uOttawa

Faculté de génie
Faculty of Engineering

Figure 1.

Project Deliverable I

Design Project User and Product Manual

GNG 2101 -
Intro to Product Development and Management for En/CS

Automatic Slide Transcription

Submitted by
GNG2101, Section D01, GroupD4
Aleksandar Plackoski, 300074474
Aaron Knapper, 300017262
Joe Wu, 300152421

11 April 2021
University of Ottawa

Table of Contents

List Of Images

List Of Tables

List of Acronyms and Glossary

Acronym	Definition
JPEG	Joint Photographic Experts Group
PDF	Portable Document Format
UI	User Interface
I/O	Input / Output
JAI	Java Advanced Imaging
PNG	Portable Network Graphics
BOM	Bill of Materials
IDE	Integrated Development Environment
OCR	Optical Character Recognition
JNA	Java Native Access
API	Application Programming Interface
CPU	Central Processing Unit
MB	Megabyte

Table 1. Acronyms

Term	Definition
Adobe XD	A UI design tool for web and mobile apps
Zamzar	Online file converter

Table 2. Glossary

1. Introduction

This document begins by giving an overview of the application which is followed by instruction to get started using this program. Next the basic functionality is explained and the reader is provided with a walkthrough of the conversion process. After this section we include information about troubleshooting and what to do when you experience problems. The following section consists of product documentation, it includes any libraries we used as well as detailing the design process and prototypes created prior to this final version. Lastly, we have included our thoughts about our work so far and what can be done going forward. The intended readers of this document is for the user of this application, and/or future students.

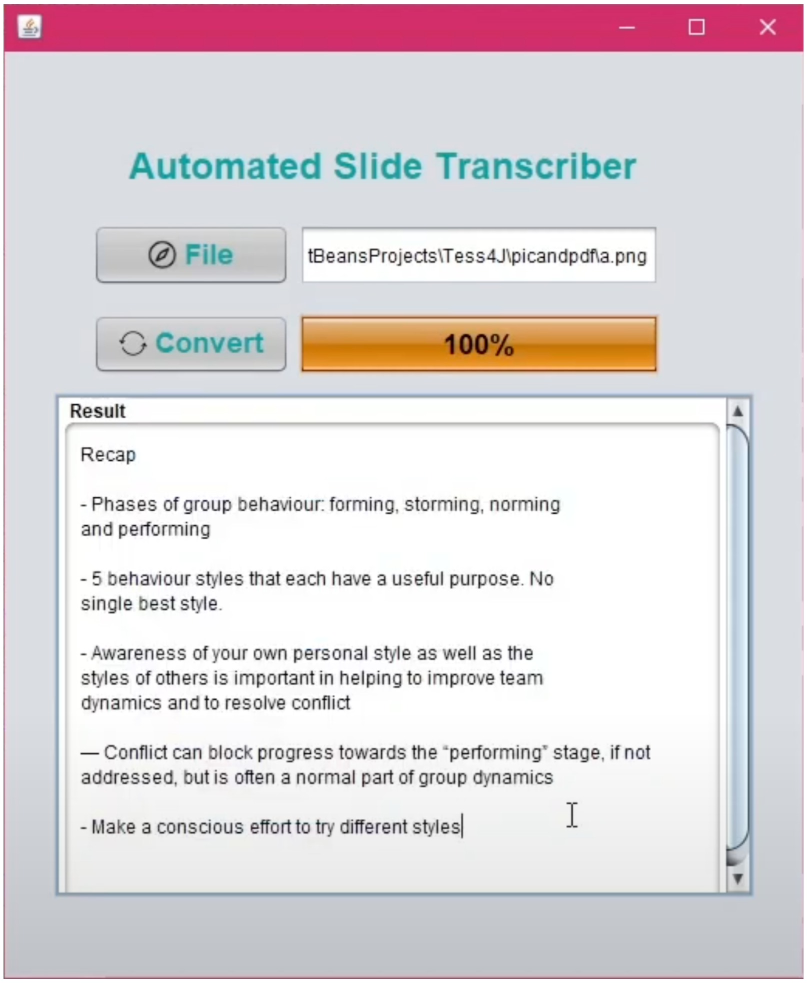
This User and Product manual provides users of varying disabilities to transcribe digital documents into plain text documents for easier note taking. This document also archives the prototyping process and procedure followed during the formation of this product.

2. Overview

Our client, a uOttawa student, came to us with the problem of note-taking being difficult due to an impairment they have. They have an arrangement with their professors where they receive all of the lecture notes beforehand but still find it takes them too long to copy the notes and they were looking for a way to quickly transcribe the documents so they could follow along during class and make in-line comments.
What we've built for them is an application that will process the contents of course notes in PDF, Powerpoint, and even JPEG format, perform optical character recognition, and save the result to a plain text document.

