Arabic Handwritten Recognition

Sondos Aabed – UX nd project 1 / 22.3.2025

"I've tried using tools like Google Lens or Adobe Scan, but they don't handle Arabic handwriting well, especially when the handwriting isn't very neat. I often end up typing manually."

- A. H., University Proffessor

Executive Summary

This research explores participants' challenges, satisfaction levels, and market potential for Arabic handwritten recognition tools. Demand is strong, especially among monthly and weekly users, but key pain points include poor recognition accuracy and limited support for various handwriting styles. Satisfaction is low, with over half of respondents dissatisfied, and users consistently request improved accuracy, editable text, and multi-format export options. Privacy concerns, though less common, affect payment preferences. Despite price sensitivity, market potential is promising, most participants are open to mobile apps, favoring free versions with ads.

The research highlights opportunities to improve the technology and align monetization with user needs.

Research Questions

1. How frequent is it for Arabs to extract Arabic handwritten text from images?

2. What challenges do they face when uploading images and extracting text?

3. How satisfied are users with the accuracy of the recognition?

4. What features or improvements do users suggest for current applications?

5. What is the market demand? Including willingness to pay.

Research Questions Cont.

6. Do those who rate accuracy as poor show a higher willingness to pay?

7. Are those who demand high accuracy also unwilling to tolerate a high price?

8. Are those who struggle with recognition accuracy more frequent users?

9. Is personal use associated with lower sharing needs?

10. Do users with high privacy concerns hesitate to pay?

Methodology

This study is conducted using both qualitative and quantitative data.

This data is collected using:

- Conducting 1-1 interviews with targeted participants.

- Distributing survey questions.

Interviews Participants

5 participants for interviews from diverse backgrounds and genders based on Palestine. No screener is needed for this research. Participants are

1. **1 Educator** (Teacher, Professor)

2. **2 Students**

3. **1 Professionals in Documentation & Archiving**

4. **1 General user**

Survey Participants

Surveys were distributed to general users from different backgrounds.

Participants are based on Palestine mainly.

LinkedIn platform is used for reach different audiences backgrounds.

The participants are 17.

Research questions
Discussions and findings

1. How Frequent is it for participants to extract Arabic Handwritten text from images?

- The most uses such tools in a monthly basis.
- A significant portion access such tools rarely.
- Nearly a quarter are regular weekly users.
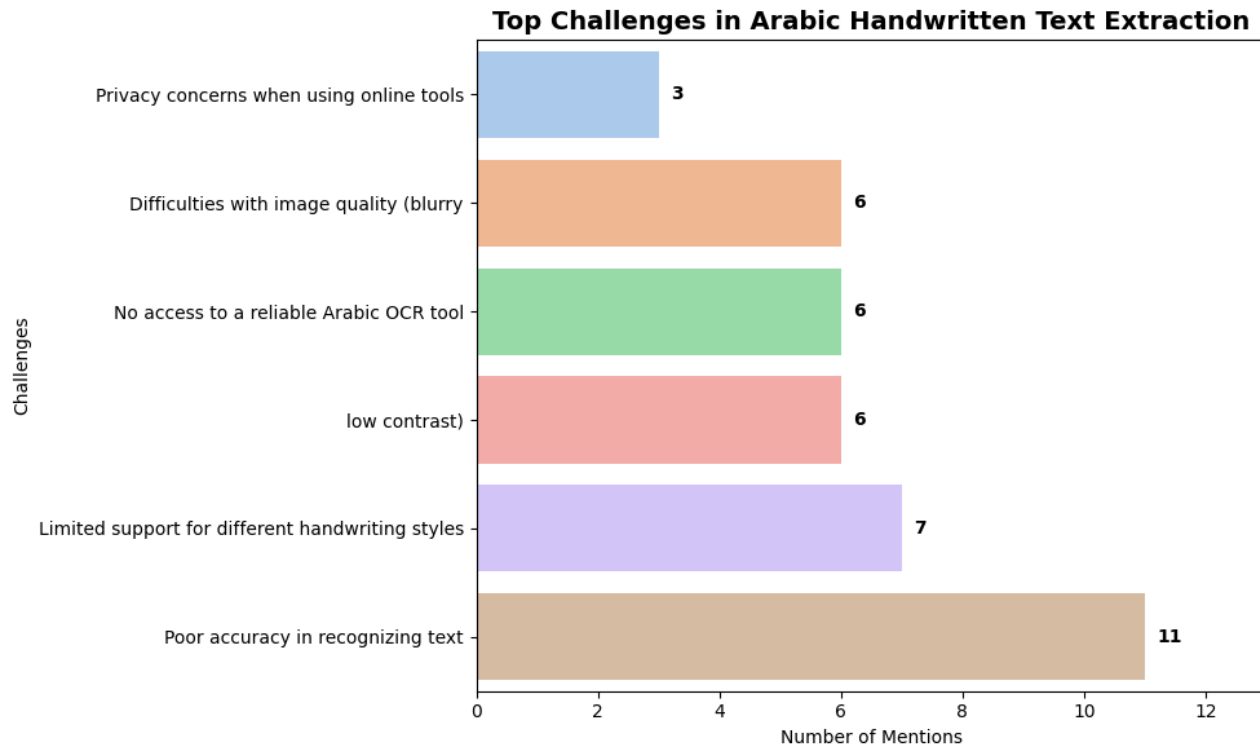- A small faction uses it daily.

