

University of Ottawa

GNG 2101[C]: Group 2.3

# **Deliverable C – Conceptual Design and Project Plan**

Submitted by

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Date: January 23, 2022

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## **Abstract**

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In this deliverable, each team member produced their individual concepts and presented it with the rest of the team. The team then analyzed the individual concepts and marked down the most suitable features of each individual concept that will be used for the final global concept. From there, four global concepts were created and compared with the target specifications to choose the most promising global concept. Finally, a visual representation of the group concept was made and some justification was provided using the target specifications defined in Deliverable B. The project plan was also updated to reflect our progress on the project.

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# 1 Introduction

In this deliverable the objective will be focusing on the core functionality of our mobile application based off Deliverable B, where we analyzed the client's needs. Those client needs were grouped into functional, non-functional and constraint requirements that were translated to a list of target specifications for the product. Consequently, the four global concepts will be compared and rated with the target specification to choose one final global concept based on the highest score.

## 2 Core functionality

Shahid

- *User interface*
  - An option that will allow the user to select an image from their photo gallery that they want to transcribe.
  - An option to take a picture of an image using the device's camera.
  - An option to change the language preference to French.
- *Accessibility to photo gallery*
  - User will be prompted to allow access for the app to their photo gallery
- *Text recognition*
  - This subsystem will be responsible for rendering the image and recognizing the text written ready to be translated.

Serigne

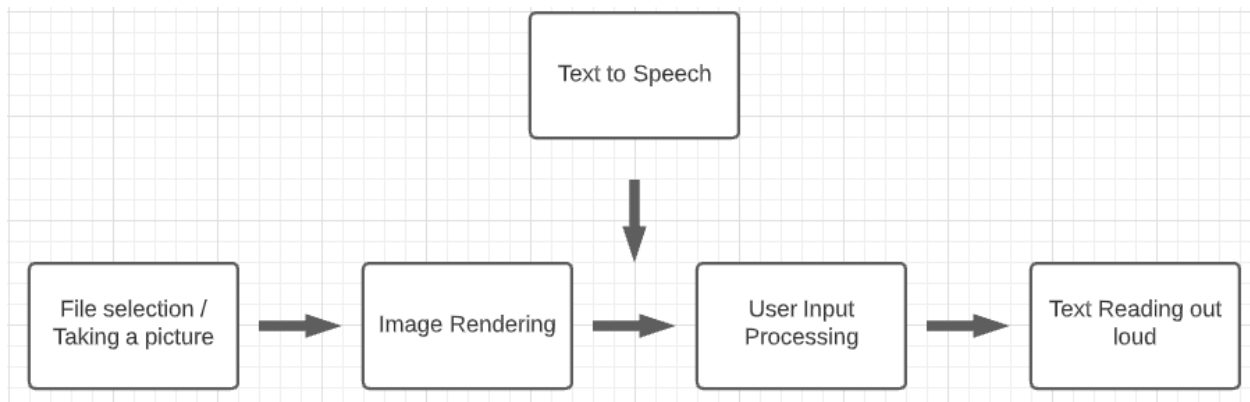
- *Text translation*
  - User will be able to press a "READ" button that will initiate the translation of the pieces of text on the chosen image with the option to translate to French, English, Mandarin and Spanish
- *Voice output*
  - User will be able to press a "Read out loud" button that will use the device's speaker and an automated selectable voice to read it to the user clearly and loudly.
- *Response time (Reasonable timing) / External subsystem boundary*
  - This subsystem is responsible for maintaining a fast response time between the user pressing "READ" button and how fast the application can transcribe the image

Valentin

- *IOS compatibility* | *External subsystem boundary*
  - Preferable operating system for our app is iOS as mentioned by client
- Accessibility to camera
  - App should be able to access the camera to capture text images on device or be able to scan documents
- *Image rendering*
  - This subsystem will render the image chosen from the device's photo gallery/camera prior to recognizing the text written on the image

Jathushan

- Voice Preferences
  - This subsystem will be responsible for choosing a preferred voice out of the available ones in the app to read the text.
- Language Options
  - This subsystem will be responsible for choosing a preferred language out of the available ones in the app to read the text.
- Reading Speed Adjustments (Word per Minute)
  - This subsystem will be responsible for choosing a preferred reading speed out of the available ones in the app to read the text.



