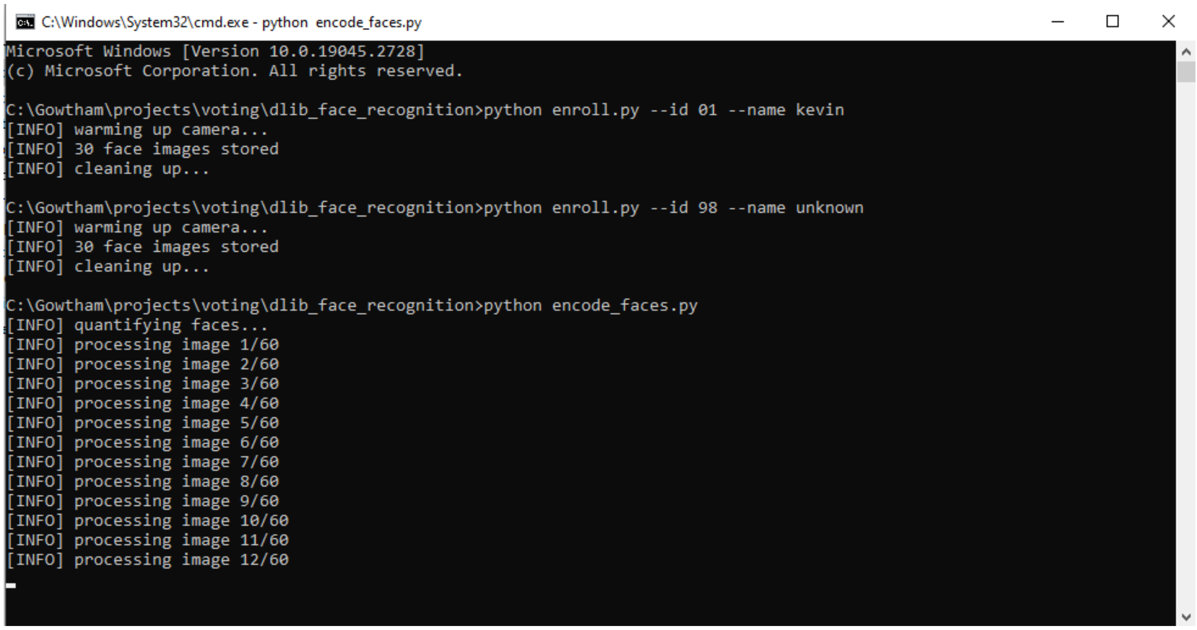
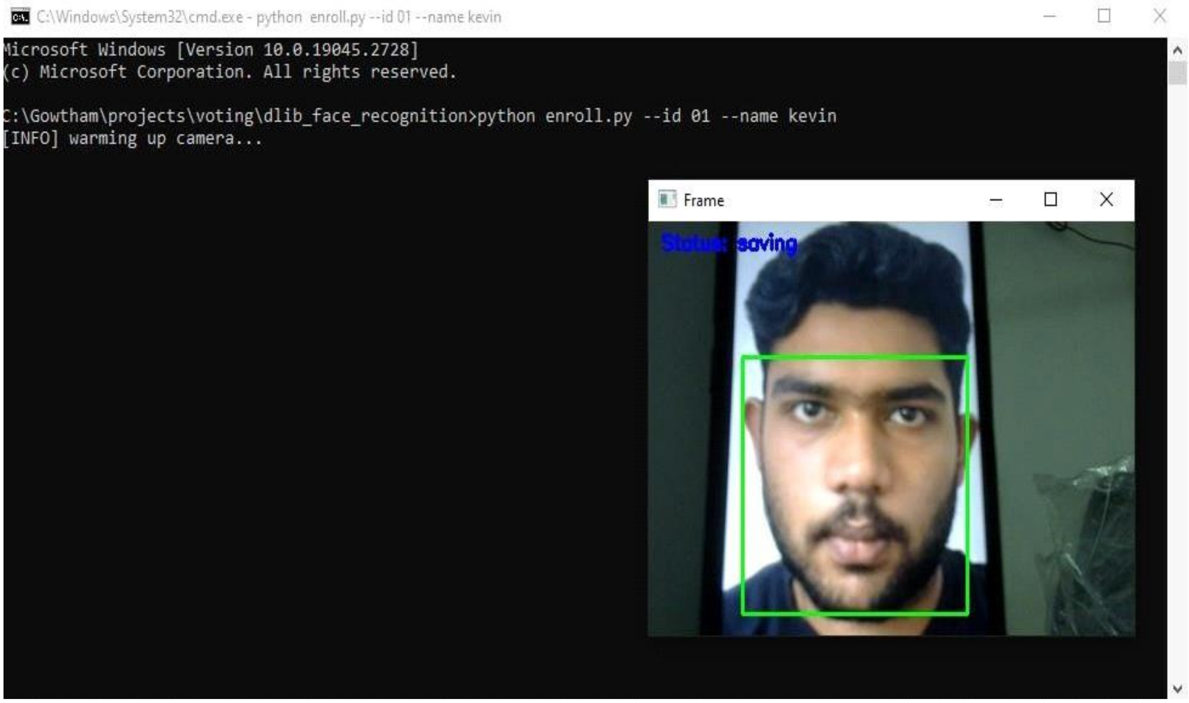
