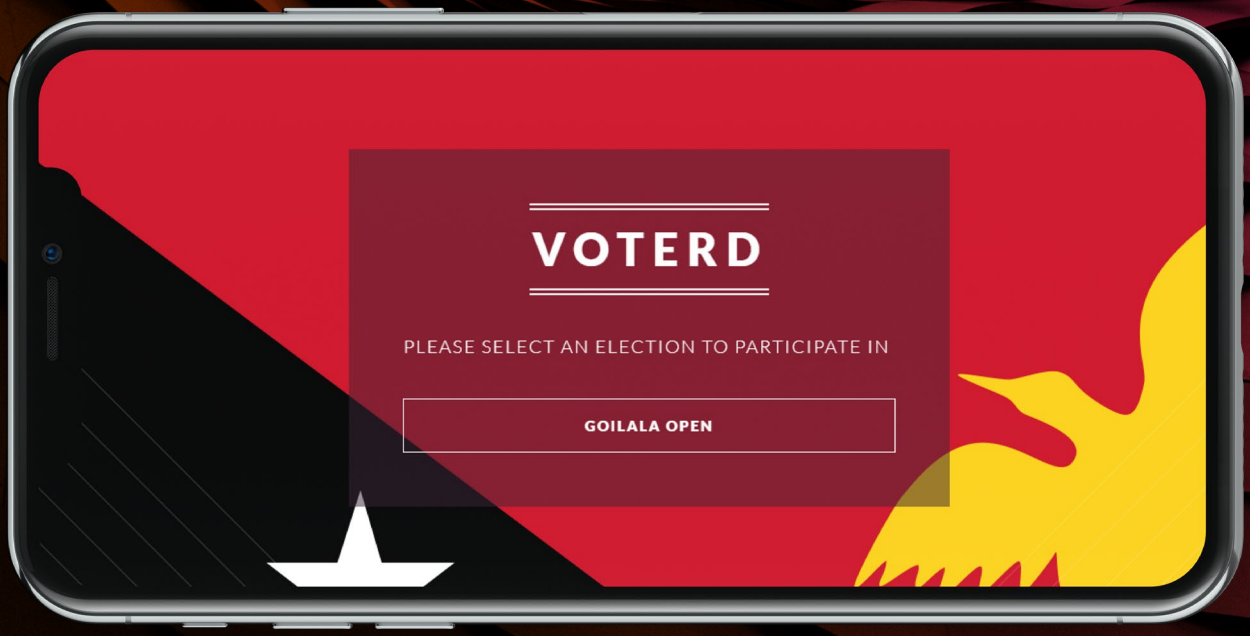
Voterexy

EXPRESSION OF INTEREST

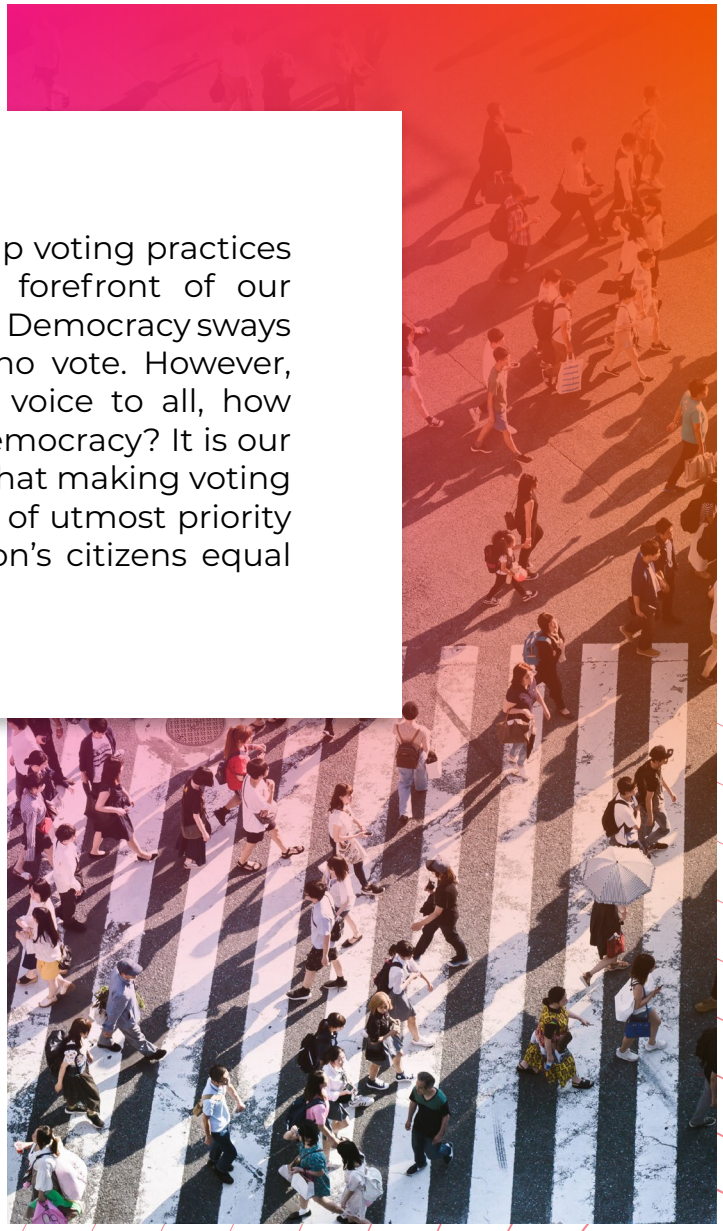


SOCIAL GOOD
A WORLD OF GOOD

Akera Akalanana Moi
Akera.moi@outlook.com
+1 513 227 4900
Social Good Apps
Yet & Sons

Introduction

The urgent need to revamp voting practices has always been in the forefront of our country as a national need. Democracy sways in the hands of those who vote. However, without giving adequate voice to all, how can we state we have a democracy? It is our firm belief as a company that making voting accessible to all citizens is of utmost priority as it seeks to give a nation's citizens equal voice in governing.



Voting Challenges

The challenges that ballot boxes present are numerous. During elections, voter ballot boxes have been known to be missing, sometimes stolen and on occasion destroyed. Because the votes that are cast are physical votes, these votes cannot be regained unless another election is held. Additionally, the challenge then becomes that voter turnout may not be as original thought. The challenge then becomes how to reconcile actual votes cast with our voter registration records. At times, ghost voters may appear as votes cast when original voter or census records may dictate otherwise. These tactics erode voter integrity and the trust that citizens have of a fair election. Furthermore, it diminishes voter confidence possibly impacting whether or not they as voters will vote again. That will or resolve to participate in democracy will diminish over time as voters may perceive their vote as not being protected and their voice not heard or represented due to these voting challenges.

A real threat to voting is the issue of voter intimidation. It is basic human instinct to react to fear in either a fight or flight mode. If a representative of a tribe or party is present, there is an implicit guidance and expectation of how that voter should vote. This type of voter intimidation may skew a voter's real desire to vote for their original candidate and make their decision biased. If a voter fears for their family or personal well being, they will invariably vote the way they feel would please their intimidating party; therefore obscuring the democratic process of voting.

The process of counting votes can be a long and arduous process. Election officials take time to physically count votes to ensure that every vote is counted. However, in an effort to produce election results per electorate, voting mistakes may occur as everyone is prone to human error. Any counting that occurs has to be validated with the actual count of voters that live in that electorate and matched with