*Figure 1: High-level decomposition of the text to speech application*

### 3 Product concepts

#### 3.1 Shahid

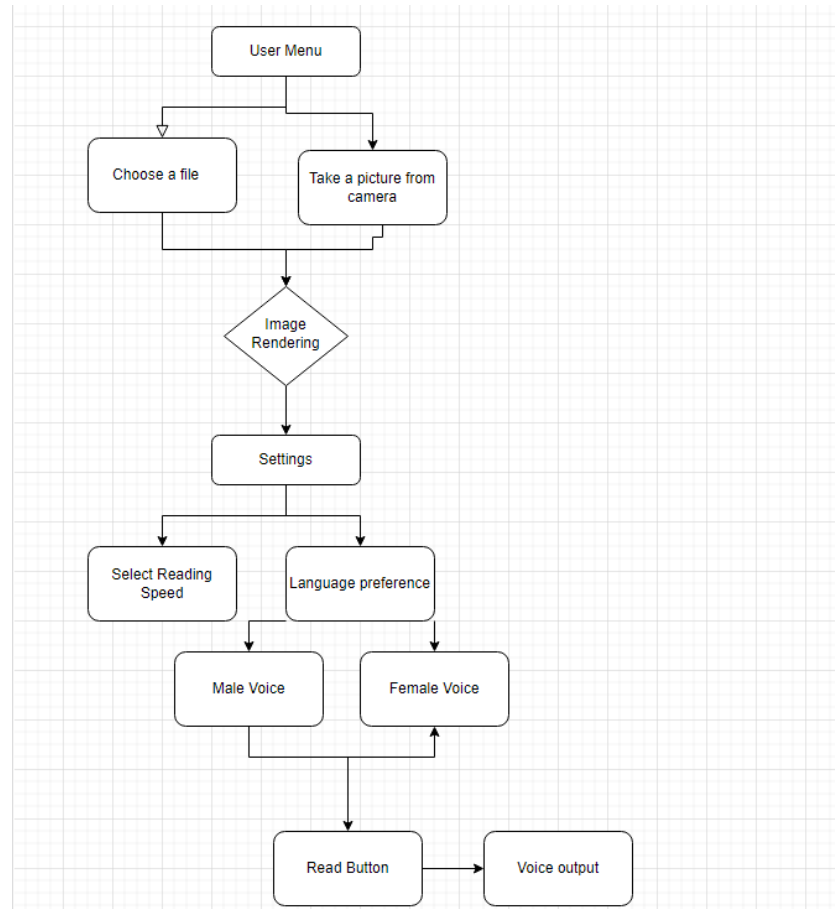


Figure 2: Global Concept 4

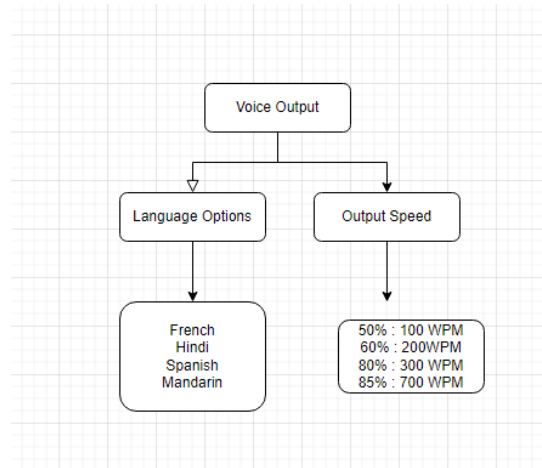


Figure 3: Voice output

## 3.2 Serigne

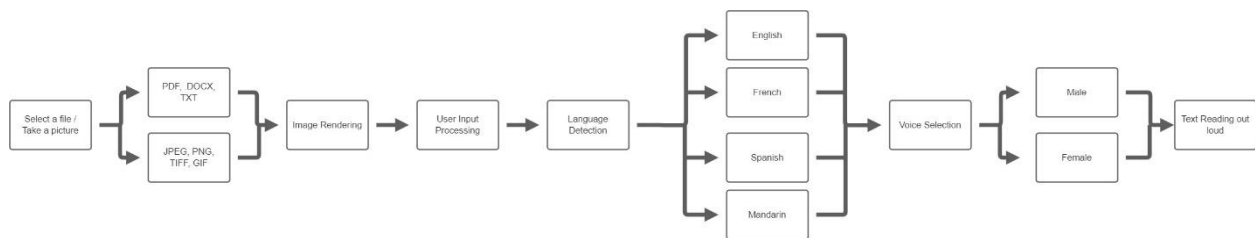


Figure 4: Goba Concept 3

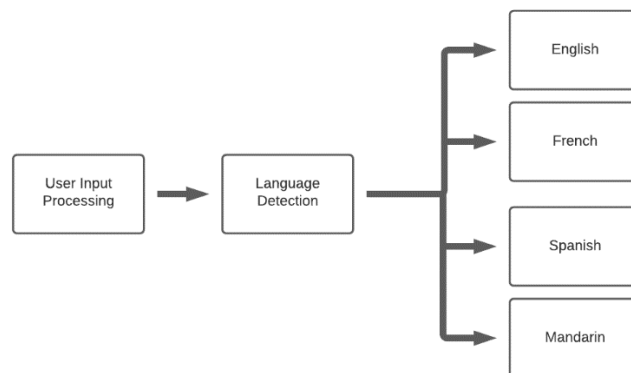


Figure 5: Text translation subsystem

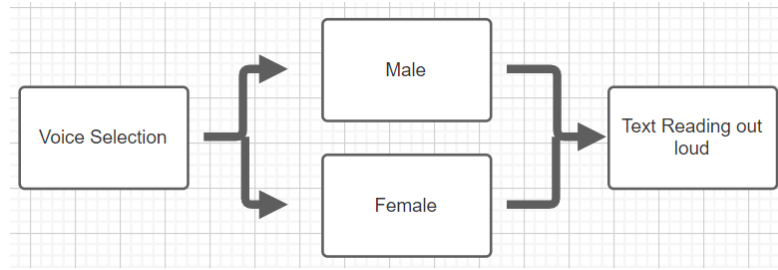


Figure 6: Voice output subsystem

### 3.3 Valentin

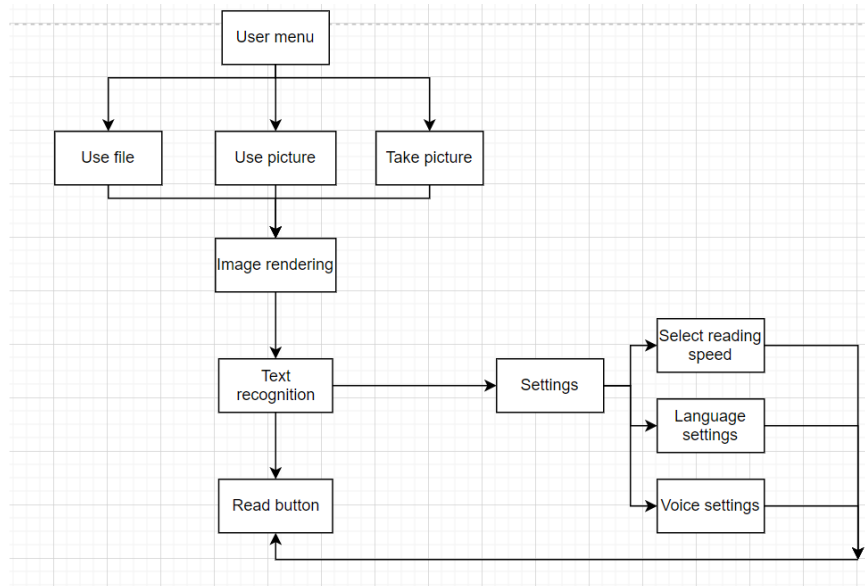