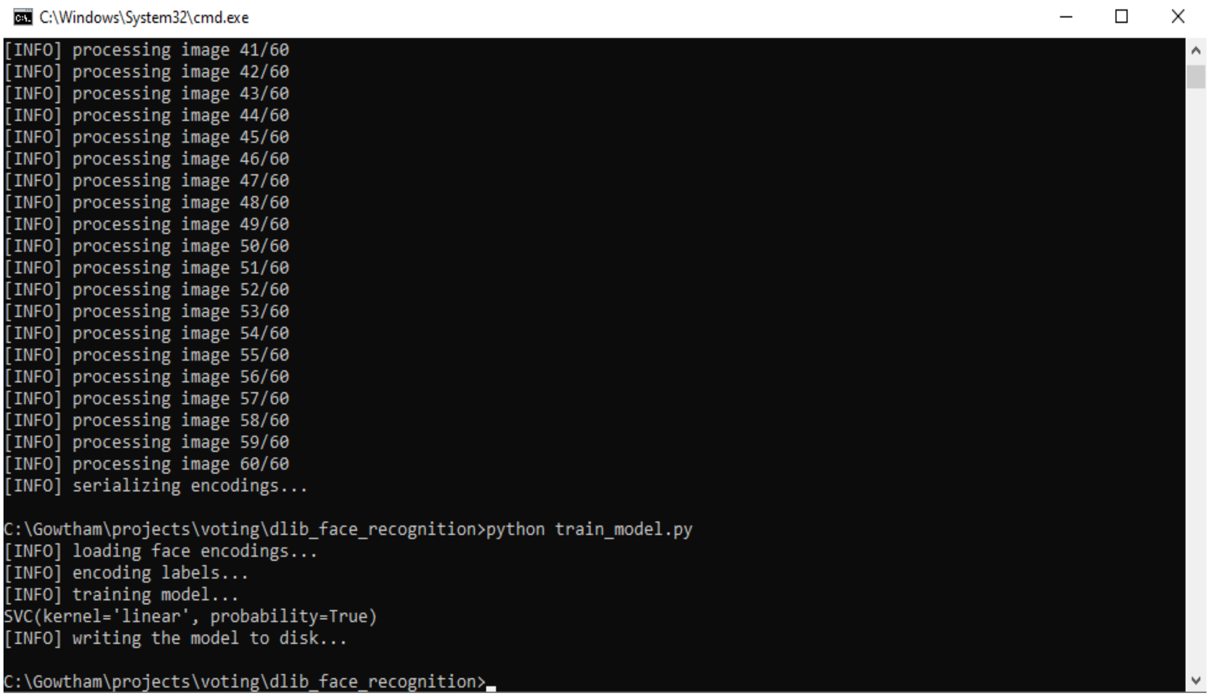