Our product is better than other potential solutions for the following reasons:

1. It is very simple to use and requires very little input from the user.
2. It can process more file formats than the alternatives, such as image files of png and jpg where text may not be as easy to extract.
3. It can transcribe handwritten documents (although accuracy declines in this situation).
4. And it also functions offline.



tBeansProjects\Tess4J\picandpdf\a.png

Recap

- Phases of group behaviour: forming, storming, norming and performing

- 5 behaviour styles that each have a useful purpose. No single best style.

- Awareness of your own personal style as well as the styles of others is important in helping to improve team dynamics and to resolve conflict

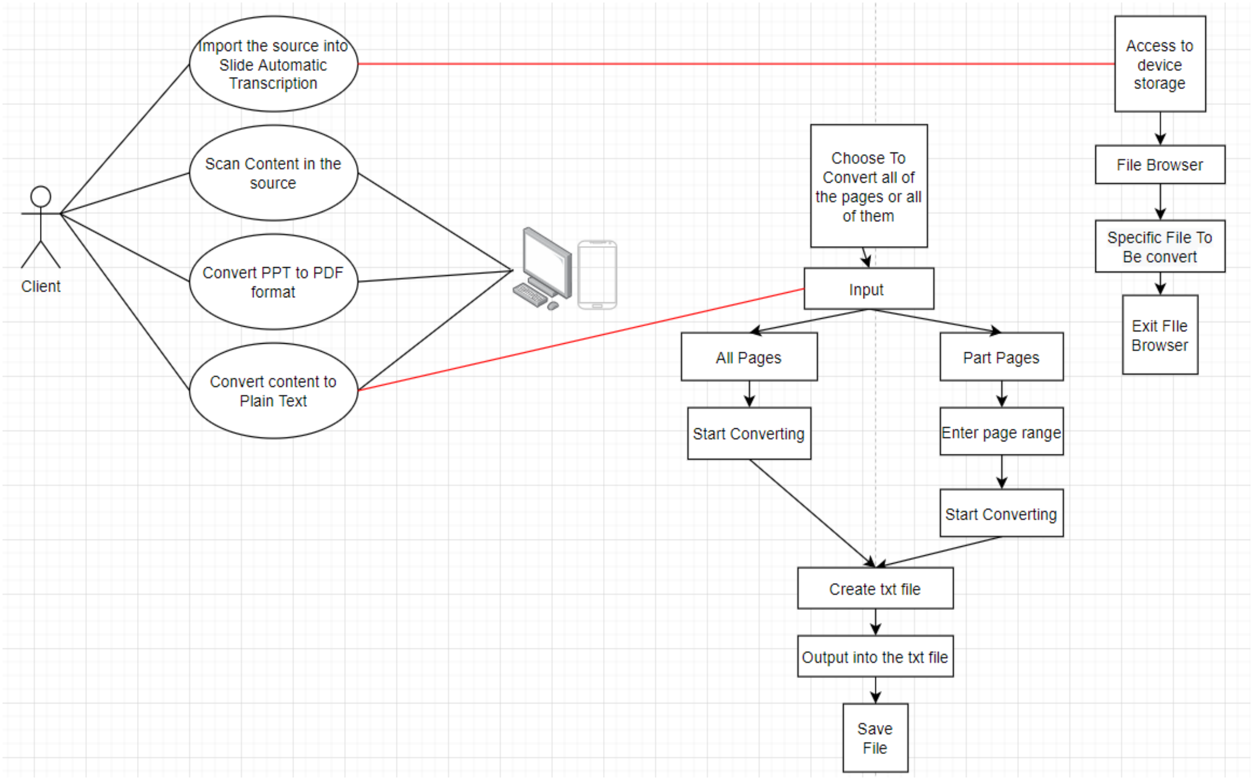
— Conflict can block progress towards the "performing" stage, if not addressed, but is often a normal part of group dynamics

- Make a conscious effort to try different styles

Automated Slide Transcriber.

The key function of this product is to transcribe the target file into a plain text document, therefore the user interface provides the user with the option to select a target file from their hard drive and then start the transcription process.

The following block diagram further details the program functionality from a user's point of view / perspective.


Import the source into Slide Automatic Transcription
Scan Content in the source
Convert PPT to PDF format
Convert content to Plain Text
Client
Access to device storage
File Browser
Specific File To Be convert
Exit FIle Browser
Choose To Convert all of the pages or all of them
Input
All Pages
Part Pages
Start Converting
Enter page range
Start Converting
Create txt file
Output into the txt file
Save File

Flow Chart

2.1 Conventions

N/A

2.2 Cautions and Warnings

N/A

3. Getting Started

3.1 Set-up Considerations

The user just needs a functional pc and at least 5 mb of storage is available.
The user would be given a zip file containing the desktop icon and the application for transcribing it. Right click on the application to assign it to the desktop and from there the user can simply just double click the desktop icon to open it up.

3.2 User Access Considerations

Anyone that is able to operate a pc on the most basic level will be able to use this application.

