



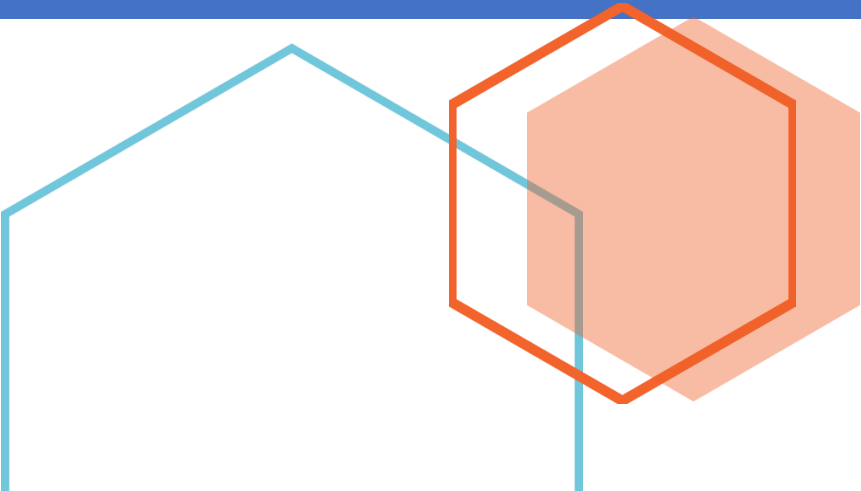
iVote



Augmented Democracy Proposal



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RESUME

This report is based on the framework of a proposal for augmented democracy.

A new model for political voting is discussed here, where a new system is proposed, based on digital twins, which are a collection of personal information, that serves as a virtual version of yourself. The main idea of using those twins, is that the projects now will be voted considering the information on them, to make this voting process system automatic.

The inform also shows a user interface, and deals with security, privacy and adaptability issues that were thought by the work group.

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INTRODUCTION

The modern society is changing in high rates thanks to the technological revolution. As days passes, new and better information systems are developed, to make life quality of people better, in this scenario we can see new devices, new software, new hardware, and predictions say that it won't stop. The retail is one of the prominent entries to use the data, allowing them to create new items that fulfill people needs, and also, to get more utilities with less costs. But, what happens with politics? The main discussion treated here is to propose a new model for the old politician's system, which is not giving coarse with the growth of society. People have spoken, and technology has to make their entrance in that area too.

We propose a system that combines data from different origins to create digital twins, that are entities with our information, likes, relationships, political preferences, daily activities, so they can be a close approach to our person, and with the use of technology, they can automatically vote for us.

1. BACKGROUND

- **Origin of Democracy**

Democracy is defined as: "form of government in which political power is exercised by citizens", this form of government has its origins in ancient civilizations, especially in Ancient Greece and the Roman Republic. These origins date from the 5th century BC, developing over time throughout the world, although only in the 20th century did democracy take on greater strength globally, with the abolition of slavery, the end of European colonialism, recognition of the rights of workers and universal suffrage, which allowed the right to vote for all equally, regardless of sex, religion, ethnicity, etc., in this way democracy has managed to settle in much of the world.

- **Roman Republic**

The Roman Republic was a period in the history of this culture that developed between 509 BC and 29 BC, where political institutions were strengthened, improving existing ones and adding new positions for a more organized development of Rome, positions that in the present continue to exist. Among the existing political positions were:

1. Consuls: there were two, elected annually and emerged as a replacement for the king and had to give an account of his duties to the Senate. They exercised military functions, public administration and government functions.

2. Senate: consulted the consuls, in addition to directing the internal administration and foreign policy of the Roman government.

3. Censors: they carried out the enumeration of the people and their goods, they were also in charge of education and good Roman customs.

4. Quaestors: they were in charge of collecting taxes and managing public monies.

5. Praetors: they administered justice and promoted the Roman Law (set of laws established in Rome).

6. Major: they were in charge of the municipal organization (maintenance of streets, markets, surveillance)

In this period of Roman history there were assemblies divided according to social class, there was the curial assembly, where what was voted was considered as the vote of all the people, in second place was the centurial assembly, in these assemblies the consuls were

elected and the laws were voted, finally the tribal assembly existed, composed by people of the plebs, defended the rights of the commoners before the Senate and the consuls.

It should be noted that in this period there were great struggles and progress towards equality of rights independent of the socioeconomic level.

- **Democracy system in Chile**

The political system in Chile is the democratic republic that is currently governed by the Political Constitution of 1980, including reforms implemented in 2005. In Chile, the democratic system is presidential, the head of state and government is the same (president of the Republic), the powers of the State are separated and the legislature power with the executive power are elected through popular suffrage.

Within the democratic systems applied in Chile are:

1. Binominal system: this system was established in Chile from 1989 until 2018, for the elections of senators and deputies. This system consists in that for each district or district each list or political alliance can present a maximum of two candidates (for each district or constituency two candidates are chosen), in this way once the votes are taken, the total votes are counted, both lists with the largest number of votes among their candidates have the right to choose a candidate that represents them (the one that got the most votes), unless the list that gets the most votes has a percentage equal to or greater than twice the list that have the second majority, in this case the list that obtained the most votes has the right to choose their two candidates to represent the corresponding district or circumscription.

