

University of Ottawa

GNG 2101[C]: Group 2.3

**Deliverable D – Detailed Design,  
Prototype 1, BOM, Peer Feedback and  
Team Dynamics**

*Submitted by*

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## **Abstract**

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In this deliverable, a summary of the last client meeting that includes design changes and improvements is provided. Based on the feedback received by the client, an updated and detailed concept design is made. Furthermore, a bill of materials regarding the necessary components for the success of this project is presented in a tabular format. The first product prototype is completed after having defined the most critical assumptions. Many sketches and ideas are added, and some testing methods are proposed. Finally, a description about our plans for the next client meeting is given.

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# **1 Introduction**

After meeting with the client and receiving feedback, the team came up with improvements that were made to the chosen global concept and accomplished the first prototype and test plan. In deliverable D, the objective was to use the client feedback and present a detailed version of the updated global concept that displays all the changes that were made. A prototype will be presented that shows the detailed concept visually along with a test plan that will be carried out prior to the next deliverable. Finally, this report will address the next meeting with the client.

## **2 Client Feedback, changes and design improvements**

The client was overall satisfied with the presentation that we made and the final concept that was chosen. Some concern was raised about the language settings which normally would offer the choice between French, English, Spanish, Mandarin and Hindi. More specifically, the client was wondering if the application would be functional if there were multiple languages on the text. To address this concern, we proposed a language detection capability that would allow us to pick up different languages automatically. That would exclude the language setting from the main menu and the client would not have to always select the appropriate language manually. The client was furthermore worried about the place of the settings' options in the application because it seemed to them that it was just present at one place. However, we reassured the client that the menu would be always accessible. Another issue that was raised by the client is about the male voice being too low in speech and that it 'hinders the comprehension' and that we should be careful in the voice that we select. When a question was asked about adding a voice that would read the options for the user, the client mentioned that it would be a good idea to include that as an option because

some people might not necessarily need it. The client also wondered if the application would be able to recognize handwriting and we told them that it would probably require some machine learning as everyone's handwriting is different, but that we would be happy to add it as a feature if the time permits or if it were a top priority. Isaiah mentioned adding a 'replay' functionality, which would allow the user to start over the text to speech, pause it or resume it from some specific point. The client said that Apple had that functionality, but that when you want to resume from some point, it starts over from the beginning and not from where the user left off. Another proposition of Isaiah was to incorporate the ability of adding several documents at the same time rather than having to go back for a new file upload every time. Moreover, Isaiah mentioned about the app being accessible with large enough buttons and a good contrast. Isaiah also pointed out to focus on the core functionalities and not be too ambitious about all the features the team wants to include in the application, and to have another diagram describing the minimal viable prototype. The client also wanted a feature where the application would automatically pick up the dark mode of the phone or to have it as an option in the settings. To add on more to that, the client also said it was easier for them to read lighter colors in a dark background than darker colors on a white background. When the client was asked about a preferred font size, they said that it is usually between medium and large size. The client was sent a website that describes what "80%" means when it comes to the reading speed, and it seemed like the information on the website did not match the 80% that she was referring to. Finally, the client said that they were going to come back to us about the reading speed issue so that we can have a better idea during the actual implementation phase.

### 3 Updated and Detailed Concept Design

Initially we had chosen Global Concept #1 in the previous deliverable and presented it to the client. Based on the client feedback, there was a change needed to be made to the *Settings* section where *Language Settings* was removed due to the requirement of the mobile application to automatically detect the language written on the chosen file or picture. Additionally, the client mentioned that they would like to be able to press *Play*, *Pause*, *Replay* as buttons after the *Read* button has been pressed to allow them to go back and forth between the transcription of the chosen file and/or picture. Likewise, another feature was mentioned as a need for the client that was the addition of being able to switch from *Light mode* to *Dark mode* since these aids in viewing clarity to the client. The goal is to implement all the features shown in the flowchart, which would optimally meet all the client needs and present a software prototype for the next client meeting for user feedback. (Refer to Figure 1)