3.3 Accessing the System

There will be an icon on the desktop for the transcribing application

Team Icon

3.4 System Organization and Navigation

There is a main window that will pop up that acts as the General user interface between the user and the application.

3.5 Exiting the System

Simply click on the ☒ button on the top right corner to exit the system.

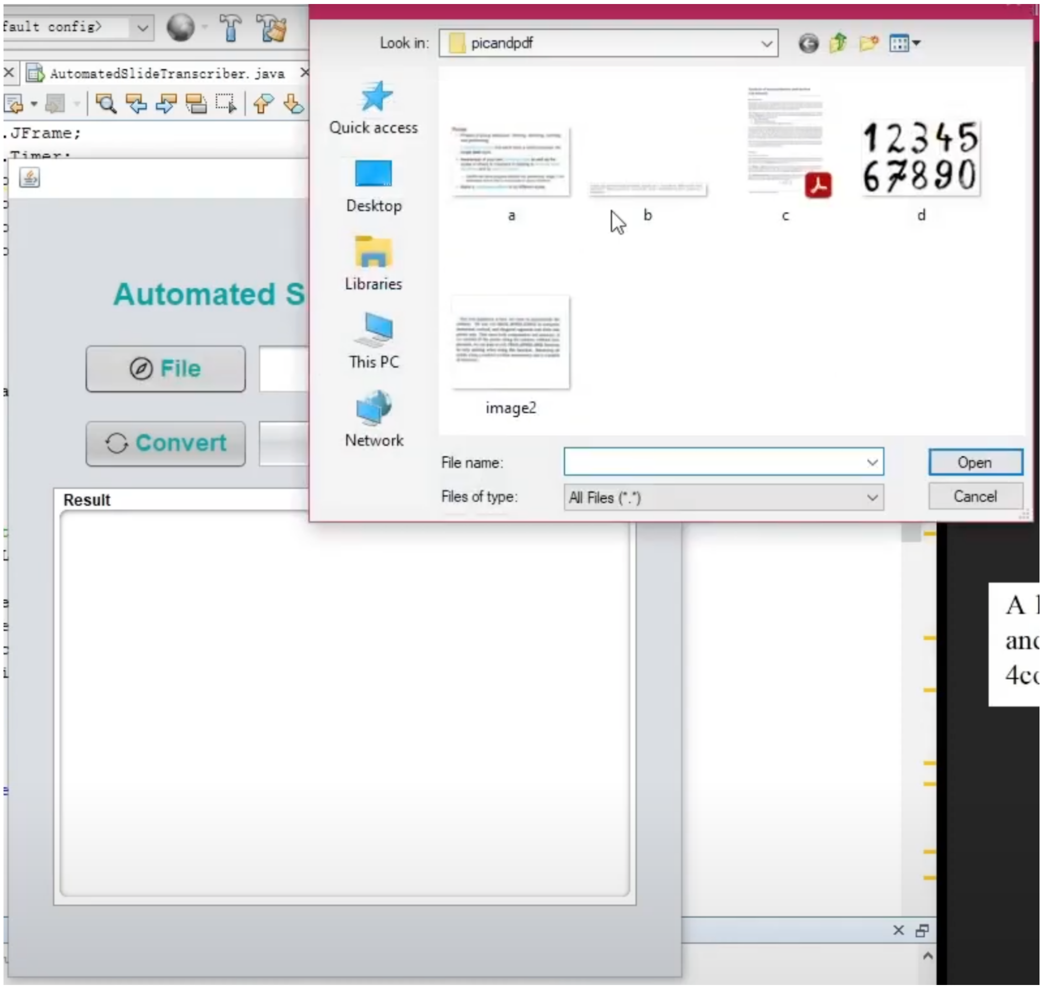
Close Button

4. Using the System

4.1 Conversion

4.1.1 File Path Selection

The first step of conversion is selecting the file to be transcribed. This is done by pressing the *"File"* button. This will pop open a file explorer window where you can select the file you want to convert. After selecting the target file, the path to said file will appear in the box directly beside the "*File"* button.