2. D'Hondt method: it is a mathematical method that allows candidates of different positions to be elected by the proportion of votes obtained. By means of this method a number of seats is defined that is equal to the number of positions that are elected by district or district, once the votes are made, the quotient for each list or alliance is calculated, this is calculated by dividing the total votes of each list successively by the dividers from 1 to the number of existing seats, once this is done, order the highest to lowest and assign a seat to each quotient until all existing seats are occupied, for these cases the total number of votes does not influence.

Currently the voting in Chile is voluntary, which has caused low citizen participation, for the 2016 municipal elections only 36% of the people qualified to vote did so, while for the 2017 presidential elections it paid 46.6% of the votes. enabled to do so, a fairly low number, considering that less than half of the voters are deciding for a whole country.

- **Democratic system in Switzerland**

In Switzerland a system of semi-direct democracy is practiced, that is, there are still representatives who administer the government, but it is the people who control their government and the laws in different ways. For the Swiss case citizens can vote through different levels, federal, cantonal and communal, in addition to voting online.

1. Federal level: according to the federal constitution of Switzerland, citizens can modify laws in different ways, can write a legislative text to create or modify a constitutional article, they have 18 months since the initiative to collect 100,000 signatures is raised, in this way it goes to a vote and can be elected if it has a majority of votes and cantons in favor, another form of decision-making is that which, when gathering 100,000 citizens who demand a federal assembly, must be carried out to legislate a specific issue, in addition any revision of the constitution, adhesion to supranational organizations and laws declared urgent are submitted to popular and cantonal voting.

2. Cantonal level: there are 26 cantons in Switzerland, each has its own parliament and its citizens can choose or modify cantonal laws, in addition there are activities (such as education, hospital management, roads, among others) that depend only on the cantons.

3. Communal level: the conditions for referendum or popular initiatives are defined by each canton.

3. IDENTIFICATION OF GAPS THAT LEAD THE AUGMENTED DEMOCRACY SYSTEM

In the day to day within countries, regions, states and/or cities, there are different issues that affects society and that no one in the community knows how to solve or to which entity to turn to find a feasible solution, that is, due to the misinformation on the part of the people, as well as, the scarce citizen participation in the decision-making at the political level.

We work together with the Management and Content area of Municipality of Concepción, which is responsible for advising the mayor, define the long-time projects, in addition to finding and solving community problems.

This area does not have a defined work team, but the work team is conformed with respect to the needs to be met, or problems that need to be solved. To do this, a multidisciplinary

team is formed that is as efficient as possible, encompassing as many points of view as possible

After a period of observation, accompanied by regular meetings with members of the staff of the Management and Control Area, the following problems were evident: Many municipal projects that pursue the welfare of society, are truncated both by the large amount of bureaucracy present in the decision-making, as well as by the little interaction that present the entities (mainly government) related to the projects in question, those who present obstacles rather than solutions.

On the other hand, due to the politician interests, who represent a political party rather than representing the citizenry. It has happened countless times that projects that really have a benefit for society, have been processed for longer than expected, or worse, their negotiation has been rejected absolutely.

The opinions and immediate needs of the community are not considered as a priority, even though the authorities know the problems they generate for the neighbors of the sector and passers-by, diminishing their quality of life and with this, their faith and hopes in the social-political system in which they are immersed.

However, by escalating the problems to higher levels, it is possible to detect a greater number of problems, which affect a greater number of citizens. Thanks to the secondary information present in different media (surveys, reports, news, among others), it is possible to detect new problems at the national level, mainly by the Congress, such as: Centralization of decisions in the hands of few individuals who do not know the reality of the people they represent. Decision making biased by personal interests, which include political commitments, personal ideals not shared by their constituents and even bribes and blackmail.

4. SYSTEM OPERATION

Assumptions of the proposal of augmented democracy

Provided data is enough to make digital twins with a least half-percent matching between them and their real part.

People have an email associated with google, with which they have their Social Media accounts and other linked accounts.

Users have a Smartphone (Android or iPhone), it has access to Google's location system, which is able to triangulate the location of a cell phone even when the GPS is deactivated.

Users have access to the internet, at least a couple of hours a day.

It is necessary that all users have their updated data in the Civil Registry.

People over 18 years must have an associated address, which must belong to a larger organization (neighborhood board).

Users are aware and responsible for the answers they deliver to their digital twin.

Users understand the consequences of not correctly and periodically using the application during the "data ingest" period of the digital twin.

Persons who are unable to vote will not be sanctioned for not using the application during the "data ingest" process.

In the event that a part of a neighborhood committee is directly affected by a project, the entire organization must participate in the voting of the project in question.

Explanation of the proposed model for increased democracy

The proposed solution consists of two parts both closely related, where the first one focuses on a personal application, unique and non-transferable for each natural person over 18 years, while the second part consists of a system of voting by organizations, for nomination, realization and/or approval of projects of different kinds.

The project has a 1-year kick-off and prototyping plan, during which the digital twin received data, which is an interface with the personal characteristics of each human being, based on machine learning, in order to acquire the greatest similarity with the user. The main goal in this period, is to have better digital twins that could make automatic choices regarding their real world counterpart.