#### 3.1 Updated Global Concept

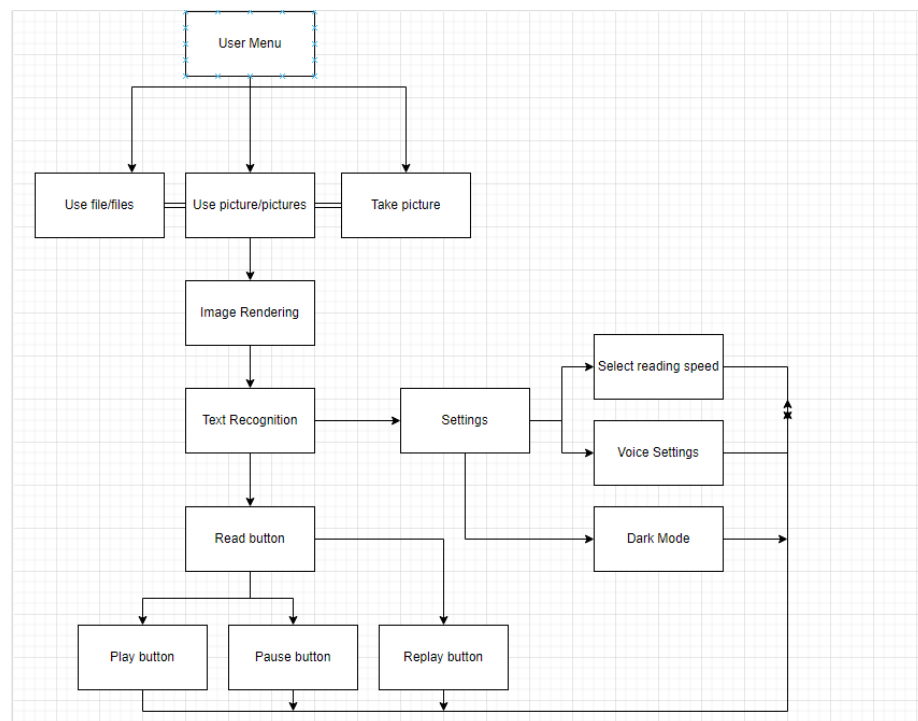


Figure 1: Updated global concept #1 based off the client feedback

## 3.2 Minimal Viable Prototype

The chosen global concept was further reduced in terms of features that were most important to the clients and that our mobile application was able to meet almost all the needs with the least number of features that would work properly. Therefore, a minimal promising global concept was made where the user can choose file/files or picture/pictures to be rendered and recognized for text upon pressing the Read button. Consequently, the user can also choose between Dark mode and Light mode to their preference. However, there will be one default voice, one optimal reading speed, no ability to press Replay and Pause the voice output. In this manner, the simplest global concept will be the approach if Global Concept #1 cannot be accomplished successfully.