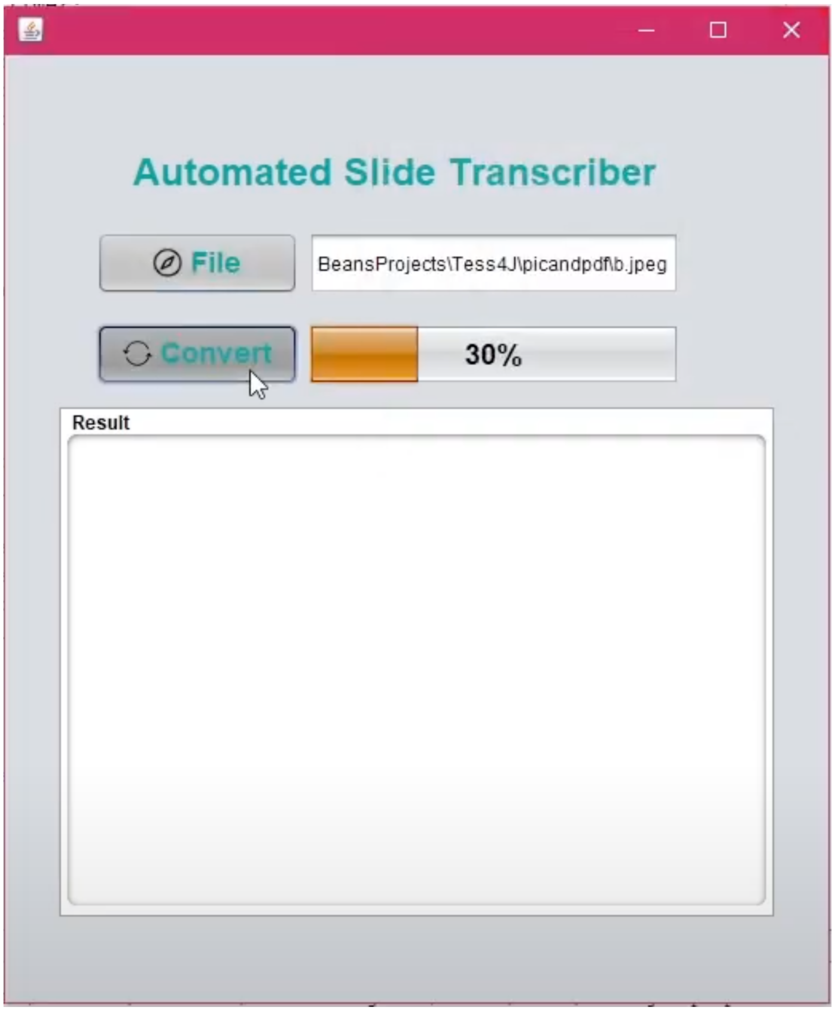
Select File Path.

4.1.2 Initializing Conversion

To start the conversion process after selecting a file, simply click the *"Convert"* button located directly below the *"File"* button.

4.1.3 Conversion Process

While the file is being converted, a progress bar will appear next to the *“Convert”* button. This will display the percentage completed as well as fill according to the progress.

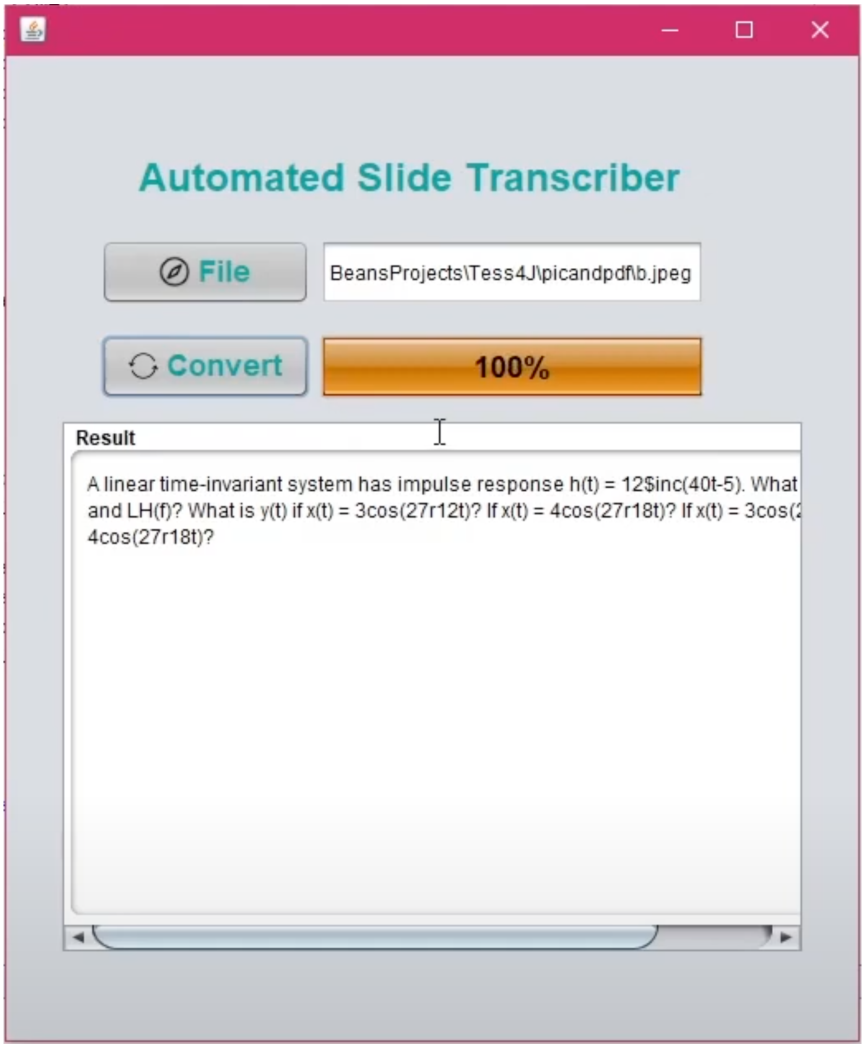


BeansProjects\Tess4J\picandpdf\b.jpeg

Conversion Progress.