- ## ScreenShots



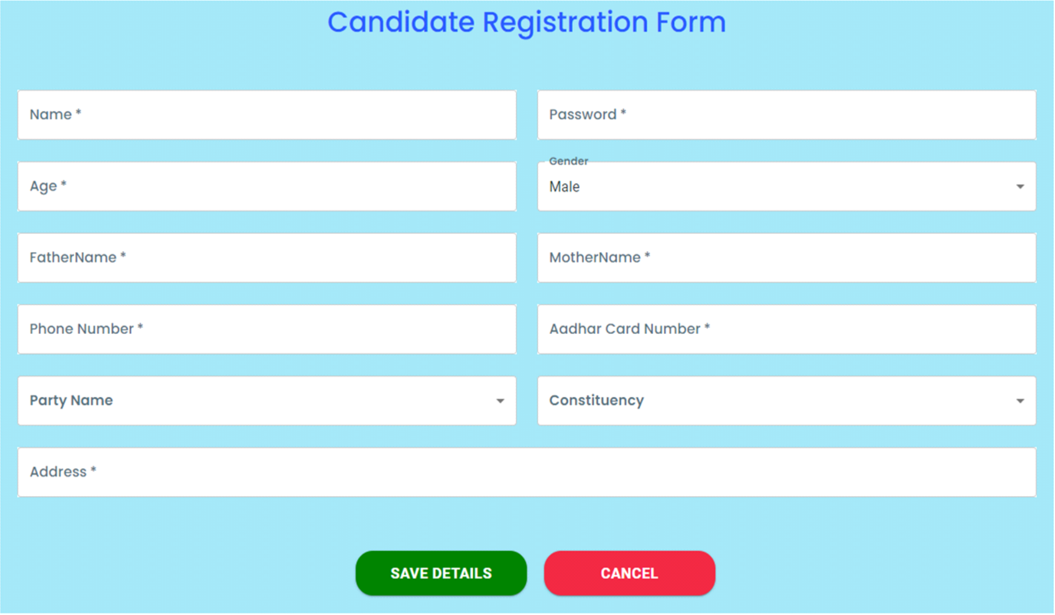
```
Microsoft Windows [Version 10.0.19045.2728]
(c) Microsoft Corporation. All rights reserved.

C:\Gowtham\projects\voting\dlib_face_recognition>python enroll.py --id 01 --name kevin
[INFO] warming up camera...
[INFO] 30 face images stored
[INFO] cleaning up...

C:\Gowtham\projects\voting\dlib_face_recognition>python enroll.py --id 98 --name unknown
[INFO] warming up camera...
[INFO] 30 face images stored
[INFO] cleaning up...

C:\Gowtham\projects\voting\dlib_face_recognition>python encode_faces.py
[INFO] quantifying faces...
[INFO] processing image 1/60
[INFO] processing image 2/60
[INFO] processing image 3/60
[INFO] processing image 4/60
[INFO] processing image 5/60
[INFO] processing image 6/60
[INFO] processing image 7/60
[INFO] processing image 8/60
[INFO] processing image 9/60
[INFO] processing image 10/60
[INFO] processing image 11/60
[INFO] processing image 12/60
```


C:\Windows\System32\cmd.exe - python enroll.py --id 01 --name kevin
Frame
Status: saving

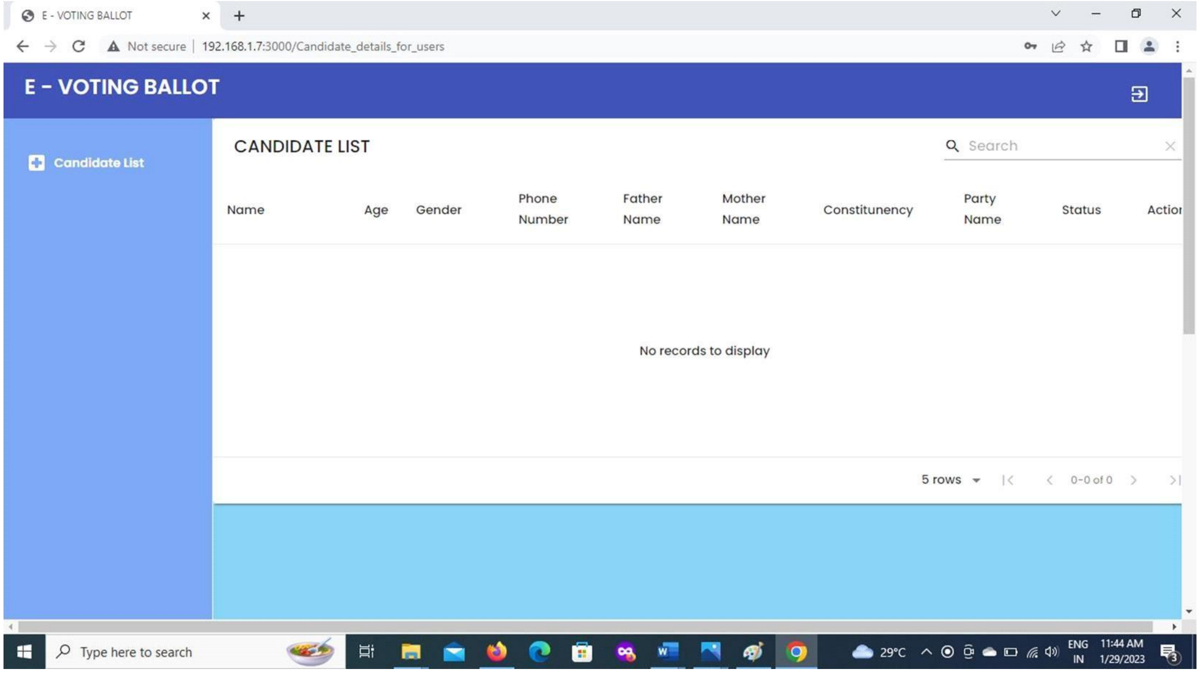
```
Microsoft Windows [Version 10.0.19045.2728]
(c) Microsoft Corporation. All rights reserved.

C:\Gowtham\projects\voting\dlib_face_recognition>python enroll.py --id 01 --name kevin
[INFO] warming up camera...
```



```
[INFO] processing image 41/60
[INFO] processing image 42/60
[INFO] processing image 43/60
[INFO] processing image 44/60
[INFO] processing image 45/60
[INFO] processing image 46/60
[INFO] processing image 47/60
[INFO] processing image 48/60
[INFO] processing image 49/60
[INFO] processing image 50/60
[INFO] processing image 51/60
[INFO] processing image 52/60
[INFO] processing image 53/60
[INFO] processing image 54/60
[INFO] processing image 55/60
[INFO] processing image 56/60
[INFO] processing image 57/60
[INFO] processing image 58/60
[INFO] processing image 59/60
[INFO] processing image 60/60
[INFO] serializing encodings...

C:\Gowtham\projects\voting\dlib_face_recognition>python train_model.py
[INFO] loading face encodings...
[INFO] encoding labels...
[INFO] training model...
SVC(kernel='linear', probability=True)
[INFO] writing the model to disk...

C:\Gowtham\projects\voting\dlib_face_recognition>_
```