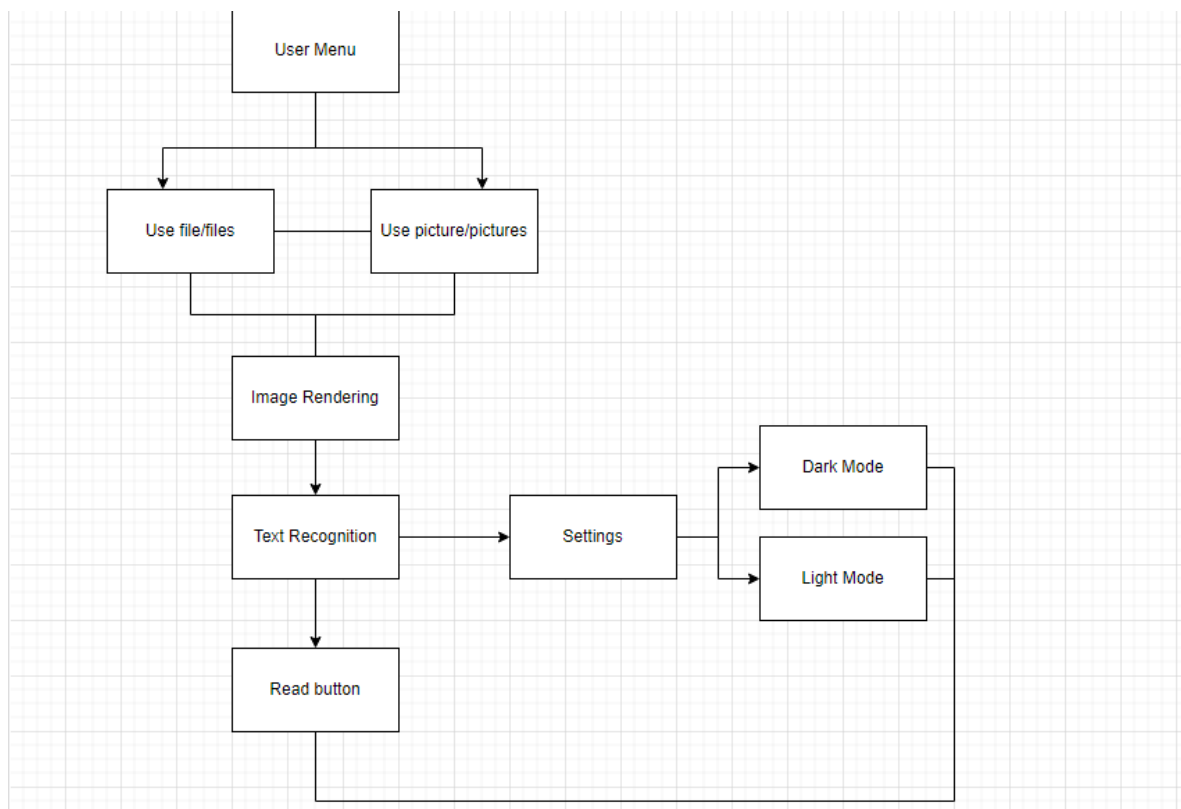


Figure 2: Minimal viable prototype for global concept #1 based on client feedback



## 4 Detailed bill of materials (BOM) and parts

Table 1: Bill of Materials

Item #	Part Name	Description	Quantity	Unit Cost(\$)	Extended Cost
1	Flutter	An open-source UI software development kit that allows developers to develop applications for Android, iOS and many more platforms.	1	0	0
2	Android Studio	IDE for Google's Android operating system.	1	0	0
3	Git Bash	It's a terminal application used to communicate with an OS using commands.	1	0	0
4	Translator Dart Package	Google's translation library used to input in an application to translate words into selected languages.	1	0	0
<b>Total:</b>				<b>0</b>	

## 5 Most critical product assumptions

### 5.1 Critical functionalities

#### Accessibility to camera and file gallery:

App should be able to access the camera to scan the text or choose between JPEG and PNG picture type and access the file gallery to select files in the corresponding app's file format. This functionality will also render the image and prompt the user back to the user menu if image/text is not of the required type.

#### Text recognition and translation:

This functionality will be responsible for recognizing the text language and reading it (through read button) while giving the option to translate it from any language to the desirable language included in the languages option using a translate button.

Voice output:

This functionality includes a “Read” button that will use the device’s speaker to read it clearly at user’s volume and a convenient reading speed.

## **5.2 Acceptable specification values**

The reading speed range is 100 to 1500 wpm.

The file types acceptable for the app are only pdf, docx and txt file types.

The image types acceptable for the app are only JPEG and PNG

The app is only acceptable on iOS and Android devices.

## **6 First product prototype**

Upon discussion with the client, the main feature that needed to be incorporated into our concept was the replay functionality. That is, the client should be able to start the text to speech, pause it at some point and be able to resume or start over. In this way, the prototype was further improved and is illustrated below. A link is also provided below for a demonstration. The reading speed is kept in terms of percentage so that it is user friendly to the client since she is already used to it. The images (PNG, JPEG) are accommodated by the first box on the main interface of the application, while the files (PDF, txt and WORD docx) can be selected through the second box. Finally, the third box will allow the user to take any picture they would like the text to be output to speech. They also have an easy navigation bar to access the main settings such as the reading speed, and the voice setting. The language setting was removed as the application will now automatically detect the language on the text that is being processed as discussed and agreed upon with the client. This initial prototype will serve as a presentation of the core functionalities and features of our application.

