ISEF 22

[Let's Elect]

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Table of Contents

Students' identification

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His contribution to the project was based on creating the application itself. As he more proficient in mobile applications, so he played the main role in doing it.

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She was responsible for the theoretical part more. Which was represented in writing the poster, portfolio, and so on. Or searching more about developments to the idea.

Abstract

Have you ever decided not to go to the elections because you didn't want to wait in a long queue? Or because you couldn't take permission from your work to go out for hours to elect?

Many reasons, but the problem is one -which lies in the process itself-. Whether because of the wasted time, money, and effort or because of the election fraud. Moving through the development track for this process, it was converted into biometric elections using fingerprint scanners, but it was still following the same criteria for the old one. After the pandemic of Covid-19, it became harder to hold the process during it because of the prevention of the gatherings. So after combining the biometric system with the current virtual world, we reached a virtual biometric election using mobile phones. By creating a mobile application that serves as the exact traditional process through entering your name, national id, and fingerprint then selecting your desired candidate and submitting your vote. The application will be connected with the database that contains the actual data of the citizens which are required for the verification step. After verifying your entered data with the existing one and ensuring that your age is eligible to elect, you will be able to vote for just one time. After testing it on some people, it was concluded that our hypothesis has been achieved as well as saving time, money, effort, and increasing the accuracy in sorting the votes. "E-voting: Be home, Be safe".

Introduction

During the pandemic of Covid-19, a lot of government services weren't working well. And one of these services was "The Elections". The process became difficult to hold during this pandemic because of the prevention of the gatherings. Also, it was difficult for all to know the place that they must elect in. As well as the difficulty in leaving the work for some hours or leaving the children and homes, to go to elect. And some youth be lazy to go to their polling place and others can not reach the place alone like adults and the disabled for instance. Also, the schools and polling places became very busy, and everyone have to wait a long time to elect, and this delays a lot of social interests. In addition to, spreading diseases at these gatherings because an infected person between them can spread the infection through the air to the rest of the people or because of the lifted paper that be thrown at any place causing rubbish.

So, we searched a lot about how we can get a solution that holds the process and decrease its negative impacts at the same time. We found that we can solve these all problems by converting this process into e-voting. An election mobile application will facilitate all the processes and reduce the spread of Covid-19 or any other diseases. You will be able to elect by just entering your data and choosing your desired candidate. The process will take no longer than 2 minutes. This will save time, effort, money, and increase the security and accuracy of all the collected data. The application will be created on Android studio using the flutter platform and dart language. As well as collecting the data on the SQLite driver.

Applying the application on a real-life scale will need more accuracy in collecting the data and making it more secure. As the government servers are always exposed to hacking. So, we hope that it will be applied well in the right way to achieve its expected results.

Background Research

The idea was gathered from a different prior solution which was based on fingerprint scanner devices.

The efficiency of this solution was not good enough. Because it has developed the entire method to be more modern and easier but, we still have the same problem. The process itself did not change as we have to go and do the same steps to elect and the only difference was that you will imprint your fingerprint and import your

Figure 1

Fingerprint scanner

national ID on the scanner instead of putting them on paper. So, it will lead to the same results and problems as the older process. And as a result, we tried to reach a solution that will solve these problems and change the whole process. The best solution was to avoid going to the elections. But at the same time, it mustn't be canceled. So, holding it in a virtual way was our modification. And from here we reached to create an election application. The solution will use the same method but will change the whole process at the same time to solve its problems. It will be conducted in the same steps, but the difference is that it will be converted into e-voting.

Hypothesis

All the hypotheses will be based on the mechanism of the application. So, it is supposed to consist of four pages. The first page that will appear to the user when he opens it will contain the name of the application and the welcome and start phrases.

After clicking on the start button, he will move to the next page which contains the data part. After the user inter his data, if the data exists on the server, he will move to the next verification step which includes fingerprint scanning. And if the data doesn't exist, the user will not be able to go to the next step, and an error message "User not found" will appear.

After that, if the fingerprint matched with the data, the user will move to the candidates' page to choose his desired one. But, if the fingerprint isn't matched, an error message "fingerprint is not matched" will appear.

Then, after choosing the candidate, click on the "vote" or "submit" button. And finally, a "your vote has been successfully submitted" message will appear.