Candidate Registration Form

Name *	Password *
Age *	Gender: Male
FatherName *	MotherName *
Phone Number *	Aadhar Card Number *
Party Name	Constituency
Address *	

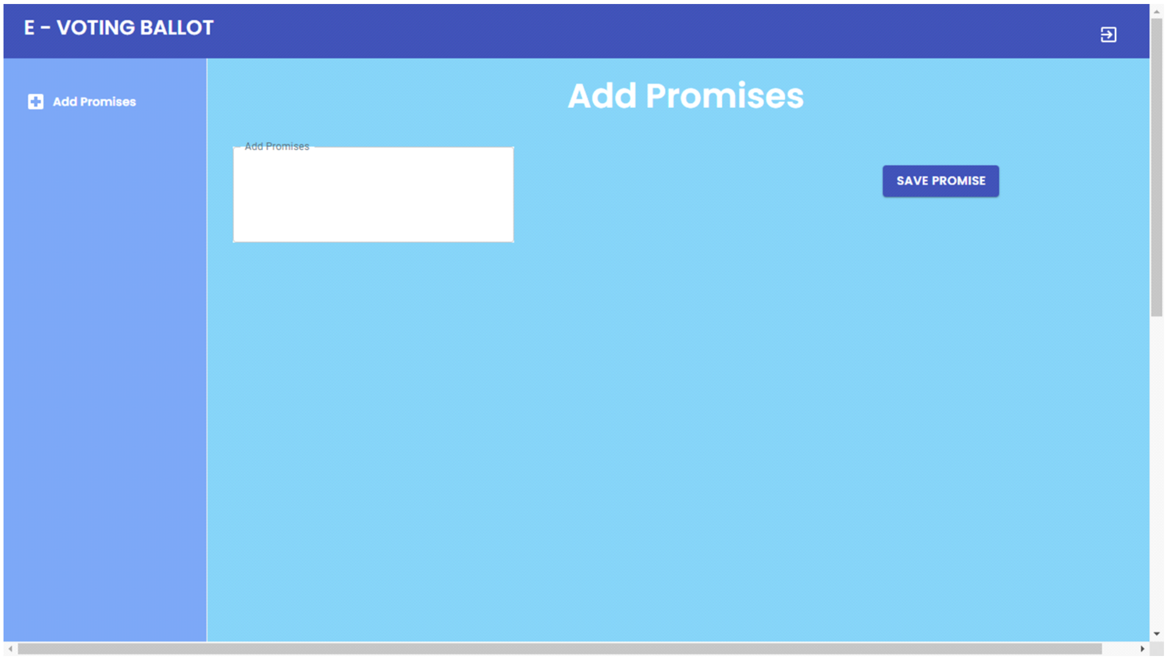


CANDIDATE LIST

Name	Age	Gender	Phone Number	Father Name	Mother Name	Constituency	Party Name	Status	Actior