The first step is creating a mobile app, in which the Google/iOS account of the individuals are linked, together with the Civil Registry, so that the application immediately obtains the user's basic data. From the link with the Civil Registry will obtain data such as Name, DNI, Birthdate, Sex, Address and a copy of the Fingerprint of the person (it will also be possible to obtain data such as criminal records, assets registered, among others, summary, all governmental information). While from the link with a Google/iOS account, you can register social media and GPS tracking, so it will be possible to get preferences, tastes, places visited, and so on. You can also look for similarities with other users.

The idea of linking an email account on Internet with the Civil Registry, is to thereby use data unique to each person, such as the fingerprint, to improve the data security,

considering that the fingerprint is unique for each person, and more difficult to hack. It also allows us to associate each user with a single organization, which in this case corresponds to an association of residents of a specific geographical location, such as a Neighborhood Board or similar.

In first instance we have **day 1**, corresponding to the activation process of the application and the "birth" of our twin. This part creates an interface with our basic data obtained mainly from the social media, our history from browsers on the Internet, among others, which will already be able to predict our decisions on different topics. However, it is very difficult for the present information to achieve an assertiveness of 100%, so it will be necessary to give new data periodically, so that the digital twin begins to evolve as it resembles the individual more.

This additional data will be delivered from periodic questions that the user could answer, being able to choose between answering a small survey on a weekly basis, or beyond that, answering a daily question. It should be noted that these questions are "Yes or No", so the time spent on them is really short.

With the creation of the twin, he can now make the decision by the user from the first day, however, if the user decides to manifest their vote manually, the latter is considered instead of the choice of the twin. During the period in question, the user will not be informed about his twin's predictions before voting, in order not to bias his decision.

Regarding the questions that users must answer, we can:

Select a question a day: in this part the application sends the question at 00:00 hrs. of each day, so that the user has 24 hours to deliver a response. In case of not responding in the required time, the application will block the mobile device, in such a way that it will not be unlocked until the question is answered (similar to a security pattern). In case of blocking the Smartphone, the emergency call option will not be impeded.

Select a short survey per week: when selecting this option, the survey is released to the application on Monday at 00:00 hrs. For this option the user will have the entire week to answer, however, once the survey is started, it cannot be stopped until each question is answered. In case of not answering the survey in the corresponding period, the Smartphone will be blocked, analogous to the previous point.

The application has "Collaborative Filters", this in order to avoid the lack of data in some individual who refuses to deliver information to "feed" their digital twin. In this case, the collaborative filters look for similarities among users, in such a way to interpolate the

decisions of a user who does not deliver information, based on users with similar characteristics, of which there is a greater amount of data. In this way, failures in predictions due to lack of information are minimized

In case a considerable part of the users are not interested in the voting system, they will be eliminated. In that way they: They have no voice or vote in future election processes laws and projects of the different levels (municipal, provincial, regional and national). They are not given the opportunity to apply for government benefits, such as subsidies or health and education services.

In the case of students, they will not be given access to the credits.

In the second part of the project, it is a system of elections based on weighted votes of organizations. In this case, an organization considers:

Non-governmental non-profit entities of a territorial nature that represent the people residing in the same neighborhood unit (Neighborhood Councils). In this case, each one has a different number of votes, with 1 vote per 25 qualified individuals to have a registered address within the geographical limits that comprise the entity. This is an official application, which is a Board of Neighbors or similar.

Personalization with geographical dependencies, in this classification, entries Colleges, Hospitals, Companies, etc. In this case, one vote is determined for each organization. zone could be 1 vote every 5 legal persons, although I would not know to do would be to control that, it could be an automatic entity)

Government entities that have direct participation in the preparation, approval and realization of projects and laws.

In addition to these organizations, for the approval of projects is considered an extra organization, in which there are *frequent passers-by* of the area in which a project can be carried out, but it is not an address associated to that area. In this way the opinion and the need of everyone involved is considered.

For the voting of a project that is in a specific and delimited area, a vote of all the organizations that have been put into practice is considered, in this case, that are geographically in the area of action of the project or its immediate surroundings. In addition, it is a fictitious organization. In this way the legal entities (Schools, Hospitals, Companies, etc.) have one vote, while the Neighborhood Boards have a number of votes proportional to the number of qualified neighbors to vote (every 25 neighbors is considered

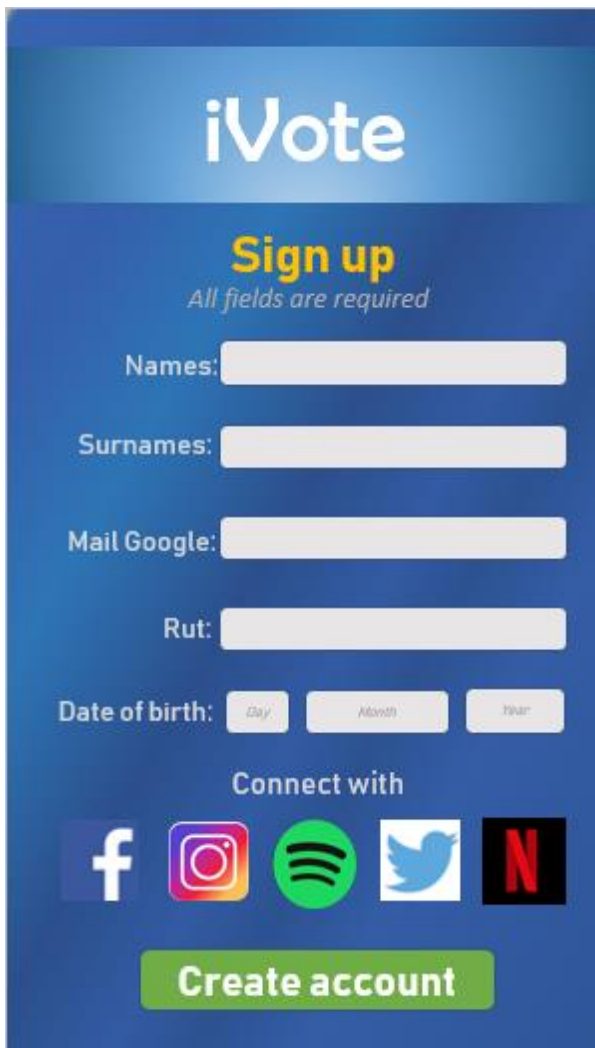
a vote), While the fictitious organization of passers-by has a variable number of votes (1 vote for every 50 people).