Figure 7: Global concept 1



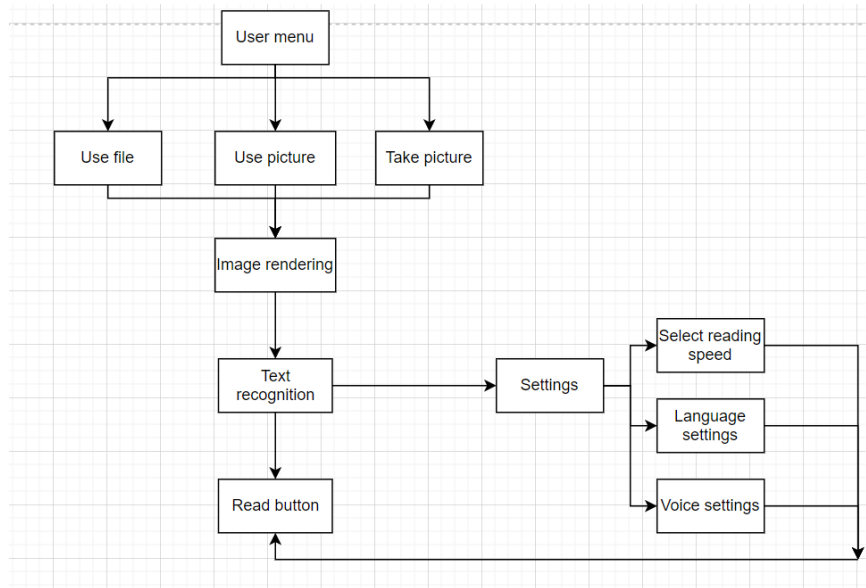


Figure 8: Image rendering subsystem

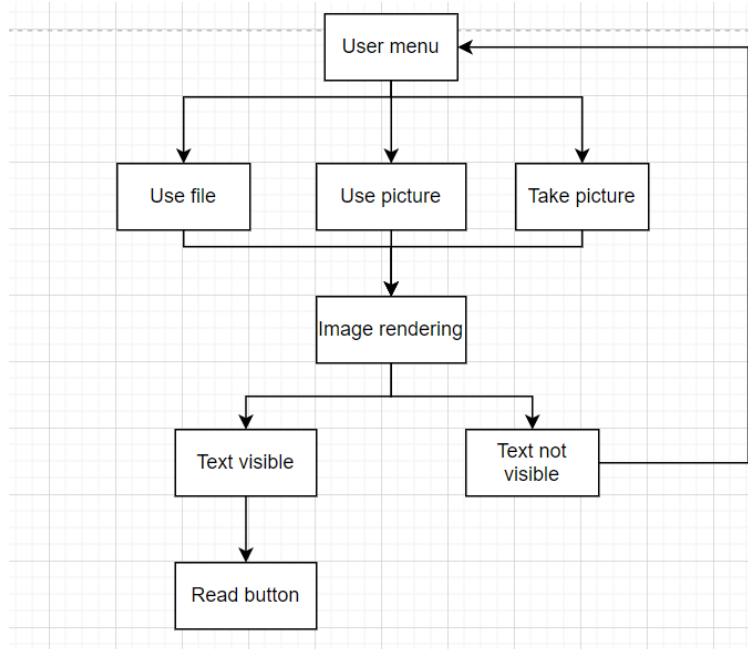


Figure 9: Use picture subsystem

### 3.4 Jathushan

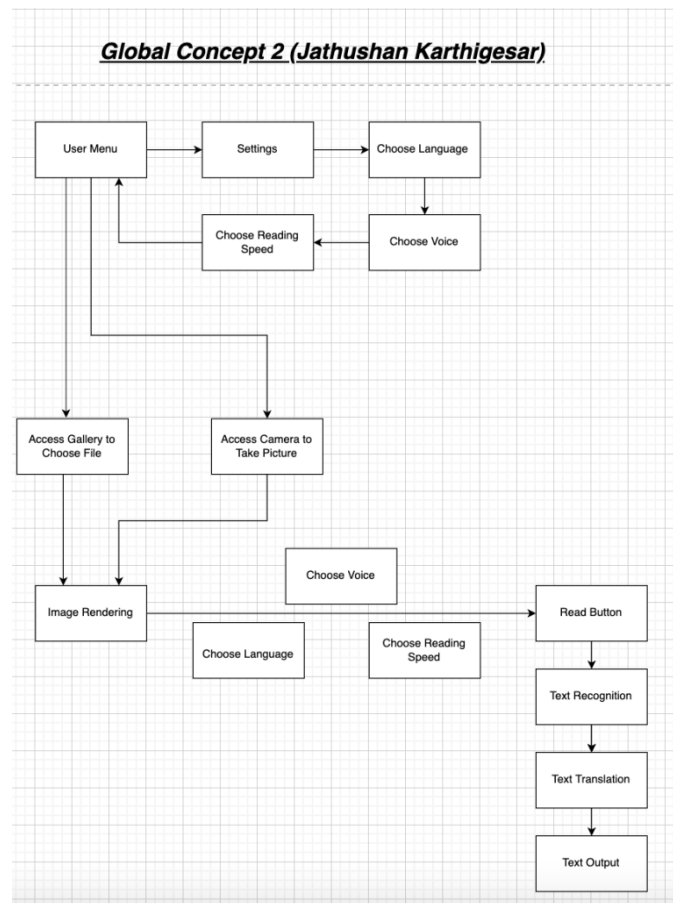


Figure 10: Global concept 2

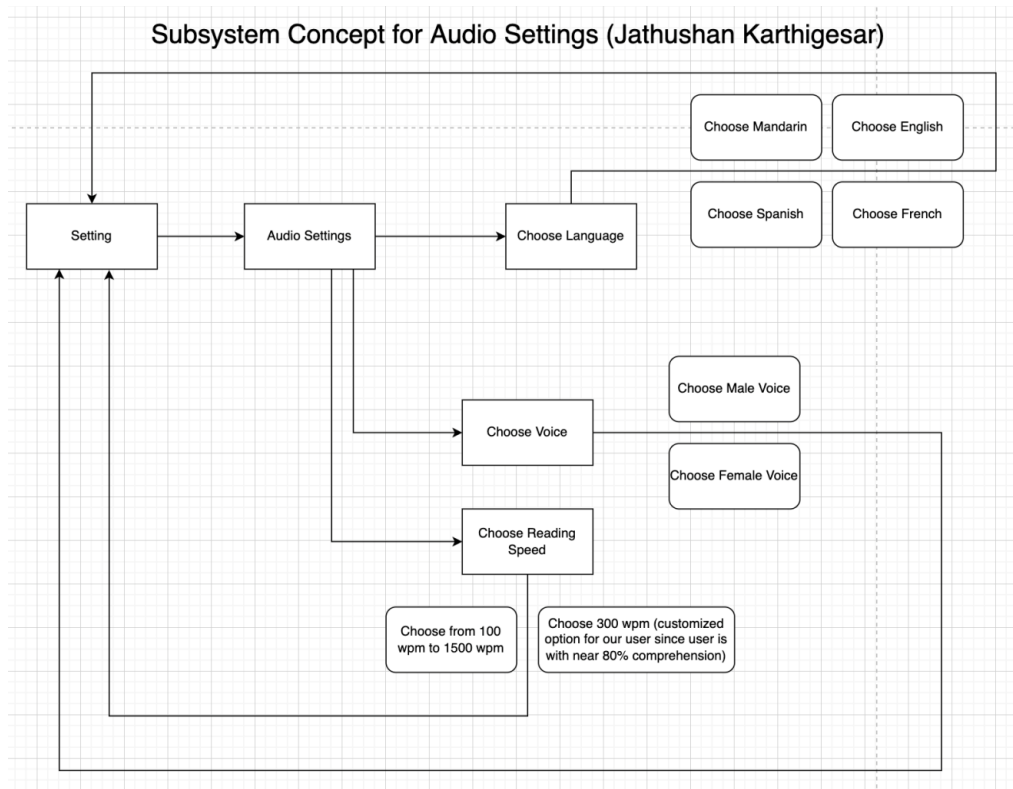


Figure 11: Audio settings subsystem

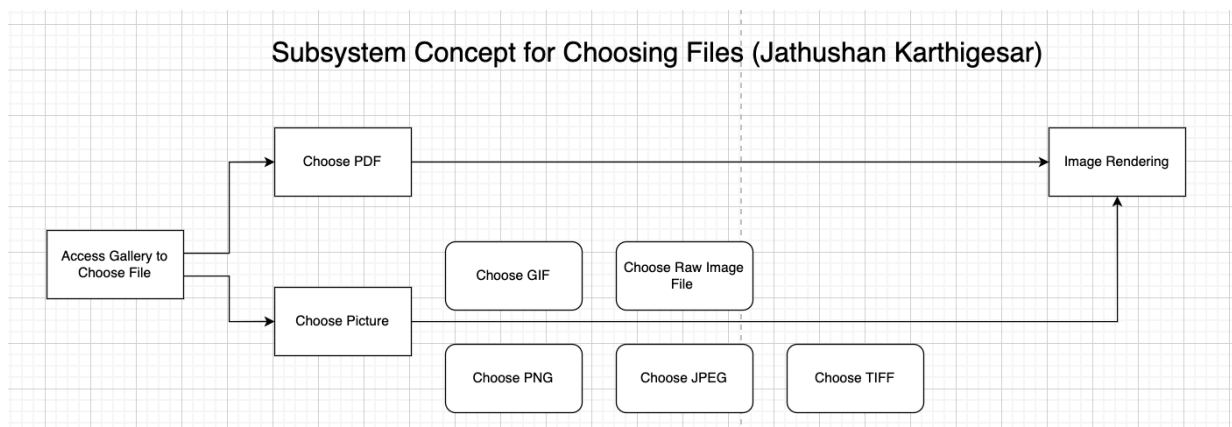


Figure 12: File selection subsystem

## 4 Concepts' analysis and evaluation

Selection criteria	Global concept 1	Global concept 2	Global concept 3
The application will be able to read out loud the text on an image with a reasonable response time.	5	5	5
The application will be easy to use and of minimal cost.	5	3	4
The application will allow the user to select common file types from their device.	5	3	3
The reading speed of the application will be convenient for the reader.	4	5	4
The application will allow the user to access their camera to take pictures.	5	3	3
The application will propose different voices to choose from.	4	5	3
The application will consider more languages to accommodate more users.	5	4	5
<b>Total score</b>	33	28	27

## 5 Promising solution(s)

Of the twelve concepts given by the team members, Global concept 1, Use picture sub-system concept and the voice output subsystem concept were chosen as they encompass all the client needs. The subsystem concepts were then modified and added to the global concept 1 to give the final global concept. The corresponding workflow diagrams are shown below to

illustrate the promising solutions:

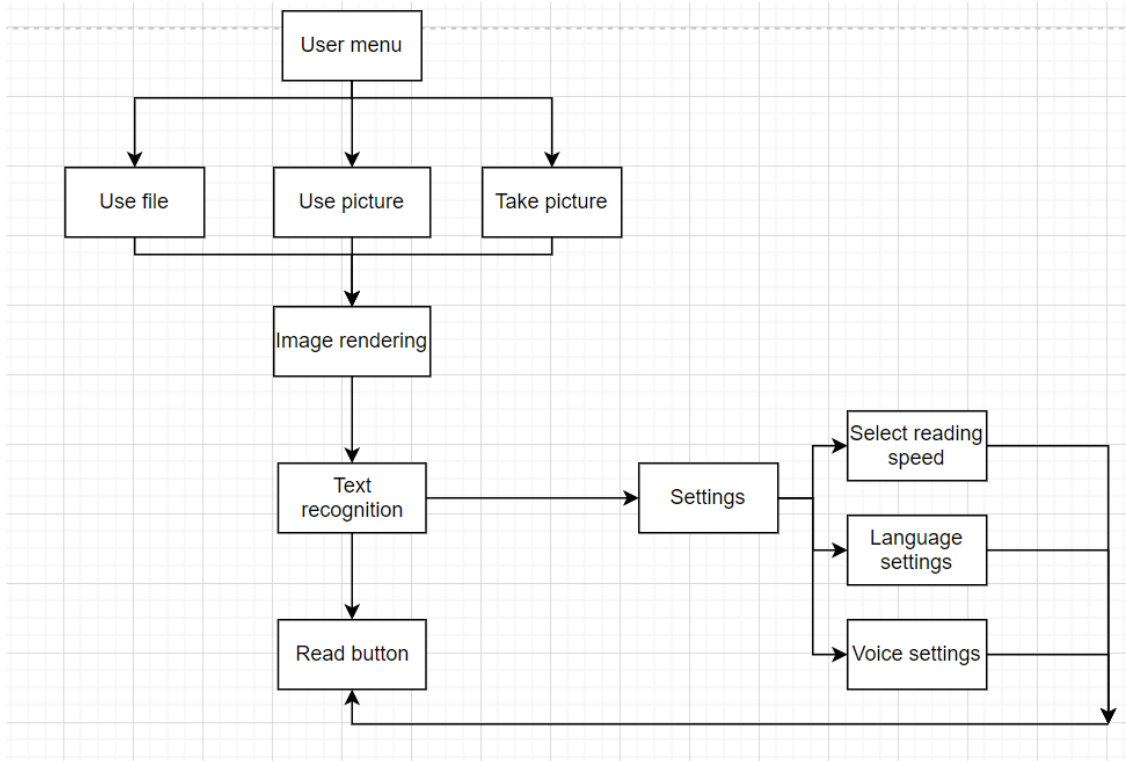


Figure 13: GobaI concept 1

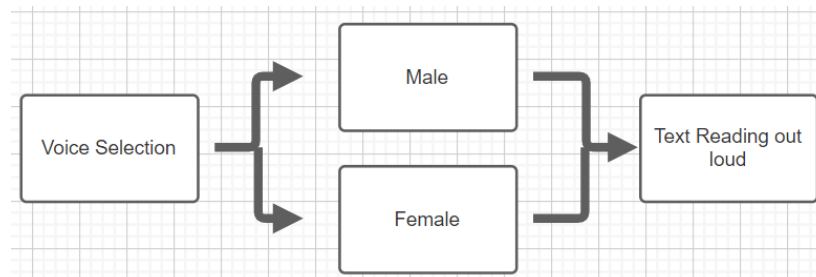


Figure 14: Voice output subsystem

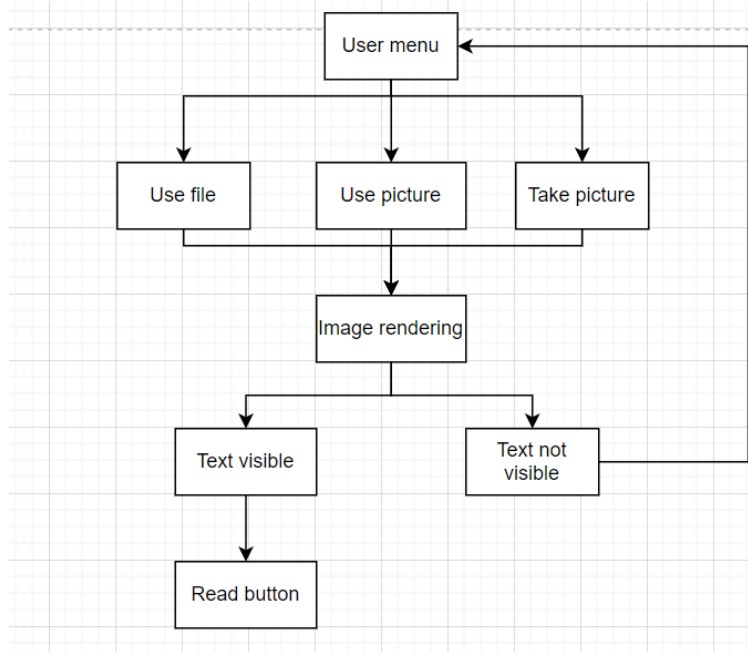


Figure 15: Use picture subsystem

## 6 Group Design Concept (Integration or Modification)

Based on the evaluation of each global concept the most feasible one was chosen to be Global Concept #1. The mobile application begins with the user interface displaying a User Menu that shows the user different options such as *Use file*, *Use picture* and *Take picture*. The *Use File* button will give the user the choice between pdf, doc, and txt files as they are the only acceptable file types. On the other hand, the *Use Picture* button gives the user the choice to use a text picture of jpeg and png type and the *Take Picture* button allows the user to take a picture of the text.