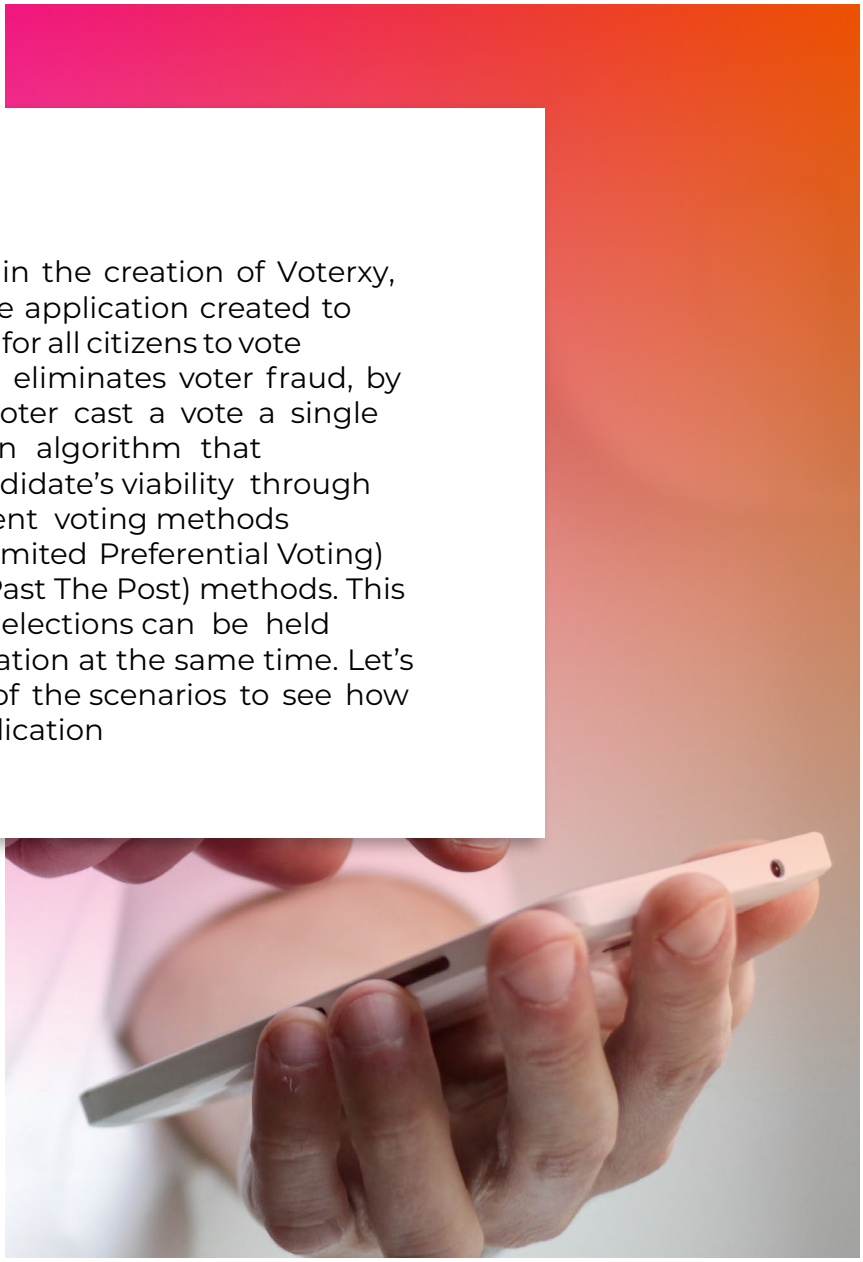
a voter in order to ensure the voter count is correct. In addition, all votes have to be counted as each votes is an equal and representative clog in the wheel of democracy.

Another challenge that must be overcome is the practice of voting multiple times. In order to ensure that one's candidate wins, voters have sometimes taken to voting multiple times for their candidate. This may be done through convincing the election official that the voter has not already voted, thereby allowing the voter to vote multiple times. This may also occur where the voter eliminates the voting mark where the election official has previously tagged the voter of having voted and attempts to vote again. This not only distorts the election results but also increases the electoral voter count, skewing voting results disproportionally. Voter misrepresentation may also occur when a voter attempts to vote for someone else due to physical similarities. Because the election official may not be familiar with all voters in an electorate, the voter could pass as a new voter has not voted. The result here is the same. Democracy is withheld as a few manipulate the voting process.