No records to display

5 rows 0-0 of 0



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Smart Voting System Based OnArtificial Intelligence

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HYPERLINK "mailto:3lavanya.cse@sathyabama.ac.in"lavanya.cse@sathyabama.ac.in

ABSTRACT: Electronic voting, also referred to as electronic voting machines or "EVMs" in India, is frequently used to conduct elections. EVMs and electronic voting were invented and used and tested in the early 90s by Bharat Electronics private limited, which is owned by the government, They were gradually incorporated into Indian elections. Since in early times, electronic voting machines have been used to conduct all national and state legislative elections in India. In India, voters frequently stand in lines to cast their ballots in person, and the voting procedure is largely manual. Unquestionably, a manual voting procedure does not produce a vote rate of 100 percent. This initiative's main goal is to inform the public about political parties'positions on a range of issues by their base of support. A website that analyses the role of the political parties andindependent candidates competing in the upcoming state election was made using React JS. The project also helps the typical individual complete a survey with a questionnaire to express their intent to vote in the most recent or forthcoming state election as well as their opinions on it. This online application's e- voting technology, which allows Face Detection authentication, is advantageous to the state government.

Keywords: Artificial Intelligence, Block chain, Haar cascade, classification, Face recognition, Face Detection, CNN model, database.

• INTRODUCTION

India is governed by its Constitution, whichspecifies how authority is common amongst the central government of the country and also followed by the other states of the country, which are made up of states and union

territories. The conduct of Union and State elections in India is the responsibility taken by the committee of election who are said to be, a constitutional body. The institution is responsible for conducting the elections for the Lok Sabha andRajya Sabha legislatures of the country.. India is an autonomous, democratic, secular, socialist nation. The Constitution written by "We, the People of India" across India's social, economic, and political structure like a golden piece of thread. The Constitution envisions a democracy in which citizens are represented in state and federal legislatures as well as in Parliament. The Supreme Court is the core of the Indian Constitution and one of its unassailable fundamental components, according to democracy. The Indian Constitution created the parliamentary system of government.

• LITERATURE OVERVIEW

A Detectable Identity E-voting System built on the Blockchain in the Area Of artificial intelligence [2020]

Leverages block chain technologies as the technologyguarantees voter confidentiality and polling security, but it doesn't offer a way to raise voter knowledge.

A Decentralized Board Count Voting Smart online system of contract [2020]

utilizes the electronic voting system. The functional project module ensures that the electronic voting system is extremelysafe and that there can be no manipulation during the official counting of votes.

Ranking and Voting System with the nodes whose states are not optimal [2015]

The Decentralized Inter Voting and Ranking (DMVR) mechanism is used. The technology efficiently detects the vote percentages. Does not guarantee an increase in ballot participation.

Depending on the European Parliament's requirements, the Helios e-voting system was evaluated. [2018]

Makes use of Helios voting concept ,Provides effective evaluation of the current voting mechanisms, Does not provide an effective technological solution to improve the E-voting.

Blockchain electronic vote system [2019]

Makes use blockchain technology, provides an effective electronic vote system, does not ensure citizen awareness enhancement so this was one of the main limitation in this journal.

Secure Physical Layer Voting

Makes use of the mobile computing technology, Ensures E-voting effectively, does not provide a secure technological solution.