4.1.4 Conversion Completed

After the file finishes being converted the text will be displayed in the *“Result”* window, directly under the *“Convert”* button, the transcribed text will be saved to the plain text document, and the progress bar will display 100%.



BeansProjects\Tess4J\picandpdf\b.jpeg

```
A linear time-invariant system has impulse response h(t) = 12$inc(40t-5). What
and LH(f)? What is y(t) if x(t) = 3cos(27r12t)? If x(t) = 4cos(27r18t)? If x(t) = 3cos(
4cos(27r18t)?
```

Conversion Completed

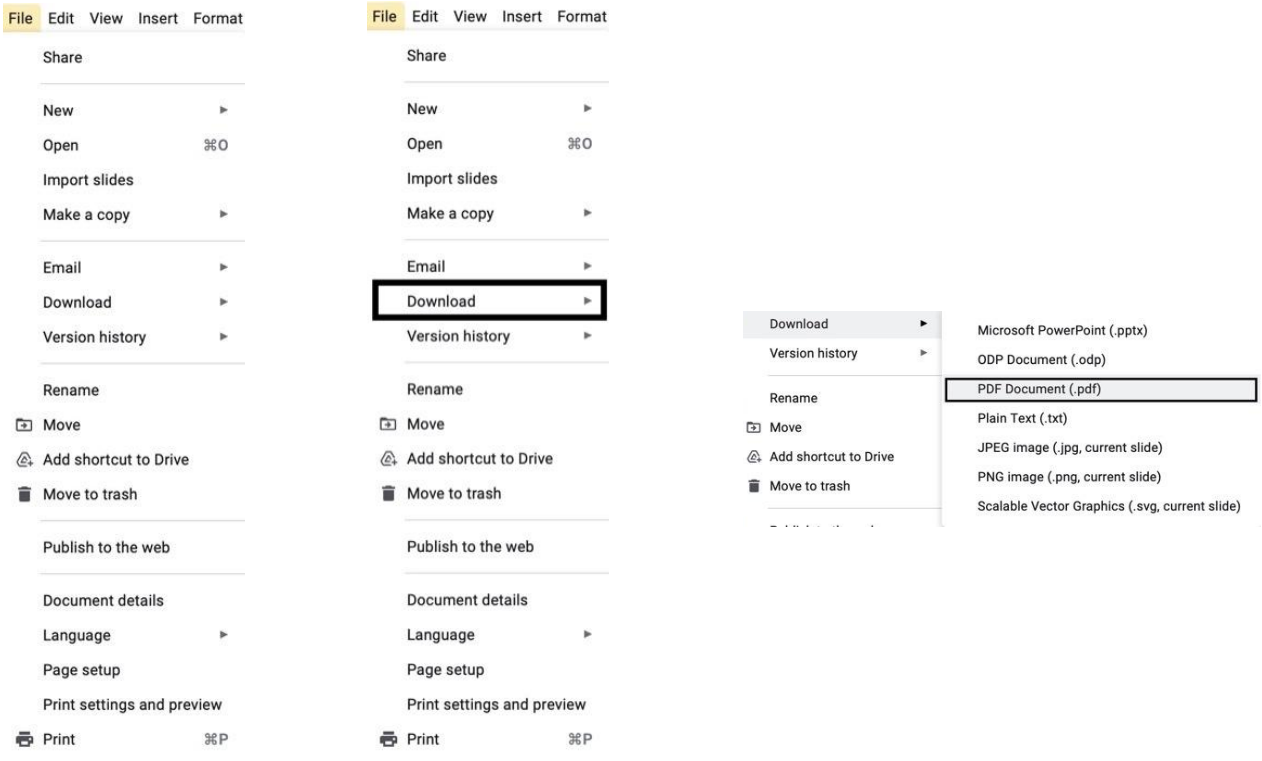
5. Troubleshooting and Support

5.1 Error Messages or Behaviours

1. “Unsupported image format. May need to install JAI Image I/O package” - Format error, the format of the file needs to be converted to (.pdf .jpg or .png)
If user require target file converted into the file mentioned above, there can be various approach by reaching that, but noticing that changing the extension(format, eg: picture.xxx) is not applicable the suggestion method is provided following:
Convert file using a file conversion website Zamzar (Instruction in appendix)
https://www.zamzar.com
2. “File not found Check the file name and try again.” - path error, the file selected has been deleted or moved to another location in the computer.
User would restore the file from bin or adjust the file location by reopening the file browser and select the file again

5.2 Special Considerations

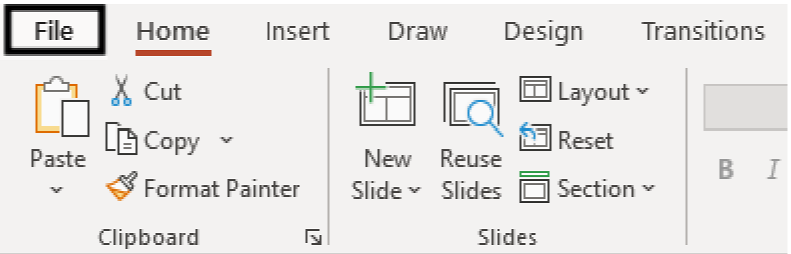
If user need to extract the content form google slide, please follow the following steps:
1. Click on file tab form the top of the google slide
2. Click on download → PDF Document



Google Slide.