Frequency of Use

Daily

Weekly

23.5%

5.9%

29.4%

Rarely

41.2%

Monthly
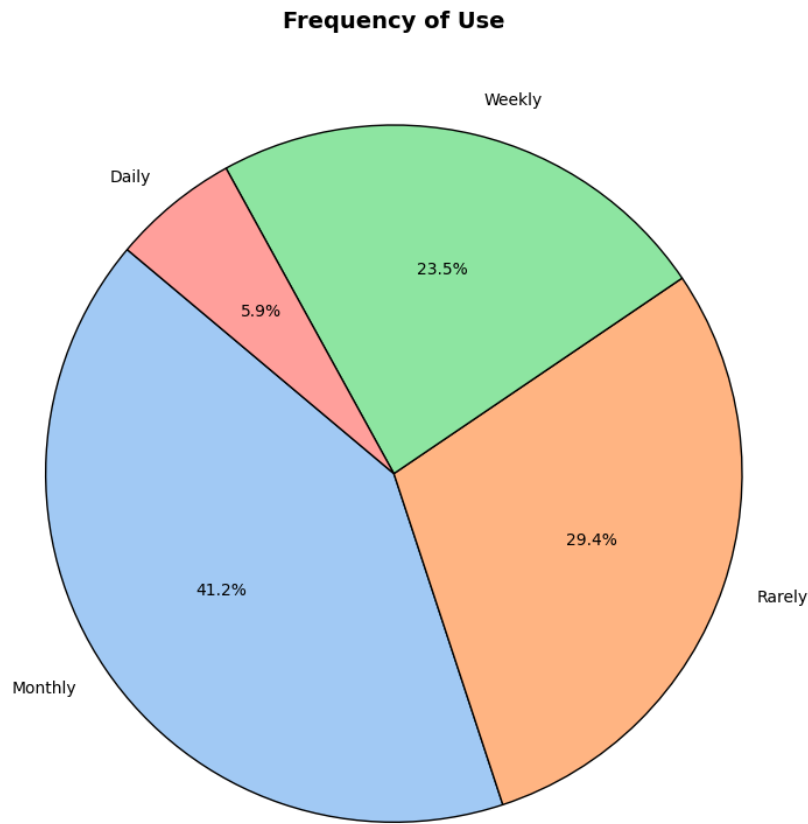
# 2. What Challenges do they face when uploading images and extracting text:

The biggest pain point is the **poor accuracy in recognizing text.**

Then comes the limited support for different styles.

The least is privacy concerns.

Top Challenges in Arabic Handwritten Text Extraction

Challenge	Number of Mentions
Privacy concerns when using online tools	3
Difficulties with image quality (blurry	6
No access to a reliable Arabic OCR tool	6
low contrast)	6
Limited support for different handwriting styles	7
Poor accuracy in recognizing text	11