The user will then choose an option and the chosen image will be rendered to optimize the text recognition. The Image rendering is a subsystem that render a complete image obtained through the Use file, Use picture or Take picture features and will inform user if the text is not visible in the picture or if the file/image obtained is not the required type and will take back user to the user menu.

Furthermore, the user will have the Settings button that will allow them to *Select reading speed, Language settings, and Voice settings* to their best needs.

- The Language settings button will be responsible for text translation using a translate button to translate the text from any language to the desirable language included in the languages option (English, French, Mandarin, Spanish).
- The Voice settings button will be responsible for changing the speaker voice to male or female according to user preference.
- Reading speed button will be responsible for changing the reading speed for the text according to user preference and will range from 100 wpm to 1500 wpm (words per minute)

Finally, the image can be transcribed by pressing the *Read* button that will read aloud the words on the image.

After comparing the chosen global concept to the client's needs, it's prominent that it satisfies all the needs of the client in an efficient manner. However, a modification that can be made to the workflow of the mobile application is to include the Voice Output feature upon pressing the *Read* button.

## 7 Visual Representation of Group Concept

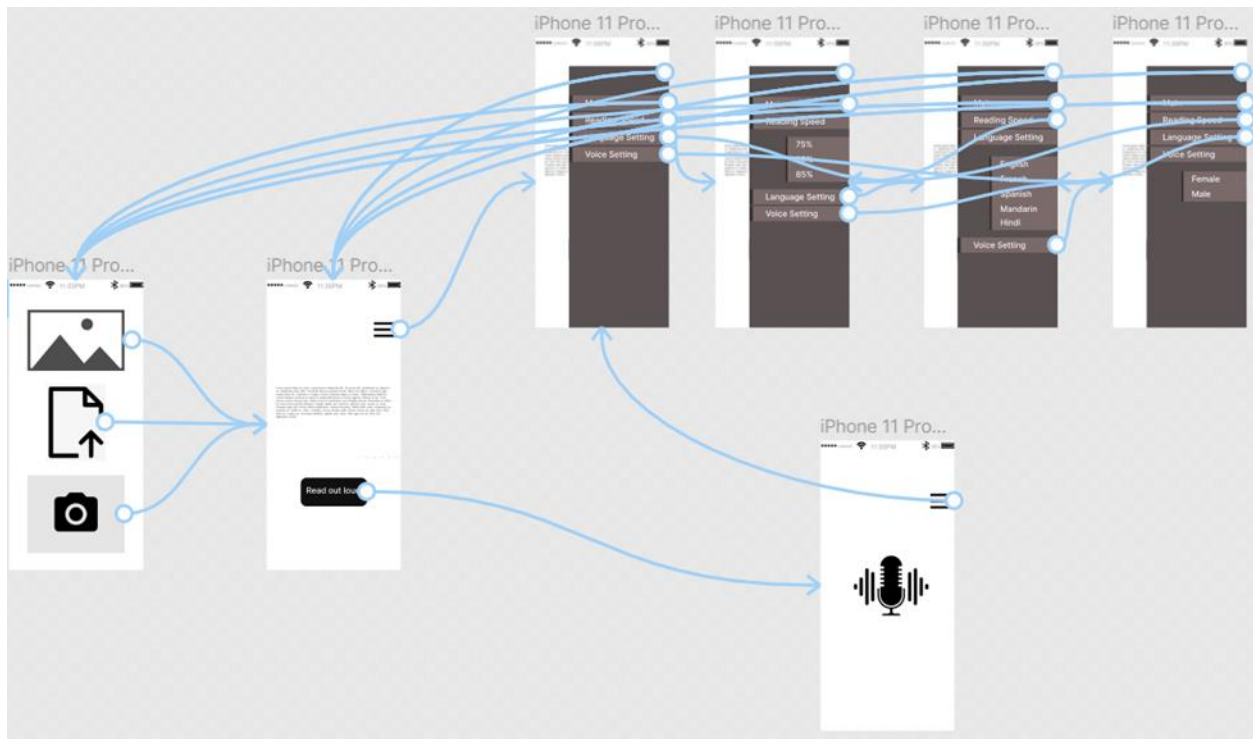


Figure 16: Visual Representation of application

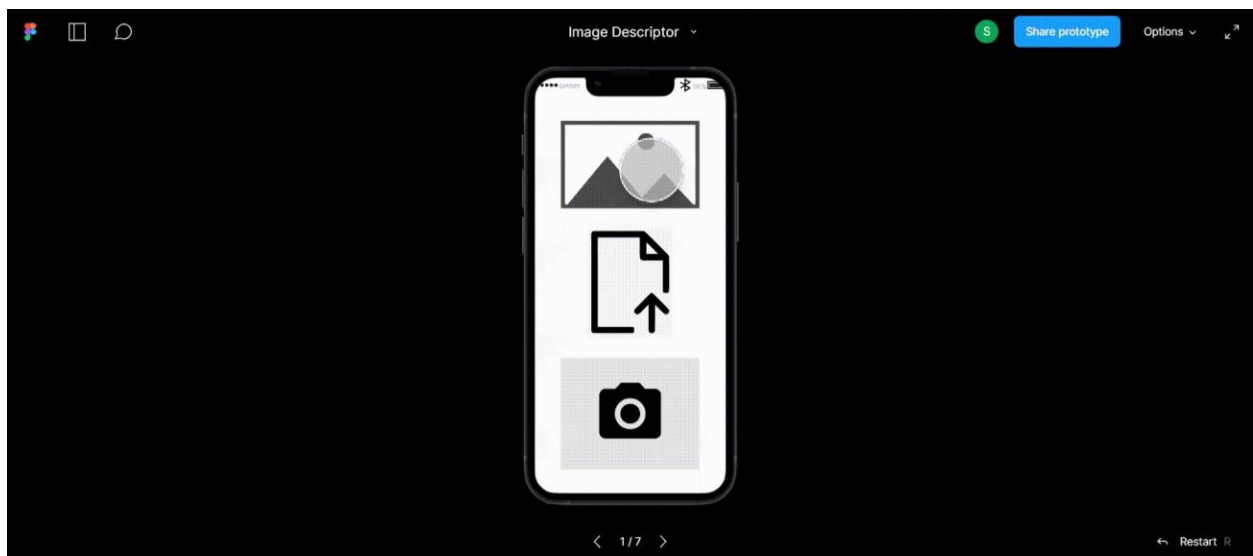


Figure 17: Prototype demo



For the mobile application design, a cross-platform vector graphics editor tool was used to visually represent a working concept of the application. Figma is very powerful as it allows to have an emulator for different smartphones. In this case, an iPhone 11 Pro was chosen to satisfy one of the requirements of the client that it should be iOS compatible. The Figma tool has an in-built prototyping function that allows to specify what happens when one presses on a particular area of the screen. Finally, it also gives the ability to simulate or have a preview of the working application as shown on figure 4.