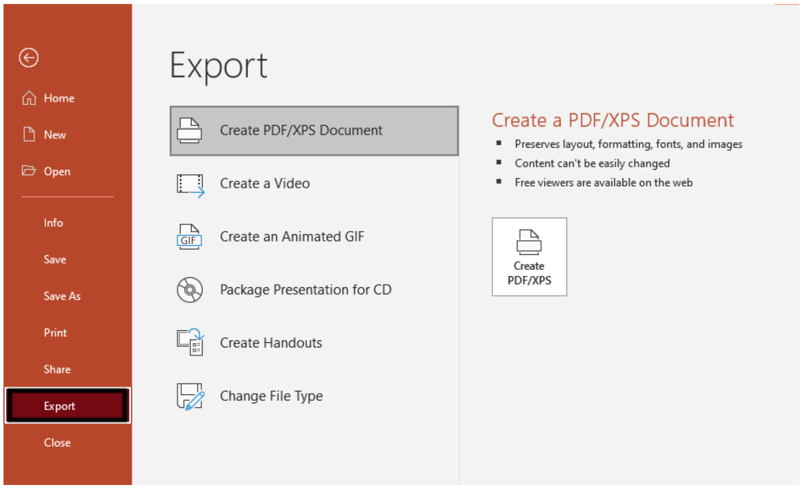
If user need to extract the content form Microsoft Powerpoint, please follow the following steps:

1. Click on file tab form the top of the Microsoft Powerpoint



Microsoft Powerpoint 1.

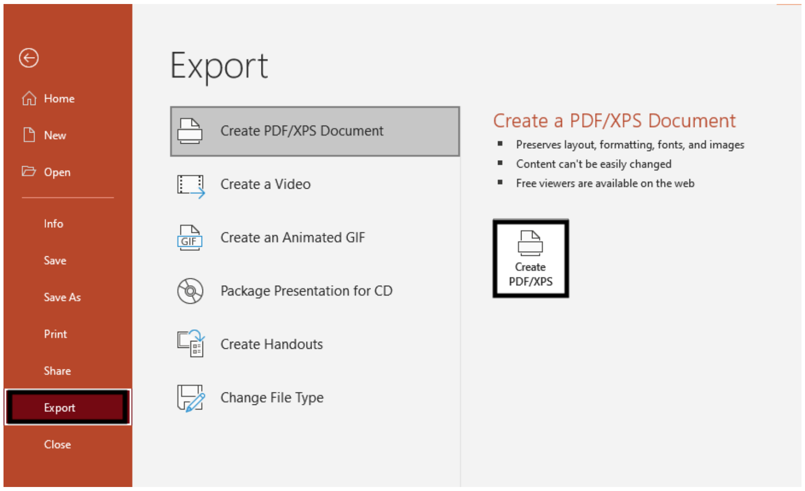
2. Click on the button "Export"



- Preserves layout, formatting, fonts, and images
- Content can't be easily changed
- Free viewers are available on the web

Microsoft Powerpoint 2.

3. Click on "Create PDF/XPS"



- Preserves layout, formatting, fonts, and images
- Content can't be easily changed
- Free viewers are available on the web

Microsoft Powerpoint 3.

5.3 Maintenance

No maintenance is required for using the product.

5.4 Support

If there is any emergency situation or unsolvable problem, please contact us by email:

Aleksandar Plackoski - aplac079@uottawa.ca
Aaron Knapper - aknap067@uottawa.ca
Yuhui Wu - ywu309@uottawa.ca

6. Product Documentation

6.1 User Interface

6.1.1 BOM (Bill of Materials)

Item Number	Part Name	Description	Quantity	Unit Cost ($)	Extended Cost ($)
1	Java GUI	GUI toolkit available to use with JAVA	1	0	0
				Total:	0

Table 3.

* Our Product is entirely digital with no physical parts that have associated costs

6.1.2 Equipment List

- Netbean Java IDE

6.1.3 Instructions

N/A

6.2 Optical Character Recognition

6.2.1 BOM (Bill of Materials)

Item Number	Part Name	Description	Quantity	Unit Cost ($)	Extended Cost ($)
2	Tesseract OCR	OCR Engine	1	0	0

Table 4.