This is the hypothesis that the application will be constructed on. It is also shown in the following flowchart clearly.
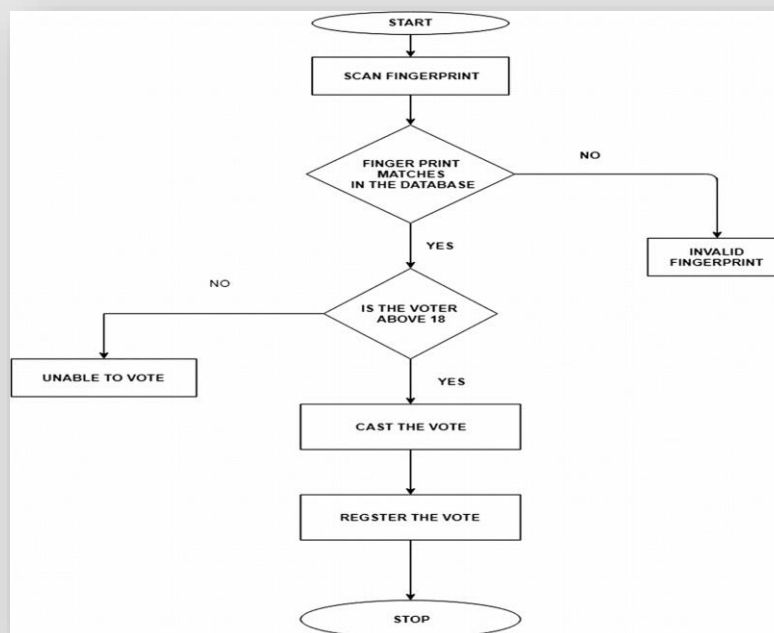

Figure 2

The entire mechanism of the application.

Methodology

The procedures will be done in 3 steps, Step 1 (data collection):

First of all, we should collect the citizens' data that we will verify our inputs from. But in real life, when you go to extract your national number, you scan your fingerprint to be collected so, every administration has the data -national id, name, date of birth, and fingerprint- of each citizen.

But, on the small scale, we will collect a sample of data and store it on SQL lite driver.

- Step 2 (creating the application):

Creating the application will be done on the android studio application. By using the platform flutter to write the code on it.

Flutter will be used because it allows the applications to be installed on both IOS and android.

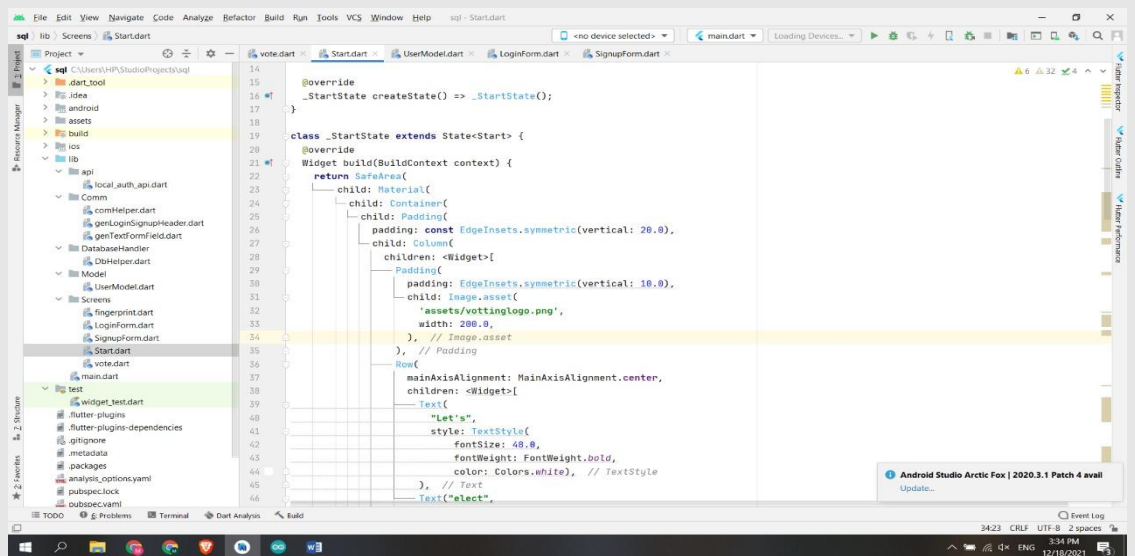The code will be written in dart.