As a voter, one should reserve the right to see whether his or her vote is counted. In our opinion, voter accountability is an important topic to note as knowing where one's vote has been cast instills a tenant of voter confidence. If, as a voter, I am able to track my vote; I will have more confidence in the future to vote. As it stands today, once the ballot is cast, the voter will usually hope that their vote gets counted and has no recourse to validate that their vote has been applied to their candidate. If a process does exist, it may be difficult to prove and track the vote. Many times voters can feel that their vote has been cast and although they cannot prove it; they hope their vote gets counted toward their candidate. While this is normally the case as election officials perform their duties, many voters are left with a sense of insecurity and can only hope their does count in the end. Traceability and accountability must be a foundation of our elections.

Voting Solution

The solution lies in the creation of Voterxy, a web and mobile application created to allow easy access for all citizens to vote securely. This app eliminates voter fraud, by only allowing a voter cast a vote a single time. It utilizes an algorithm that calculates a candidate's viability through voting via different voting methods including LPV (Limited Preferential Voting) and FPP (First Past The Post) methods. This means multiple elections can be held within the application at the same time. Let's delve into each of the scenarios to see how the Voterexy application works.



Authentication

To counter the challenge of voter fraud, Voterxy implements a 2 method authentication scheme. This means that the Voterexy application will require the user to login twice if using traditional login methods. This has proven to be the world-wide standard if users are using a username and password to login. This will certainly be the case if Voterexy is utilized on a portable device. This means the first login will require the username and password and the secondary login will be a passcode that may be sent via text or email. If the user is the assumed user, they will be able to access their voting options by authenticating additionally with a passcode.

Biometric logins will also be another option to allow logins for unique users. Newer Android phones, tablets, iPhones, iPads allow logins with the finger printer scanners on the devices. This application will also allow the login of users through these devices. In order to ensure this method does work, we would have to have all eligible voter fingerprints or thumbprints available. This will allow the Login screen to validate the user's login with their fingerprint prior to allowing them to their voting options.

The secondary phase of implementation will include facial recognition. The aim of this is to use cognitive services to study the features of a voter's face and determine who they are. Characteristics such as age, sex and even emotional state can be derived from this algorithm. As mentioned previously regarding fingerprinting, we would have to have the equivalent of photos of each voter prior so that the matching processes can map the voter with an existing known photo of the member. This method will be useful in determine voter characteristics and allow us to log the voting experience for the voter.

Voter registration details are vitally important for this endeavor. This ensures that we are able to map voters to their correct electorates and show only the voting options that pertain to that voter. In addition, any additional voter characteristics that can be derived from the census or the National ID program, or the Electoral Commission would be important as it further distinguishes the voter.

We have discussed various ways of authenticating the voter. Voter identity is the first step. The question arises as to how we ensure that the voter does not vote multiple times. This is done through the VoterD app. Now that the voter has authenticated, we know who they are, any vote they cast, will be recorded and logged. VoterD will not allow the same person who has now authenticated the ability to vote again. This is because there a one to one relationship with a voter and an election for a specific electorate. This means only one voter can vote for one unique election. If the voter has already voted for that unique election, they will no longer be able to vote as this option will be unavailable.

Limited Preferential Voting (LPV) Algorithm

Limited Preferential Voting has had an impact on Papua New Guinea by ensuring that all voters have a preference of up to 3 candidates. This is useful in ensuring that an electorate has a representative candidate that is elected by the majority of its voters (50% + 1). Unlike the FPP(First Past The Post) method, a complicated calculation of votes cast in preference have to be counted and excluded until a candidate receives more than 50% of the vote. VoterD has implemented an algorithm that counts these votes in order of preference and eliminates the lower count candidates up until it reaches the final candidate that has the majority vote. It expertly exhausts votes that are cast for a single candidate, but continues in adding second and third preference to the remaining candidates while eliminating the lowest count candidate. This occurs at the end of the election to make sure all voters preferences are tallied prior to declaring a winner. This algorithm also denotes all candidates that were eliminated so that there is visibility to the count when a candidate was removed. It also displays the total count that was allocated for a specific candidate to allow transparency into the process.