6.2.2 Equipment List

- Tess4J Java JNA wrapper for Tesseract OCR API

6.2.3 Instructions

1. Download the Tess4J API.
2. Extract files.

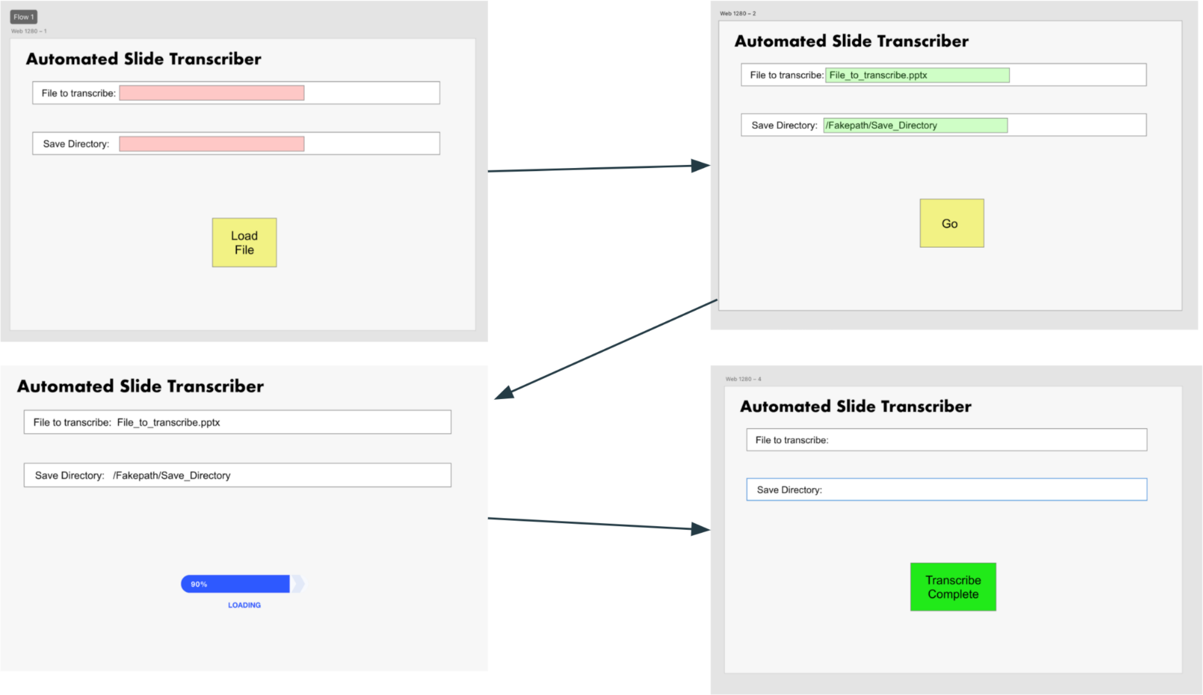
3. Open a new project in the IDE of your choice.
4. Link the jar file with your project.
5. Migrate via this path”..\Tess4J3.4.8-src\Tess4J\dist”.

6.3 Testing and Validation

Numerous tests have been performed with a ringe of files. With some internal testing and external feedback, this application is robust enough to handle almost any file type and has an accuracy of nearly 100%.

6.3.1 Prototype 1

The first completed prototype was an interactive user interface designed in Adobe XD to simulate the design flow and how a user would interact with the application. The only testable metrics for this prototype were the cost and overall ease of use. Our prototype received full points for cost since there are no costs listed on the BOM. Ease of use was rated a 9/10 because the user interface (UI) is simple and meets the customer’s needs.



File to transcribe: File_to_transcribe.pptx

Save Directory: /Fakepath/Save_Directory

File to transcribe: File_to_transcribe.pptx

Save Directory: /Fakepath/Save_Directory

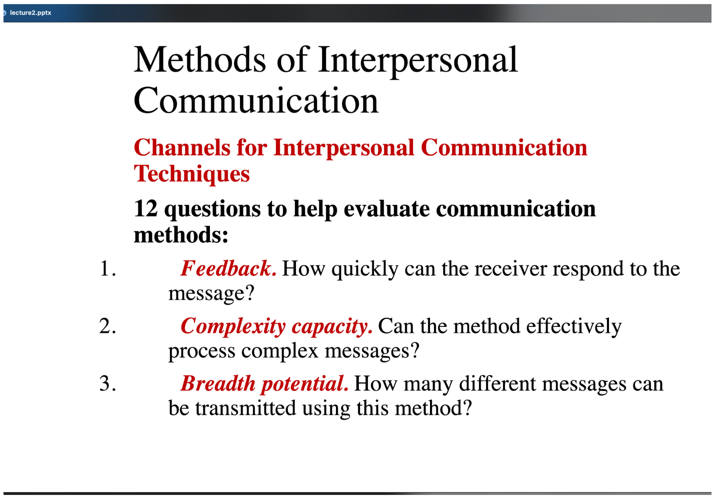
Figure 14.