Figure 3

Sample of the written code.

- Step 3 (verifying the data):

The application will be linked with the driver of the data of the citizens and the person who wants to elect should enter his own national id, name, and fingerprint. Then the application will link this data with the data that was collected before, and if the data that this person has entered is true, the application will let him elect. But, if the data is mismatched, he will not be able to elect (following the above flowchart).

After ending the process, the votes will be sorted and counted to determine the final results.

And as not all people have smartphones that support fingerprints, every phone will have access to elect to more than one person (everyone with his own data) but, every citizen will have only one response.

Results

After creating the application and testing it on three samples of data, the results were as expected. The first sample was on correct data, the result was submitted successfully. The second was with mismatched data, this results in not accessing the voting page. And the last one was with data that was not found, and the result was "the user not found".

Figure 4
If the data is correct.

Figure 5
If the data isn't matched

Figure 6
If the user doesn't exist.

And for real-life scale, the expected results will be:

- Increasing the number of voters.

- Increasing the accuracy in calculating the votes for every candidate.

- Faster and safer voting.

- Saving a lot of time and effort.

- Less manpower is required.

- Saving a lot of money that was spent on the preparation for the elections.

- Decreasing the gatherings and the spread of Covid-19 and other diseases.

- Decreasing the pollution of the environment.

Conclusion

After testing the application and collecting the results, we have concluded that our hypothesis has been achieved. The application worked as it was planned to be. And this will drive us to achieve the expected results. It will ease the process of elections very much, save a lot of time instead of wasting it in waiting in a long queue to be able to elect, save the effort of the policemen who save citizens during the elections, and increase the number of votes as many people could not go to elect for many reasons and the application will let them elect from their place. And at this time, it will prevent the gatherings and decrease the spread of the virus that may happen during the elections. Also, it will facilitate the process of sorting and calculating the votes for every candidate as it will be calculated automatically which make it more accurate. Finally, it will save the money that was used in preparing schools and places for the elections.
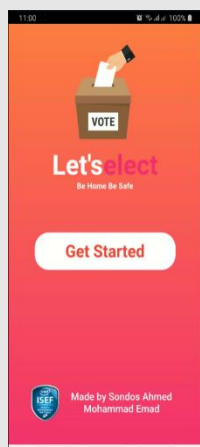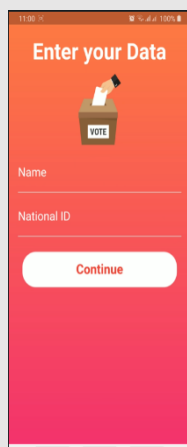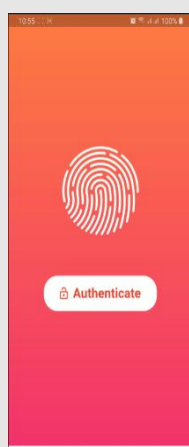
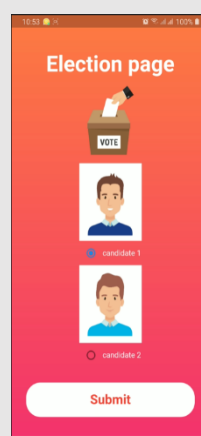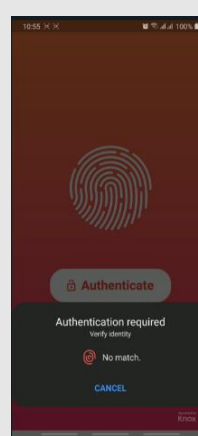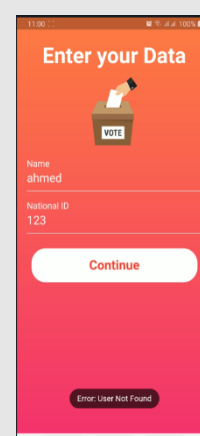| Figure 7	Figure 8	Figure 9	Figure 10	Figure 11	Figure 12
The starting page	collecting the data	scanning the fingerprint	the election page	if the data is mismatched	if the user isn't found

And for future work, here are some recommendations and suggestions.

- ✓ Using alternative languages to write the code may be easier and faster in use. For instance, swift for IOS and Java for android. As they run on older mobiles because they are lighter than flutter that they occupy less storage and don't require high processors to work.

Acknowledgment

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