Logging_ID	Candidate_ID	Election_ID	History	DateCreated	Candidate_Name	PercentageofVotes	Round
168	1	3	Initial Run	8/2/2017 9:17:54 PM	Peter ONeil	0.3333	1
169	2	3	Initial Run	8/2/2017 9:17:54 PM	Michael Somare	0.3333	1
170	3	3	Initial Run	8/2/2017 9:17:54 PM	Julius Chan	0.1667	1
171	4	3	Initial Run	8/2/2017 9:17:54 PM	Paias Winghti	0.1667	1
172	4	3	Candidate Excluded	8/2/2017 9:17:54 PM	Paias Winghti	0.1667	2
173	3	3	Candidate Excluded	8/2/2017 9:17:54 PM	Julius Chan	0.3333	2
174	2	3	Candidate Winner	8/2/2017 9:17:54 PM	Michael Somare	0.6667	2

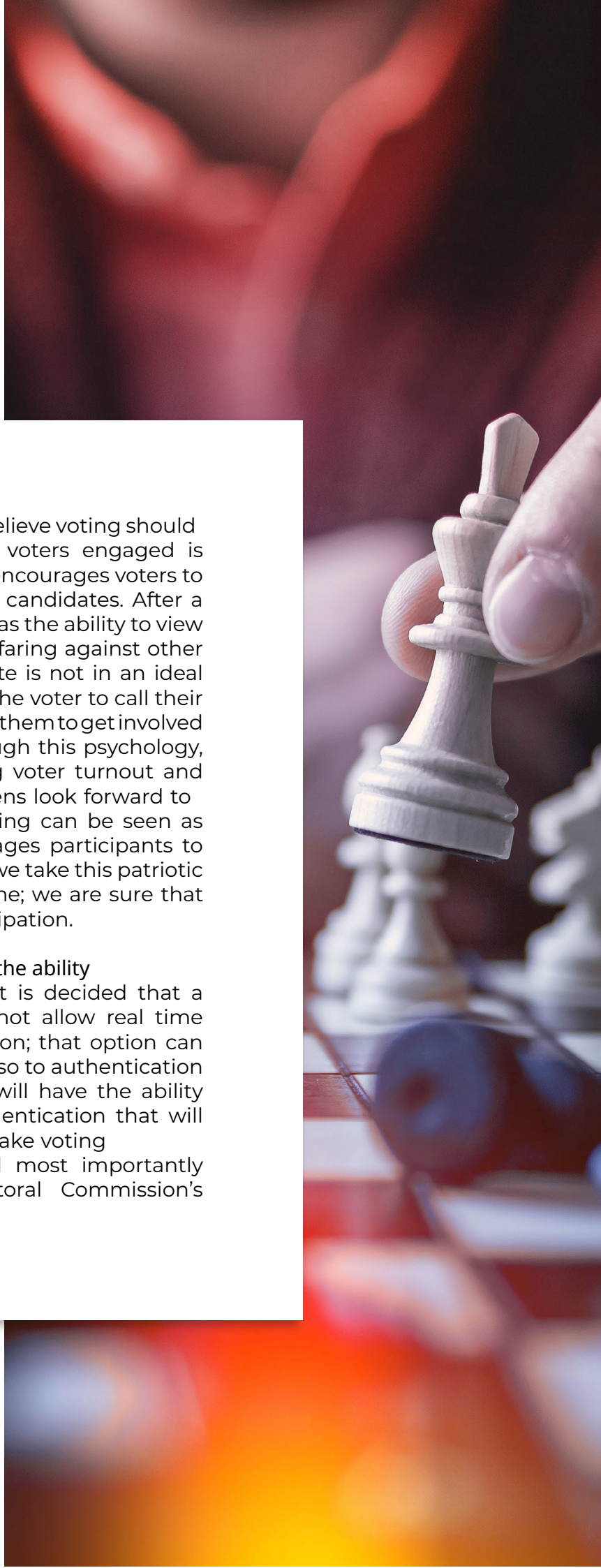
LPV Algorithm Test Run Sample Result

Voterexy Benefits

An important aspect of Voterexy is voter turnout by making voting accessible, easy to do and secure. Voters should have the ability to easily vote without the constraint of standing in line or waiting on an election booth to be available. This can only be done if the app is accessible by voters. If eligible voters are registered and their biometric and Face ID data is captured previously, they may have the option to vote on their own mobile Android or iPhone device. They will have to authenticate on the device; therefore eliminating the possibility of voting elsewhere such as in an election booth for example. Mobile devices in Papua New Guinea have a high saturation rate, meaning nearly every Papua New Guinean has a mobile device. This in turn will increase the utility of Voterexy.However,it must be noted that there are voters that are remote; possibly located in villages that may not have accessibility to a mobile device. These will require traditional voting booths instead of paper ballots and Voterexy will be acessible on portable devices there so voters may make their candidate selections. This will ensure that every citizen, whether they have a mobile device or not has the accessibility to vote.

Voterexy will also contain the voter's voting history so that the voter has access to all their virtual ballots that were cast. Historically, after a vote has been cast, there was no easy way to get information about a vote that occurred in the past. With VoterD historical visibility, voters will be able to track their vote and see who their votes were cast for indefinitely.

Game Theory



The creators of Votexy also believe voting should be fun. One way to keep voters engaged is through game theory. This encourages voters to check the progress of their candidates. After a vote has been cast, a voter has the ability to view how well their candidate is faring against other candidates. If their candidate is not in an ideal position; it may encourage the voter to call their friends and colleagues to ask them to get involved in the voting process. Through this psychology, we are indirectly increasing voter turnout and in the process making citizens look forward to voting. In sports terms, voting can be seen as a competition that encourages participants to cheer for their candidate. If we take this patriotic duty and equate it to a game; we are sure that we can increase voter participation.