- **PROPOSED WORK**

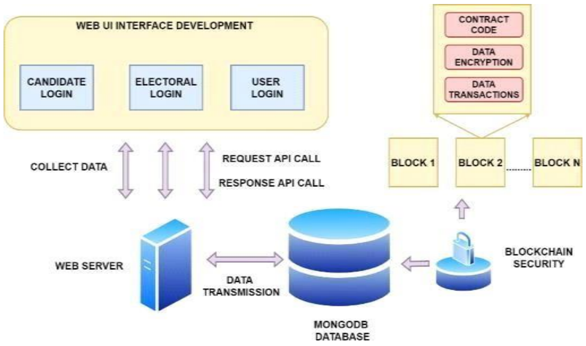


Figure 1 Proposed System Architecture

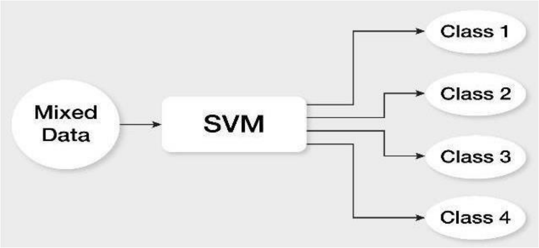
Our main goal is to give the public access to an authentic scientific community that is aware of the political parties' policy positions in light of their target audiences. A website application software that analyses the function of the present political parties and independent candidates was made using React Java Script framework system. running in the upcoming state election. Face detection and recognition algorithms are used to effectively identify authentic users when voting during Election Day using the application. For face detection, ultra light face detector is used and for face recognition mobile facenet algorithm is used. Then, The development of the(Application Programming Interface)areto be done using the java script framework and node

JavaScript to effectively integrate the web application withthe database. NodeJS is used for API development and mongoDB is used for database setup. Blockchain integration at the backend for data security which will secure the data with utmost security eliminating data hacking. The project also assists the average person in filling out a questionnaire to indicate his or her willingness to participate in and opinionson the recent or upcoming state election. By offering an electronic voting system with Face Detection authentication, This website helps the state legislature obtain a 100% turnout percentage for the assembly polls.

- ***Methodology:***

The methodology of the project is to first use face recognition as the first step of the working project the next step is top process the data which has been recognized .The third step is to use the algorithm model the algorithm that is going to be used is the Convolutional Neural Network model(CNN Model).After that the Node API and Mongo DB hasto be generated .Once all the above processes are completed the web application has to be developed and the final output of the project is provided.

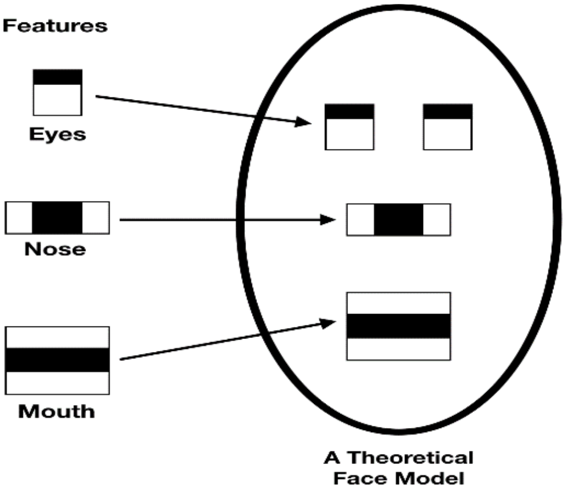
- ***Face Recognition:***



Categorization and recurrence are the basic issues in face detection. Yet even so, A Classification algorithm seeks to construct the optimal line or decision boundary that can divide dimensional data into groups so as to quickly explain whatever new data that becomes available. This optimalway barrier was known as a subspace. Machine learning is used to choose the extreme vectors and points thatcontribute to the creation of the other phases of the intended technology. Hence SVM approach may be used forface recognition, image analysis, text summarization, and more. For the Face Recognition module, we are using the SVM technique in this case.

Fig 2 SVM Algorithm.

Another algorithm that is being utilised for the face



recognition and the face identification process is the Haar Cascade algorithm.

Fig 2.1 Haar Cascade

- ***Node API and Mongo DB Generation***

It is a source of platform that is available across a widerange of devices for users in order to satisfy their need for their own projects, JavaScript virtual machine for back- end applications that uses the internal compiler engine. Outside of a web browser, JavaScript programs are run by it. Before such a page is sent to a web browser used by the user using Node.js, Users can continue choosing the Java Script frameworks to build their line of command and also the backend compiling codes that further which can be used to build interactive content for the application. Thus the, Node.jsrepresents a the usage of the Java script framework rather than other frameworks approach, putting open application creation underneath the aegis of such a single user programming platform, as opposed to employing distinctlanguages for server-side and client-side scripting. Mongo Data Base services is indeed a manuscript management toolthat really is multiple platform and freely distributable. labelled as a NoSQL database application, MongoDB uses JSON-like documents with optional schemas. MongoDB is

developed by MongoDB Inc. and licensed under the Server Side Public License (SSPL).

- ***CNN Model***

Following the output of the multi-layered neural networkcalled a CNN is determined by extracting progressively complicated characteristics from the data at each layer. CNNs are excellent at jobs requiring perception.