Metric #	Metric	Units	Tested Value
1	Cost	$	0
2	Ease of use	/10 scale	9/10

Table 5. Target Specifications for Prototype 1

6.3.2 Prototype 2

Our second prototype focused on the functional aspect of the program and getting the OCR to work reliably with test files we provided. The aim was to test the main functionality of the product by comparing the results of the program to the specs defined in deliverable B. This gave us an idea on how close we were to target specs.


lecture2.pptx

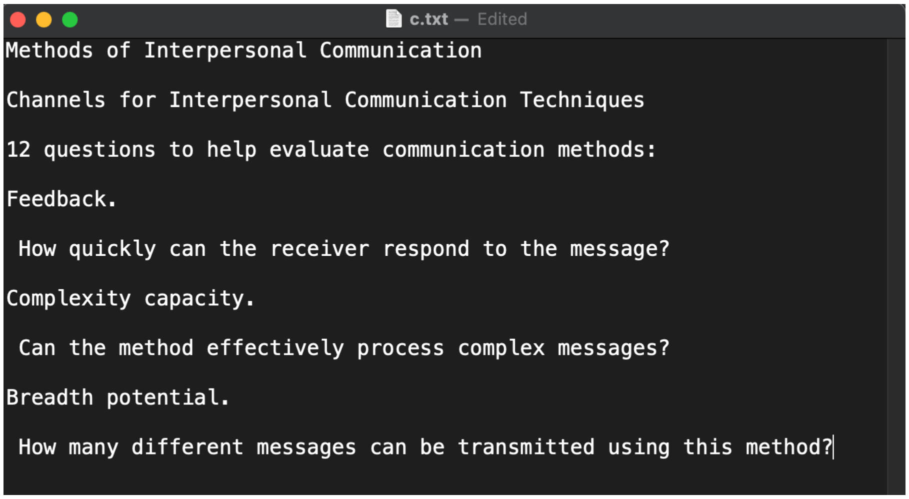
Methods of Interpersonal Communication

Channels for Interpersonal Communication Techniques

12 questions to help evaluate communication methods:

1. ***Feedback.*** How quickly can the receiver respond to the message?
2. ***Complexity capacity.*** Can the method effectively process complex messages?
3. ***Breadth potential.*** How many different messages can be transmitted using this method?

Figure 15. Input powerpoint file



```
Methods of Interpersonal Communication

Channels for Interpersonal Communication Techniques

12 questions to help evaluate communication methods:

Feedback.

 How quickly can the receiver respond to the message?

Complexity capacity.

 Can the method effectively process complex messages?

Breadth potential.

 How many different messages can be transmitted using this method?
```

Figure 16. Output plain text file

Metric #	Metric	Units	Expected Value	Actual Value
1	Cost	$	0	0
2	Ease of use	/10 scale	3/10	1/10

3	Compatibility	Yes/No	Yes	Yes
4	Performance	% cpu usage	< 25%	90
5	Size	MB	s < 100	14.26
6	Speed	seconds	t < 300	0.72
7	Accuracy	% Errors / Document	10%	2.5%

Table 6. Achievement on Prototype 2.

7. Conclusions and Recommendations for Future Work

An increase in electronic notes due to online learning leads us to believe that this could be a useful product for more people other than just our client. After showing our client our first prototypes we came to the agreement that it would be useful to add a french option for the user interface. We think going forward we would use this feedback to improve the usability for a broader range of people. We’ve also identified an issue where the application uses a significant amount of CPU resources, so from a technical standpoint further work can be done to improve resource management.

8. Bibliography

The following products listed were referenced in our benchmarking phase:

-Microsoft, Microsoft VBA for outlook addin. Microsoft, 2009
- Google, Google Translate. Google, 2012
Zamzar is a supporting website for file converting to help the Automated Slide Transcriber work

9. Appendix 1: Design Files

Document Name	Document Location and/or URL	Issuance Date
Automatic Slide Transcriber - GNG3101 - D01 - D4	https://makerepo.com/aaronknapper/870.automatic-slide-transcriber-gng2101-d01-d4	March 21, 2021

Table 7. Referenced Documents

10. Appendix 2: Other Appendices

Document Name	Document Location and/or URL	Issuance Date
Tesseract OCR	https://opensource.google/projects/tesseract	December 26, 2019

Table 8. Other Relevant Documents

Instruction on Zamzar online file convertor:

You can easily convert your files with the conversion tool on our homepage. Simply, click the 'Add Files' button in Step 1 and then select the file you want to convert from where it is stored on your computer; select a format to convert to from the dropdown menu in Step 2; and then click 'Convert Now' in Step 3. Your file will then be converted and you'll be able to download it from our site. If you'd like to receive a link to your converted file instead, you can also optionally enter an email address in Step 3.
If you'd like to watch a short video showing you how to do this, take a look at our 'How to Convert a File' video.
If you have a paid Zamzar account and are logged in to your account on our site, once you have converted your file it will also be placed in your My Files area of our website.