This process can be automatic or manual, depending on the user, the main goal of the system is to allow digital twins to vote, without asking their real world counterpart, but, to achieve this, the twin has to be as identical as possible to his person. In the case that a person really didn't showed any interest of the system, and his twin has little information from him, the system will have a prediction algorithm, that allow it to use the voting preferences of a more active user, with the same likes than the non-active user, considering that two people with the same likes could have the same preferences

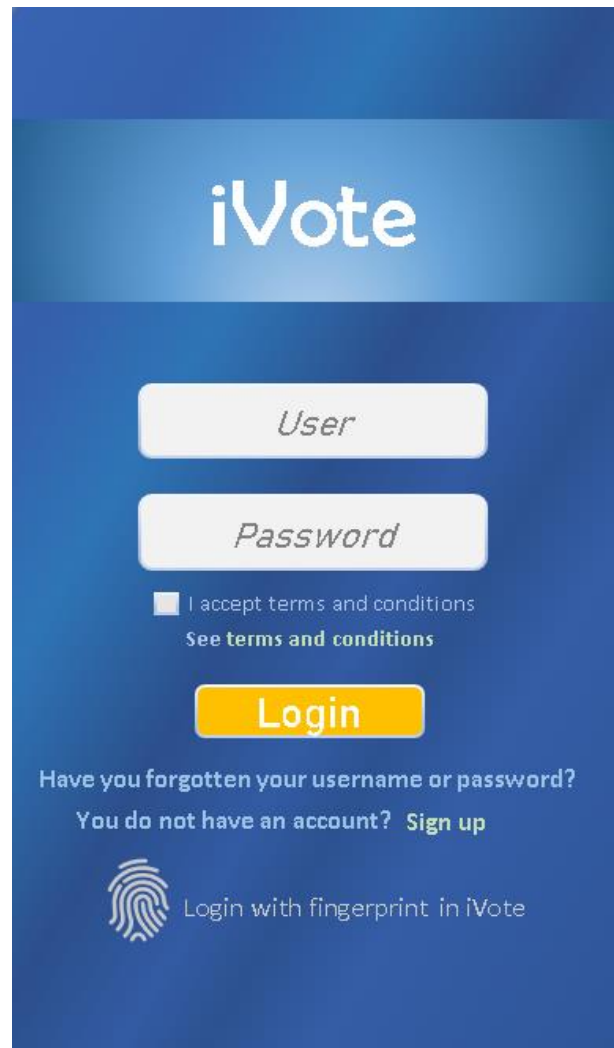
There are two ways to make a project with this system: When a lot of people make suggestions of the same problem, the algorithm will discover that society has a problem that has to be deal with, so, it will do an inform and send it to the corresponding public or private entity, so they will write the project and upload it to the platform, so, people who are allowed to vote will vote.

In absence of the situation showed before, any entity big enough can write down a project, but the entity who is responsible of the geographic zone has to approve the upload first, so, it doesn't permit bad ideas to be discussed.

5. USER INTERFACE



The sign-up screen features the iVote logo at the top. Below it, the text "Sign up" is displayed in yellow, with the note "All fields are required" in a smaller font. The form includes input fields for "Names:", "Surnames:", "Mail Google:", and "Rut:". The "Date of birth:" field is split into three sub-fields for "Day:", "Month:", and "Year:". Below the form, there is a "Connect with" section with icons for Facebook, Instagram, Spotify, Twitter, and a red 'N' icon. A green "Create account" button is at the bottom.

