

BANKING PHONE APP

PROTOTYPE

IMPLEMENTATION

The prototype interface of the app had been implemented using html, css and javascript. The interface differs from its original version of the app, but withstands its general purpose. In order to demonstrate the fingerprint authentication feature, we used an image of the finger that can be dragged onto the phone. There are two images of the finger and only one of them will work to authenticate. Since the interface is only in its prototype phase and our possibilities were limited, we decided that this is a sufficient way to present this feature. The voice control is pure javascript, annyang library is used for the user input. The library uses microphone extension, which must be enabled by a user when loading the page. Everything a user say it's captured by the browser, if any strings generated from that input are matched with provided ones in the code, the browser performs some given function. Everything happens locally on your computer, no data is sent out anywhere. The output of the voice control had been achieved by using built-in feature in the browser, which is SpeechSynthesis. Passed strings into creation of a speech synthesis object allow to read them out loud. These strings are generated by obtaining the data from the html tags.

The voice control is fully functional only on Chrome and Safari, because these are only the two browsers, which supports speech synthesis.

UNIT AND INTEGRATION TESTING

Before the prototype was submitted for user testing, it had been vigorously tested by me. Unit Tests were executed throughout the whole process of implementation this way any changes committed to the repository were fully functional. Having unit tests performed regularly and precisely, significantly increases the chances of having a working product at the end with a lot less bugs. For example, after writing a function for a voice control to query balance of the account, the local development web app page was reloaded and that particular function was tested. The same approach was taken for every piece of code which was testable.

Integration tests were completed before pushing any changes to the repository, making sure to not leave any broken and non-functional piece of code. These tests were performed as the whole product up to the current stage. In other words, before pushing the code to the repository, I would reload the local copy of the web app in the browser and test all its features present at that stage. Any found bugs would have to be fixed before pushing the changes back to the repository. This approach was taken every time before making final commits.

- <https://github.com/kosma24/banking-app>

FINAL TESTING

The undertaken testing strategy throughout the implementation process had made the final product testing a lot easier. All aspects of the prototype had been tested already numerous of times. As it turned out the final prototype testing was a walk-through process.

FINGER PRINT AUTHENTICATION

Both images of the finger were dragged and dropped all around the screen to make sure the authentication only works for a correct 'finger' and only when it's dropped at the right location of the screen. Also error handling in this case was tested, making sure the user get a right notification if the authentication fails.

VOICE CONTROL

Testing this feature was the most fun part of the project. At its final stage, I would list all declared commands in the code and test each of them on a different screen of the app. Since some commands should output different things, depending on the STATE of the application.

I would also attempt to mix up commands to see if any of them breaks, for example, instead of saying 'GET CURRENT BALANCE' I would say 'GET BALANCE CURRENT'. Theoretically we would like that to also work, but our voice control is not as smart yet.

PRACTICAL TESTING

Before allowing another members to perform the tests themselves and on the user groups, some practical tests had to be performed.

Voice control feature tested:

- 1) While TV set was playing at the background.
 - Voice control was not working as expected, the microphone was catching up words coming out from the TV and commands were not recognized.
- 2) In the car (as a passenger) in a moving car.
 - The voice control worked correctly as long as the radio was not impairing the voice commands.
- 3) In the shop.
 - Busy environment did not make things easier but once the handset was used, the voice control feature was capable of returning the right data.

USER TESTING

After the implementation of the prototype we had a team meeting to discuss in what was the best way to portrait and test the Banking Phone App from its aspects.

Following the meeting we agreed to get a user group of three different users which would contain youth, middle aged and elderly. We felt that this would be the best possible method to portrait the improvement of the interface from the actual user's evaluation itself. Before gathering the users we set out a list of objectives.

- The user must be aware of the purpose of this process.
- The user should be told what type of questions will be asked.
- The user should be allowed their own comfort and not pressured to complete this process.
- The user must be asked to return feedback with preferences from their own Bank Account.
- The user should have access to a banking app and uses it regularly. (Preferable AIB banking app).

These were the points we first considered before we gathered the sample of users. We agreed that the users would be members of our family as it was easier to confront them rather than approaching a stranger, were there first reaction would be confidentiality about their bank details.

The participants we gathered for the tests were aged 18, 31, and 70. From research we felt that these ages would test the usability to its best measure. The members consisted of a student, a bank manager and a retired school teacher.

When we were creating the tests we said we would run a number of small tests on each member as we would be able to gather a different number of positive and negative factors to portrait them on graph for each user. Usability vs Number of tests.

Factors we considered before creating the test cases:

- **Time** - The time it takes for the user to get his/her objective in comparison to the original app.
- **Response** - How fast the user's response in understanding the apps features.
- **Consistency** - How consistent is the improved app is in comparison to the original app.
- **Efficient** - How efficient are the new features to use daily.

PROCESS

- 1) The user should log in as normal and view their current credit details using the given Registration and Pac details.
- 2) The user must view its accounts by dragging the finger from the left panel of the screen on to the finger print area, and view its current account.
- 3) The user must view the balance of the current account again, but this time using voice control to select the current account, get the credit balance and get the IBAN number.
- 4) The user this time must go into the current account get the balance, get the last transaction recorded, its BIC and IBAN details along with logging out using the voice control.
- 5) To become familiar with the new features, the user should now repeat the above steps.