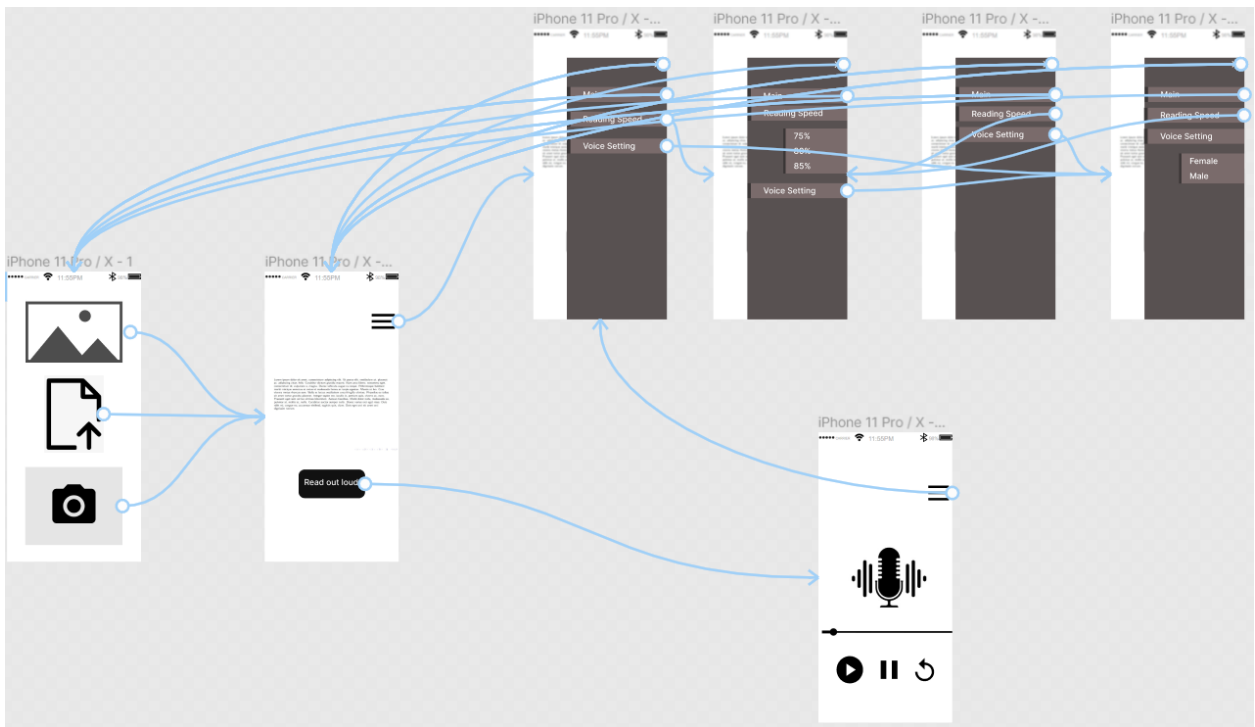


Figure 3: Updated visual representation of the prototype



Figure 4: Product Prototype #1

*Prototyping link:* <https://www.figma.com/proto/w92SjVH3OMuelJ88PpV2Qd/Image-Descriptor?node-id=1%3A2&scaling=scale-down&page-id=0%3A1&starting-point-node-id=1%3A2>

## **7 Sketches, diagrams, pictures for prototype documentation**

### **7.1 User Menu**



This sketch represents the “User Menu” interface where the client decides whether he wants to choose an image file or a document type for the mobile application to read. By clicking on the “image” icon, the user can upload an image file (PNG, JPEG) from his phone. By clicking on the “file upload” icon, the user can upload a document file (PDF, DOC, TXT) from his phone. Finally, by clicking on the “camera” icon, the user can take a picture that the app will use to read.

## 7.2 Image Rendering



This sketch represents the image rendering and the text recognition. The application gets the user's input and demonstrates it to the user. If the user uploaded a file that is not supported by the application, the app will show an error message and the user will have to upload a supported file. In this picture, the application demonstrates a supported file and the application recognizes the text. Once the user clicks the "Read out Loud" button, the application demonstrates the "Text to Speech" interface below.

## 7.3 Text to Speech



This sketch represents the interface presented after the user clicks the "Read out Loud" button. Here, we have a "Replay" to replay the reading, "Play" to play the reading and "Pause" to pause the reading. Furthermore, Clicks on the 3 horizontal bars on the top right will display the menu shown in the next sketch ("Setting Menu").

## 7.4 Setting Menu



This sketch represents the setting menu. From the menu, the user can set the reading speed and voice. He can also choose whether he wants dark mode or light mode.

We have the “Reading Speed” function. This function allows the user to set the reading speed the mobile application will read in. The user will have the option to choose from the “75%”, “80%”, “85%”.

We also have the “Dark/Light” function. This function allows the user to set the display mode to either dark mode or light mode to ease the comfortability of other users' eyes.

Then, we have the “Voice Setting” function. This function allows the user to choose the voice the mobile application will read in. The user will have the option to choose from the “Male” or “Female” voice.

From the “Setting Menu”, the user can also go back to the “Main Menu”. After setting the preferences from the settings menu, the user can click on the “X” on the top right and click on the “Read out Loud” button from the “Text to Speech” sketch. The application will read based on the user's preferences.

## 8 Prototype testing, analysis and evaluation performance

### 8.1 Prototype Testing Methods

Our objective for prototype I is to present the core functionalities of the 4Text2Speech as the 1st prototype and consists of a demo version of the app. The testing methods used for the app are using emulator and testing the app directly on an iOS device or Android device after uploading it to the AppStore/ PlayStore.