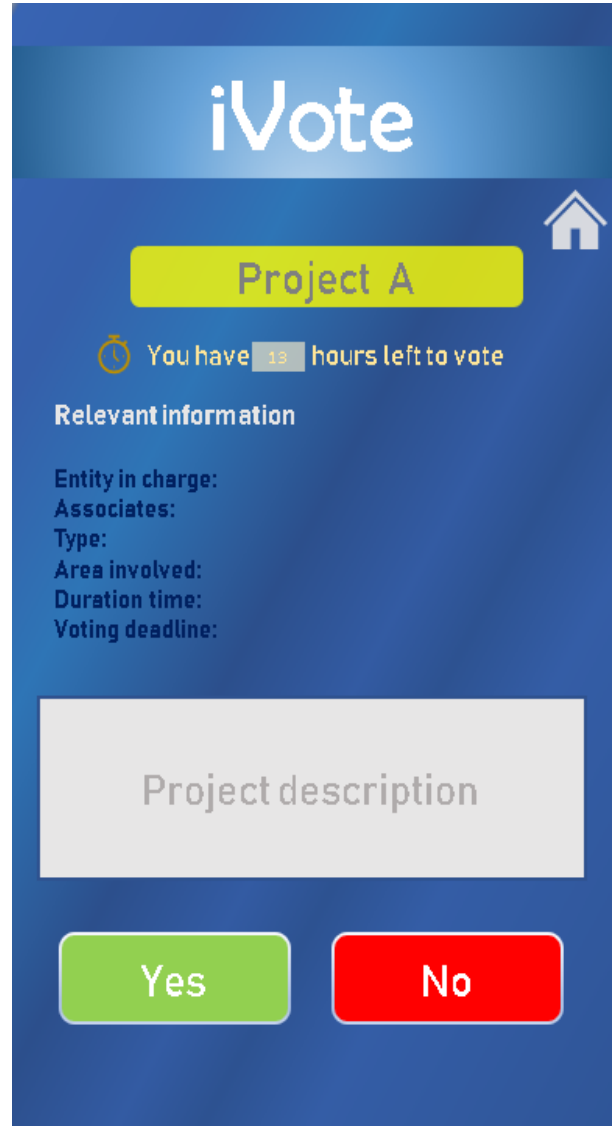


The login screen features the iVote logo at the top. Below it, there are two input fields for "User" and "Password". A checkbox labeled "I accept terms and conditions" is present, with a link to "See terms and conditions". A yellow "Login" button is below the form. At the bottom, there is a link for "Have you forgotten your username or password?" and another link for "You do not have an account? Sign up". A fingerprint icon is shown with the text "Login with fingerprint in iVote".

The application will be named iVote.

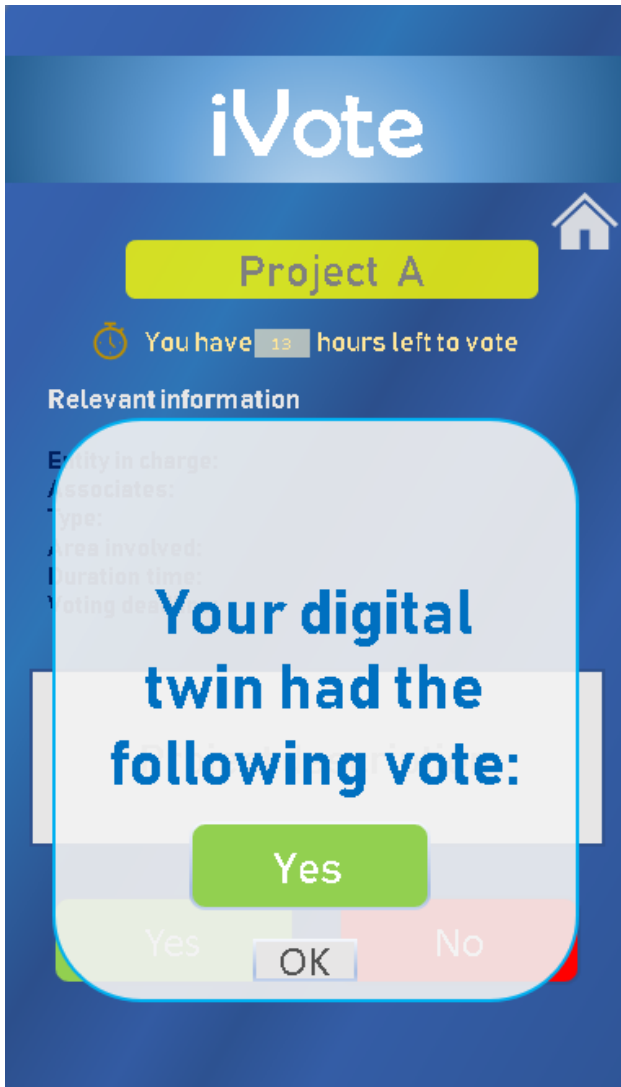
Account creation is basic, allowing you to link almost every social network available. Also, links your Rut so the app has access to governmental data.

The login is a basic login page, but it works better with fingerprint, so makes the app hard to hack.