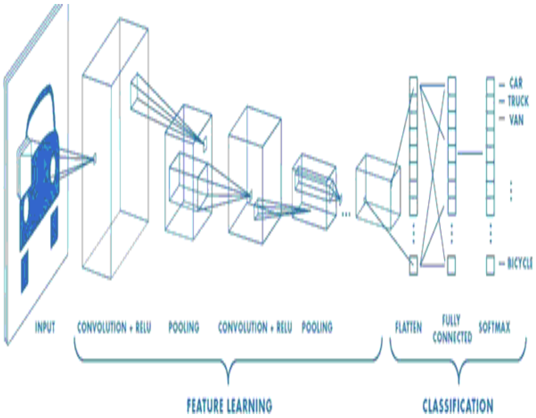


Fig 3 Working of the model

When practitioners need to extract information from an unstructured data source (like photographs), CNN is frequently employed.

- ***Creation of Web-Based application***

The process involves in creating programmes to be useddigitally. Such apps typically are kept in computer servers before being distributed throughout the system towards the terminals' intended hardware. A web application (web app) can be used online without being downloaded. The individualis able to employ a search engine like Microsoft edge, Apple, and Firefox And internet explorer to visit a software application. Responsive design, Xhtml, and Js may be used todevelop the majority of web applications. With online applications, this integration testing is frequently brief and is managed by a small development team. Front-end development for web apps is done using user side programming.

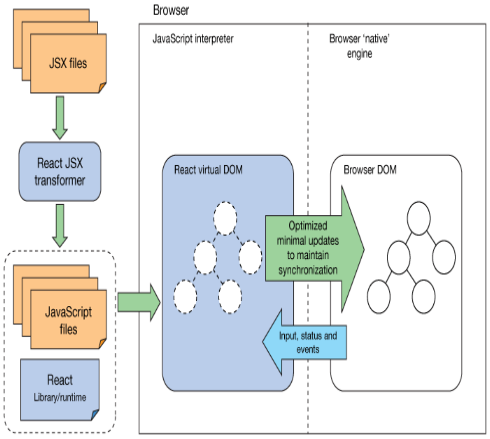


Fig 4 Development of Web Application.

- ***Blockchain Integration.***

Using block chain technology there at rear end will provide the highest possible security for information, preventing data theft.

Block chain platform Incorporation is a potent system that produces an immutable record of transactions thatcan be utilized to improve security, streamline company'soperations, and uphold investor confidence. By cutting out intermediaries and guaranteeing that operations are completed fast and precisely, it lowers expenses. The main purpose or need for using this technology of block chain is for the protection of the data of the users at the customer end or front end that is being stored .

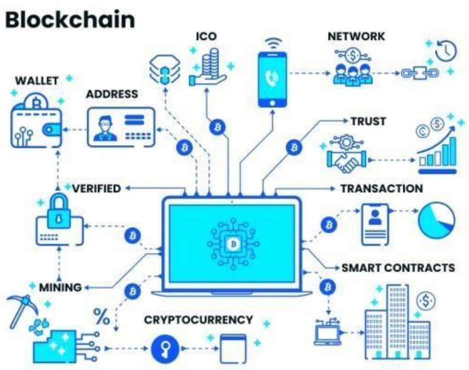


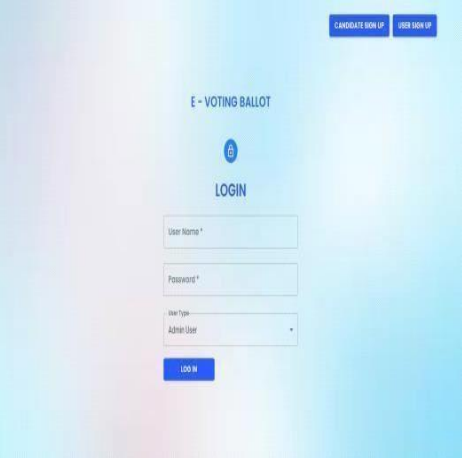
Fig 5 Blockchain Integration.

- ***Objectives and Scope of Project***

To provide an efficient technical solution that will enable thenation's population to learn more about their political

candidates. to create a safe method that guarantees that everycitizen votes.

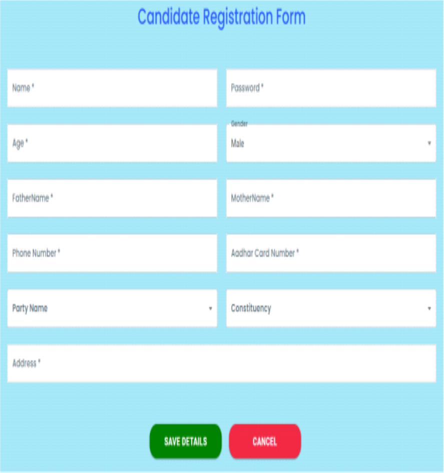
- ***Output.***



User Type
Admin User

Fig 6 Registration page.