One testing method would be to use an iOS emulator and android emulator while developing the application. It is possible to use an emulator on both MacOS and PCs but it is not possible to use an iOS emulator on a non-iOS device. This is not a restriction by flutter, but rather, by Apple, for security purposes. In this way, it is possible to view our development live, next to the code editor that we are using:

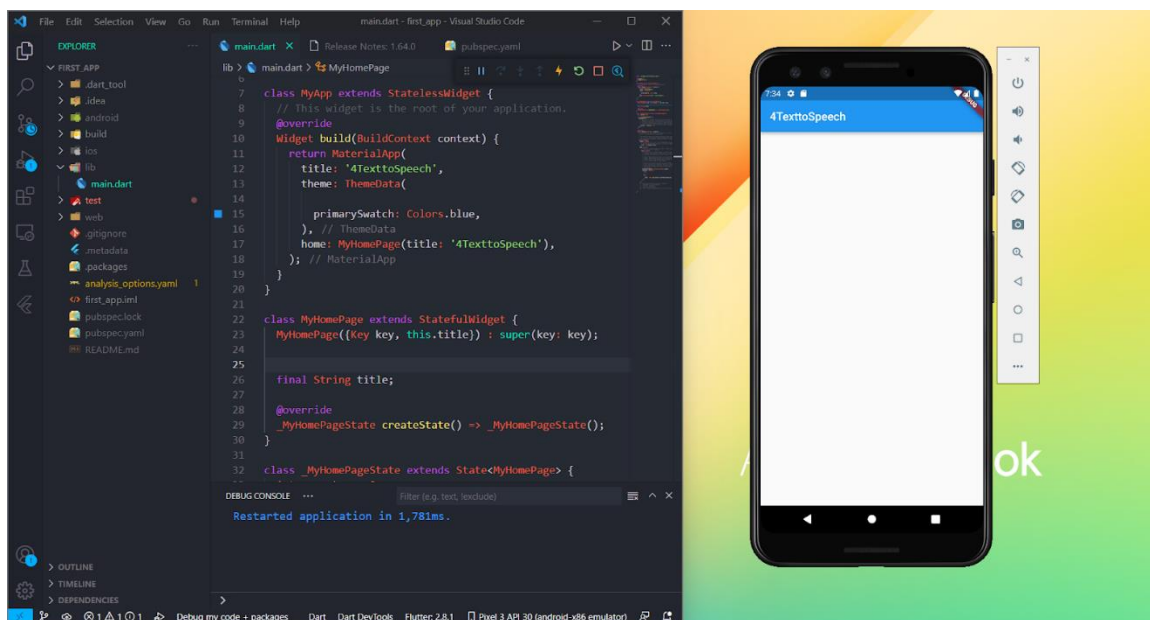


Figure 5: Prototype testing using an emulator

This is the most effective way of testing the development of the application. That is, it is more practical to debug and view mistakes than to always have to test deploy the application to the Play Store for Android or App Store for iOS.

Another method of testing is deploying the whole app after developing it on App store (iOS) or Play store (Android) and running it. This method of testing is preferred after testing the app on emulators for debugging purposes and is considered as the final testing for the prototype as it gives insight to what functionalities to change/update and more importantly to the response time.

## 8.2 Prototype Analysis

*Table 2: Prototype analysis*

Use	<p>Present core functionalitiesThis is the most effective way of testing the development of the application. That is, it is more practical to debug and view mistakes than to always have to test deploy the application to the Play Store for Android or App Store for iOS.</p> <p>Another method of testing is deploying the whole app after developing it on App store (iOS) or Play store (Android) and running it. This method of testing is preferred after testing the app on emulators for debugging purposes and is considered as the final testing for the prototype as it gives insight to what functionalities to change/update and more importantly to the response time.</p>
Type(s)	Semi-focused/analytical
Fidelity	Medium



## **9 Presentation intentions and information gathering for next client meeting**

Our team will present an updated global concept of the app and visualization with a prototype concept. The updated global concept and the visualization will remove the language settings then replace/transfer its functions to text recognition as a sub system and this is because a text can come in two or more languages and thus requires an automatic language detection. The prototype concept planned will include the user interface up to the image rendering feature. We will ask the customer feedback about the way the application is designed, what they like about it, what they like less, and what to improve on.

## **Conclusions**

Finally, in this deliverable, we have incorporated the client feedback, not only to our global concept but also, in our prototype. Furthermore, the plan has been updated to reflect the current progress of the team for the project. This deliverable will be a great reference when we will be working on the next deliverable, but more importantly, when we will be working on our next product prototype which will consist of the actual implementation of the global concept through software using flutter.