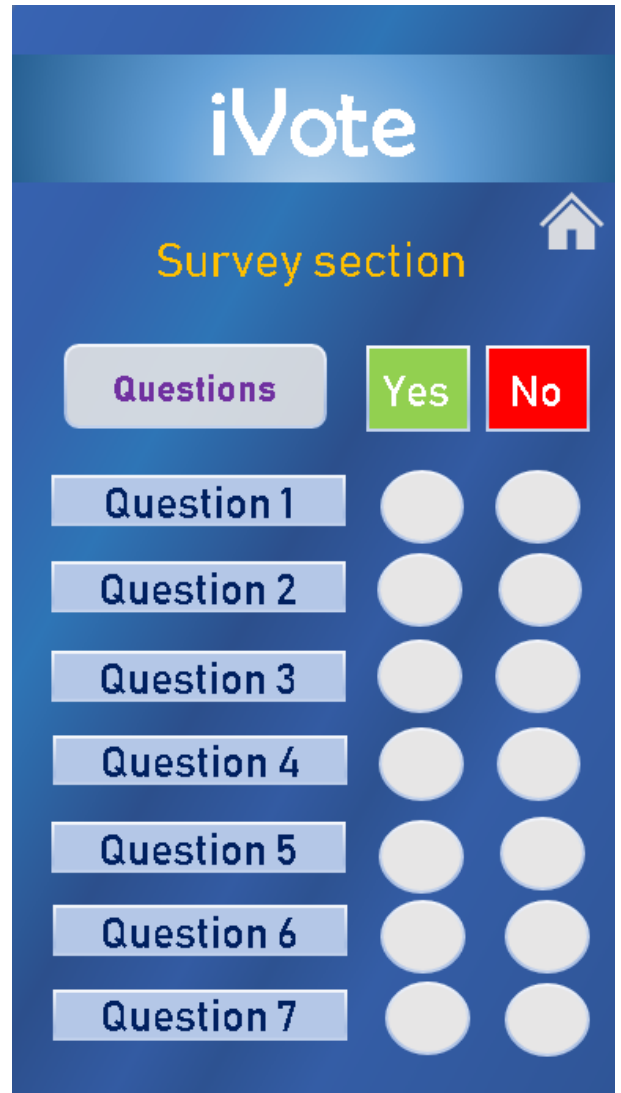
Project section shows every project that an user can allowed to vote, it is divided into 2 colors, one color represents the projects of your residence sector and the other color is associated to your fictitious address. In addition, it can be filter by type, be it social, environmental, economic, etc. and can be ordered by publication date, expiration date, project cost, among others.

When you click one, another window pops up and it shows you the detail of the project selected, in addition the remaining hours that you have left to vote.

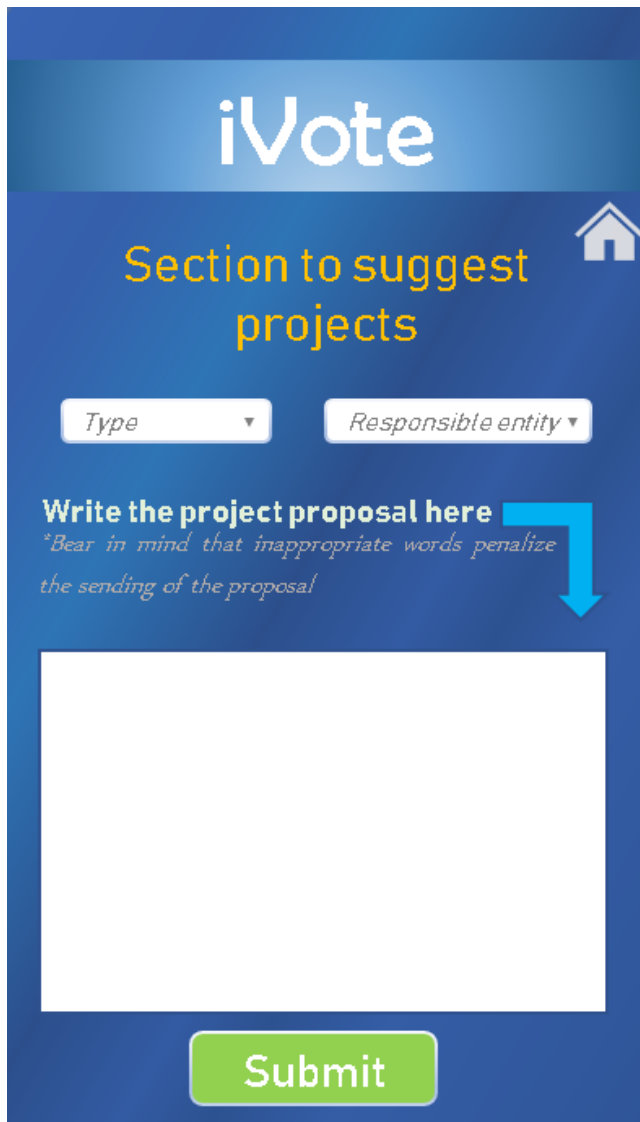


After voting, the system shows you what your digital twin voted, in case that you manually vote, if automatic was already selected, only shows you the vote of the twin.