USERS

Before the users starts the test cases we asked them to use their own app a number of times, this was to leave the original apps features fresh in their mind, so it would be easier for the user to compare with the new features.

EVALUATION

USER 1 (18 YEAR OLD STUDENT)

After the student completed the test cases we interviewed him as a team to get an evaluation of the new features. It did not take the student long to understand and adapt to the new features. He found the fingerprint sensor a huge improvement to the application as he did not know his registration number which he had to always go out of the app where he had it saved on his phone. The student was also impressed by the voice control, but he admitted that it was unnecessary for his use.

USER 2 (31 YEAR OLD FACTORY WORKER)

After the factory worker completed the test cases he was also impressed by the use of the finger print to access direct bank details, instead of using your Registration number and PAC to view recent transactions as it is something you would check for more than once a day. It was clear that we had kept consistency in the design of the interface as we did not have to instruct the user to gain access to the account using the fingerprint feature.

USER 3 (70 YEAR OLD RETIRED TEACHER)

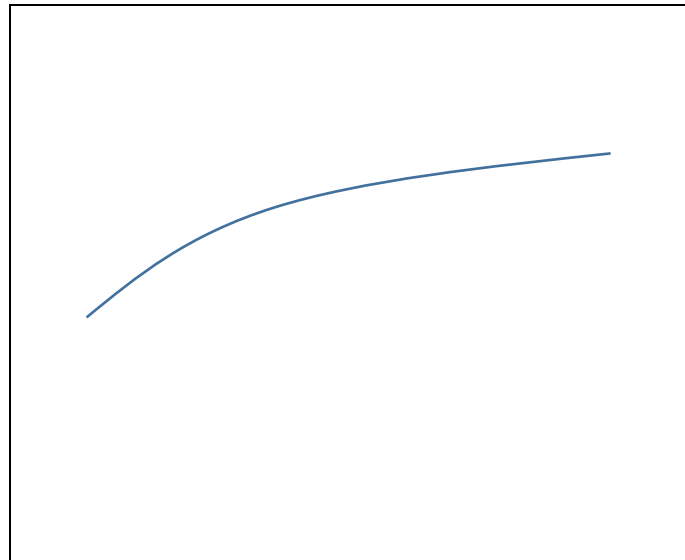
This was the user group we were focusing on as from research the use of applications through mobile devices was very low. There was a lot of explaining even to get through the test cases. However the user felt that the implementation of the voice control was a positive factor as he admitted to finding it difficult to read the small digits on the screen.

The use of the fingerprint feature was also a massive advantage to this user as there was no difficulty in accessing bank details due to this feature.

TEST CASES

USER 1 - CATHAL RABBITTE

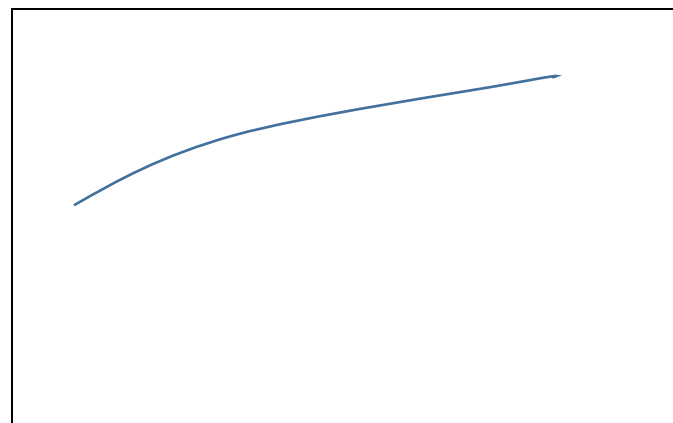
Usability



Number of tests

USER 2 - SEAN MCKEOGH

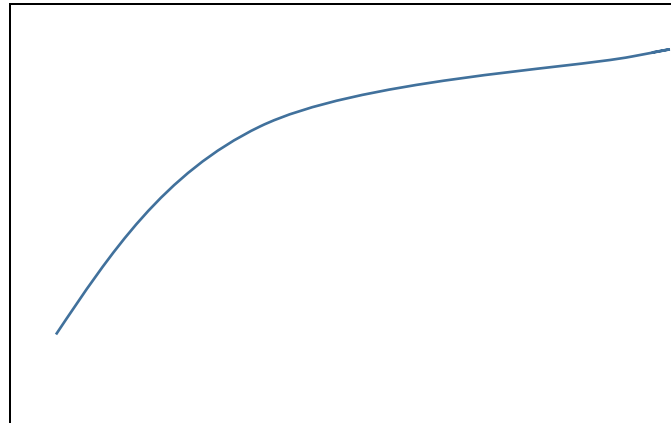
Usability



Number of tests

USER 3 - JIMMY BRADY

Usability



Number of tests

CONCLUSION

As seen above is the diagrams showing the coloration between the numbers of repeated tests for the user's usability to improve for each user.

From looking at the graph for user 1 it shows that the student did not take much learning to figure how the apps new features worked.

There is a similar result and relation between user 1 and user 2, however the user 2 new slightly more about the app than the student did, this is probably just picked up over time from experience with the original application.

When we look at the graph for user 3 we see that there is a massive learning curve for the usability of the user 3 to improve and to get use to these new features, however he did manage to understand what was been achieved.