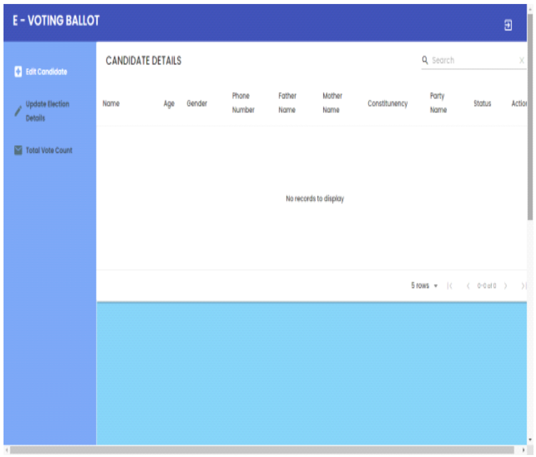
The previously specified figure given on top is the pagewhere the end user of the web application can log in forvoting process, The users can register themselves in order to vote or the upcoming elections. This page also represents themain opening page of the web application.



Gender
Male

Fig 7 Candidate Registration.

The above page represents the registration of Candidates whoare supposed to be participating in in the election process. only the candidates who are registered are to eligible in the process of voting.



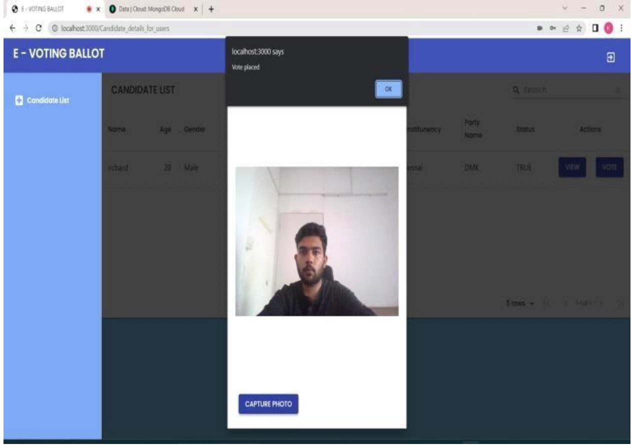
CANDIDATE DETAILS

Name	Age	Gender	Phone Number	Father Name	Mother Name	Constituency	Party Name	Status	Actio

No records to display

Fig 8 Admin page.

The above diagram represents the final list of registered people and all the related information. That has to be accessible to the organizers of the election and also the election committee.



localhost:3000/Candidate_details_for_users

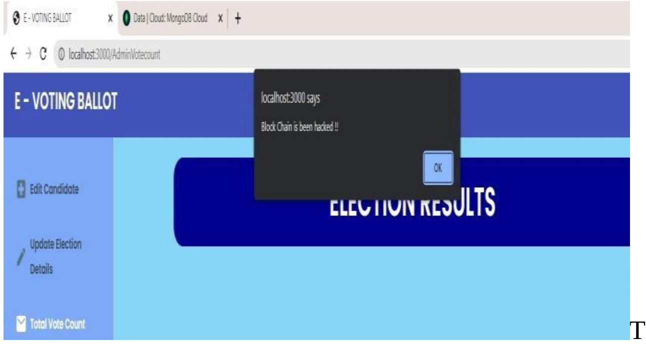
localhost:3000 says

Vote placed

CANDIDATE LIST

Name	Age	Gender	nstituency	Party Name	Status	Actions
ichard	20	Male	ennai	DMK	TRUE	VIEW VOTE

Fig 9 Voting page with face recognition.



localhost:3000/AdminVotecount

localhost:3000 says

Block Chain is been hacked !!

The above figure represents the voting page where the facerecognition is uses in order to verify the authenticity of thevoting user which can be checked by the admin.

Fig 10 block chain security.

The above figure tells the admin that the security of the voting system has been tampered and the block chain is hacked which will alert the election committee this is achieved by using various hashing algorithms and the blockchain integration for the security and authenticity of the voting process.

Future work:

For The future work or additional functionality for this project there are several new features that can be added which include the development of a mobile application either native android , ios or cross-platform correspondingto the website that has been developed in this project. The functionality of creating multiple rooms for election process can also be added additionally which will further improve the use cases of the application.

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