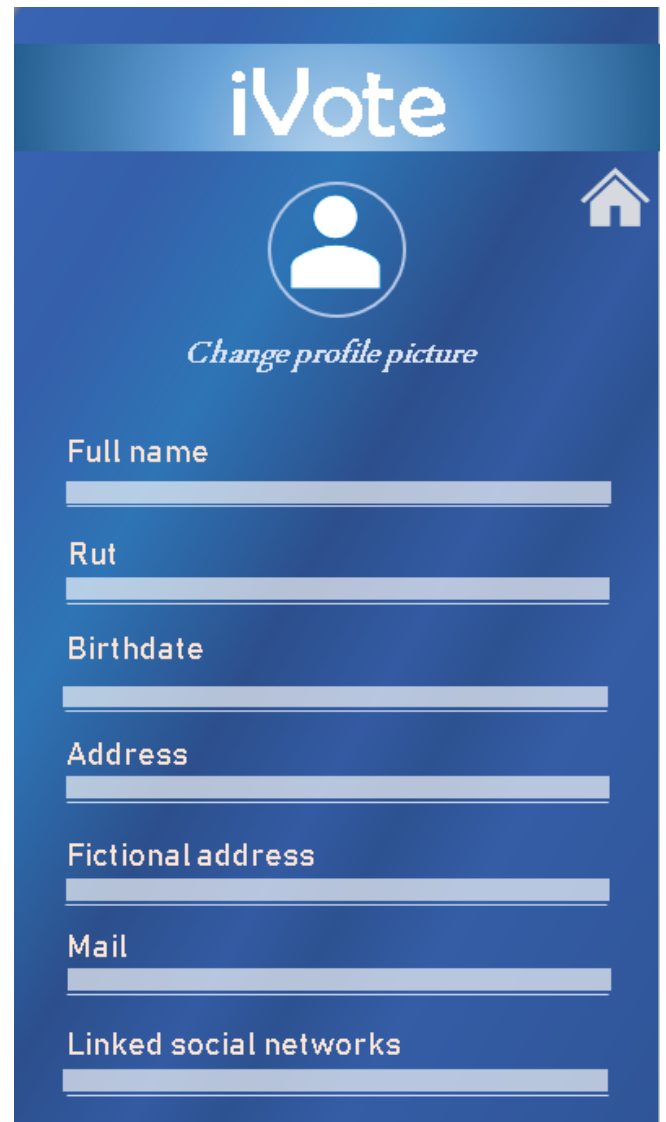
Record section shows the relationship between your votes and your twin votes, as shows the assertiveness. N/I indicates that no information has been found, that is, the person did not vote.



Daily questions help the twin to grow, enhancing his assertiveness rate and the survey serves the same purpose, but the user will only see one of the two sections and it will be the one he chooses in setting.



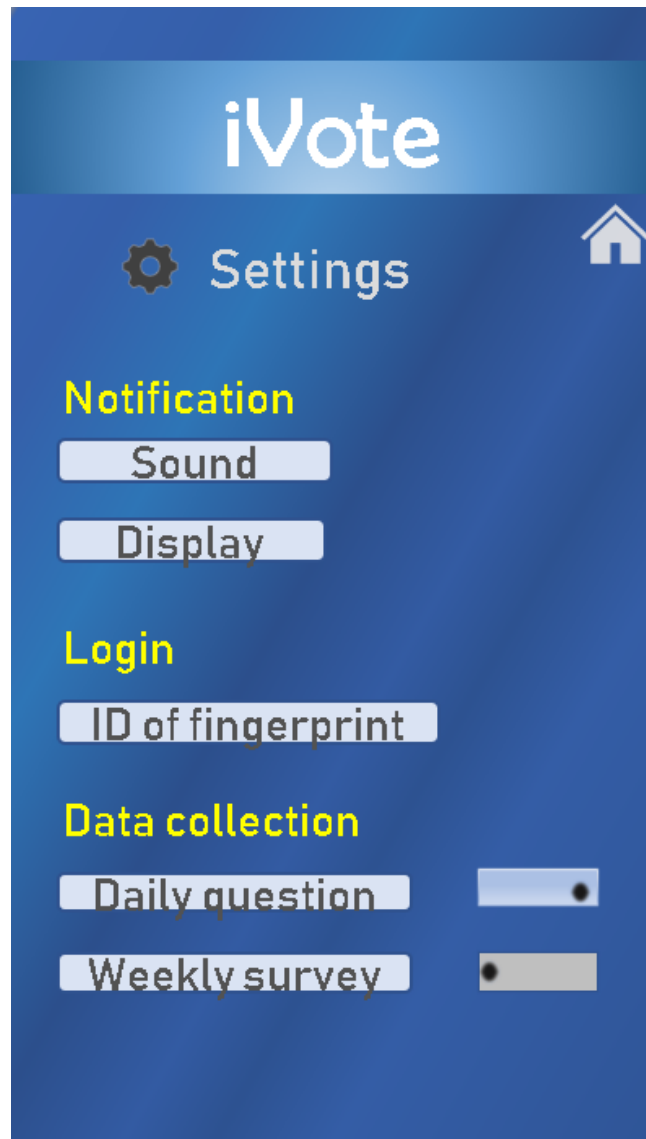
The image shows the 'iVote' app interface for suggesting projects. At the top, the 'iVote' logo is displayed in white on a blue background. Below the logo, the text 'Section to suggest projects' is written in yellow, with a small white house icon to its right. There are two dropdown menus: 'Type' and 'Responsible entity'. Below these is a large white text area for writing the project proposal, with a blue arrow pointing to it from the text 'Write the project proposal here'. A note below the text area reads: '*Bear in mind that inappropriate words penalize the sending of the proposal'. At the bottom, there is a green 'Submit' button.



The image shows the 'iVote' app interface for user profile details. At the top, the 'iVote' logo is displayed in white on a blue background. Below the logo, there is a white house icon and a white circle containing a person icon. Below the person icon, the text 'Change profile picture' is written in white. There are several input fields for profile details: 'Full name', 'Rut', 'Birthdate', 'Address', 'Fictional address', 'Mail', and 'Linked social networks'. Each field has a corresponding white input bar.