Of course, Voterexy will have the ability to be turned on or off. If it is decided that a particular election should not allow real time counts until after the election; that option can be turned off. This applies also to authentication as election administrators will have the ability to choose the type of authentication that will be utilized. The goal is to make voting accessible and secure and most importantly compliant with the Electoral Commission's requirements.

Conclusion

In conclusion, Papua New Guinea stands to benefit from the Voterexy app. As a result of this app's usage, we can eliminate the possibility of miscounted or misplaced ballots. Voterexy will provide an audit trail for every vote cast that will allow the Electoral Commission to follow a vote from assignment to casting. In addition, Voterexy will offer a secure mechanism by which voters may authenticate utilizing biometric and Face ID to ensure that they are authorized to vote. Voterexy is not just a platform by which voters perform their patriotic duty, but an avenue that permits voters to enjoy the process
of voting. Most importantly, the application seeks to encourage the PNG voter to effectively participate in democracy. It is our firm belief that this application will strengthen the underpinnings of Papua New Guinea and give voice to a deserving nation with transparency.

Akera Akalanana Moi

About Lead Developer

Akera Akalanana Moi is full stack Developer with over 20 years of experience developing and supporting large-scale, enterprise applications, web services and websites for Fortune 500 Clients.

He has experience working in Insurance, Healthcare and Financial services domains including eight years of background designing and supporting Sarbanes-Oxley compliant applications in the financial services sector. His primary focus is on database driven dynamic web applications and web services using ASP.NET technologies. He has worked on Single Sign On (SSO) applications and created .NET applications for desktop use with extensive experience designing rich and interactive user interfaces using technologies such as HTML5, CSS, JavaScript, jQuery, and AJAX. He has created Web APIs and Restful Web Services including creating windows services for Active Directory. He has a strong database background with SQL including creating tables as well as writing stored procedures, SQL views, and functions for tools. Over 10 years of IT consulting experience for a vast array of clientele including Siemens, Atos, Morgan Stanley, and Cincinnati Financial Corp.