## 8 Concept's relationship to target specifications

Our concept is strongly related to our target specification since our concept is based mostly on the ideal values of our target specifications.

### Concept's Benefits

The first benefit of our concept is that our concept has a response time of 3 seconds. This response time is the time from which the client pressed on the "Read out loud" button to the app outputting the speech aloud. A response time of 3 seconds is our ideal value.

The second benefit is that our concept has 5 languages which are English, French, Mandarin, Hindi, and Spanish. Our ideal value was 5 languages.

Our third benefit is that our app runs on Android devices and iOS devices. This agrees with our marginal and ideal values.

Our concept supports a speech speed of 250 WPM (ideal value) and 300 WPM (marginal value). The concept supports a reading speed of 100 WPM up to 1500 WPM.

Finally, our concept does not have any monthly subscription cost. This agrees with the ideal value of our target specifications.

### Concept's Drawbacks

One of the drawbacks is that the concept only has two voices for the moment. These voices are a male voice and a female voice. In our target specification, we have 3 voices for marginal value and 5 voices for ideal values.

Another drawback is that our concept does not support all files and images. Only PDF, DOC and TXT files are supported for document or non-image file types. Moreover, only JPEG and PNG images are supported. Our ideal value was to support all types of image files and PDFs, and our marginal value was to support JPEGs, PNGs, and PDFs.

## **9 Conclusions**

To conclude, we have produced a concept that satisfies all the needs of the client. We are certain that the client will be satisfied at our next meeting. We have made 12 different concepts for our mobile application (3 global concepts and 9 subsystem concepts) and chose one final concept among those 12 concepts. Based on the client's feedback, we will enhance our concept to build an improved version of our current prototype that will satisfy the client.

## 10 Client Preparation

- Based on visual representation of the app, is there anything that the client would like us to add, modify or remove?
- Does the client prefer the reading speed unit in terms of percentage or in terms of wpm (words per minute)?
- How does the client prefer to change the settings in the menu?
- Is there a certain sized font the client can see?
- Should there be a voice reading out the options?