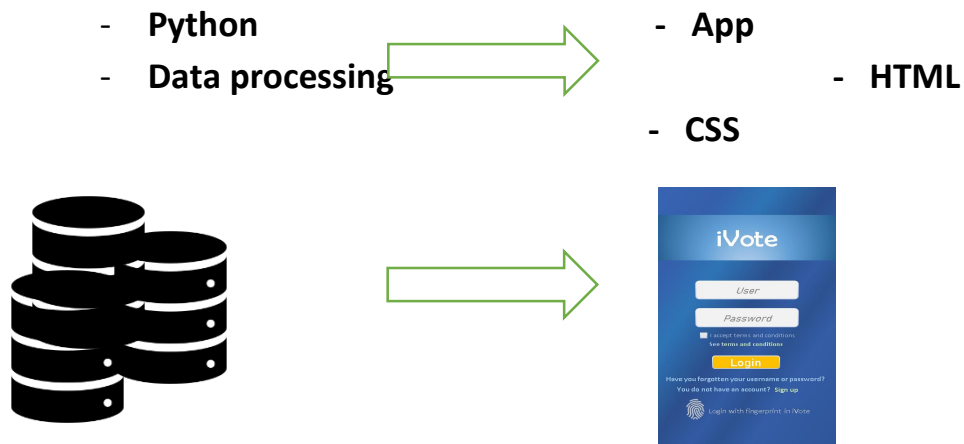
If an user wants to propose a project, he can write the details of the project, the algorithm will link it with others similar to it.

The profile section allows you to see your profile details.



Settings only update notifications, login and data collection settings. In notification you can adjust the sound, which involves some specific tone or vibration, in addition to the display if you want it to appear or not on the main screen for example. In ID of fingerprint, you can adjust and activate or deactivate the fingerprint and finally, in data collection you can select if you want a daily question or a weekly survey, if one is chosen, the other is immediately disabled, but it can be changed at any time.

6. TECH-STACK



For the Back-end technologies, we propose to use Python , they will be in charge of gathering the data and synthesizing them to transform them into action, then for the Front-end, which as previously commented an App will be developed HTML+JS+CSS.

The Data will be stored in governmental servers, considering that the project will be done by them

7. PRIVACY, SECURITY AND ADAPTABILITY ISSUES

Privacy & Security:

1. Mistrust of the population: people may tend to distrust the mobile application because it will work with personal data, such as the DNI, fingerprint, in addition to the data from google accounts and social media, so you could think of an information manipulation.
2. "Invasive" application: given that the digital twin must be fed at all times, it will be necessary to know the activity of the people, this includes their location in real time which could be a little uncomfortable for the population due to a possible feeling of persecution by part of who controls the application.
3. Minors may try to create an account: since only people over 18 have the right to vote, there may be minors who are interested in making decisions and want to register in the iVote database.

Solution: the information needed for the creation of the digital twin will be provided voluntarily by the users and the new information will be obtained from the use of the application, in addition, people must accept the terms and conditions of iVote which, obviously, include access to the personal information to verify the identity of the people (like the DNI and the fingerprint) and to the synchronization with diverse applications that could provide it (social media, gps, google, etc).

1. Theft and/or modification of data: it is possible that hackers try to access the database in order to steal personal information or to modify the data of the digital twins according to different political interests, favoring the decision making according to these interests there may be people who do not agree with this system and want to eliminate the database to end the application.

Solution: All information will be encrypted and secured so that no one can access the database of the application and, therefore, the personal data of another person.

Adaptability:

1. People without access to the application: there could be people who do not have mobile devices (smartphones) and, therefore, would not have access to the application and could not vote.
2. Operation of the application: there may be people with little instruction in the use of mobile devices who do not know how the applications work, therefore, they would complicate the use of iVote.

Solution: it is assumed that these measures will be implemented in the future, when the majority of the population has access to smartphones. In addition, tutorials and dissemination campaigns will be formulated to teach people to use the application correctly, although it will be quite user-friendly.

3. Need of internet connection: iVote will work through internet connection so it will be necessary for people to have a stable connection when using the application.

Solution: mobile companies must provide free access to internet for the use of the application, as they currently do, allowing navigation within their own websites.

4. People who are blind or have vision problems: there could be people who have serious problems in sight and, therefore, could not use the application by themselves.

Solution: implementation of a tutor, a person can assist the user with vision problems for the use of iVote, this tutor will be registered in the database as a personal assistant and must verify their identity when assisting the user.

8. CONCLUSIONS

The main idea of augmented democracy is to end politicians, which is also a desire of every human of the world that had problems with them. The idea of using digital twins may sound crazy at first instance, but, with a latter explanation of how it works, it appears as a possible solution in the near future, as technology grows, and people demands of a complete country aren't fulfilled by the work of 100 people in a building in a capital.

Intelligent algorithms that predict people needs are a reality, also, algorithms that can read a paragraph and "understand it" are not science-fiction, and they are present in society, but people don't know.

The goal here is to educate people, so they know that technology aren't just big TV's, quick Smartphones, and it can help to enhance quality of life aspects of people, such as political interaction with their representatives.

The model here is just a first approach to what can digital twins do in the future, considering that the knowledge of the work group is limited, and many opportunities are missed, so, the model can be iterated to a better version

Combining political decisions with smartphones is not a crazy idea considering that most of the people have at least one, and it became part of our daily lives, so, it's a opportunity to have to be taken into account.

As final words, the work group is enthusiastic to see how technology will grown, and which at that what heights will reach, in their goal to enhance life quality of people.