3. How Satisfied with the accuracy of the recognition?

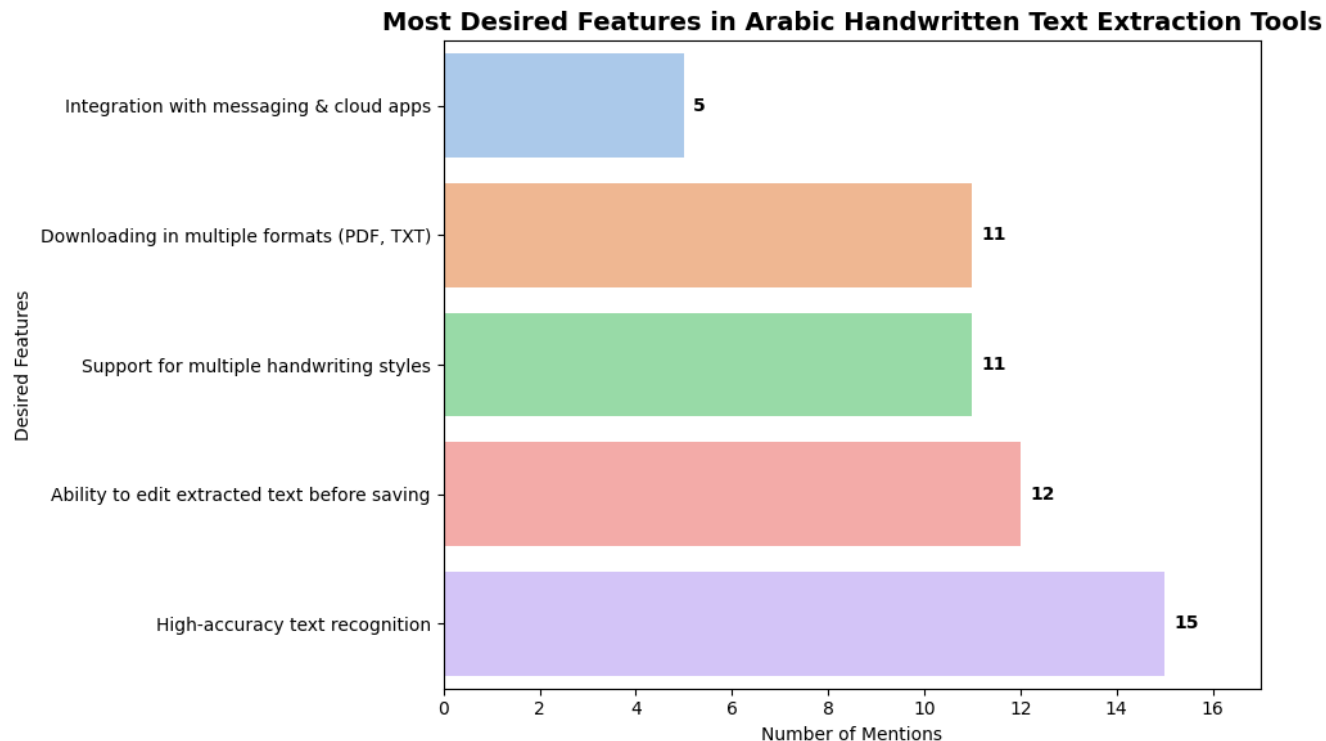**User Satisfaction with Arabic Handwritten Text Extraction Tools**
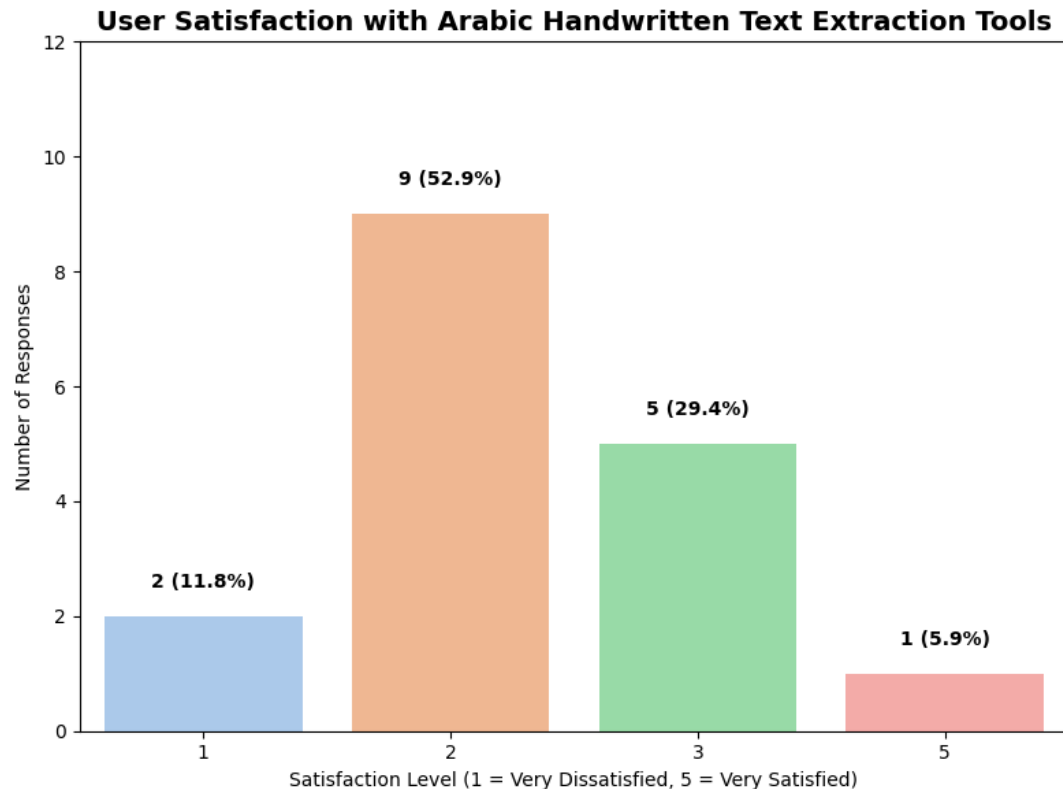
Most participants are not satisfied with the current extraction tools 52.9% are dissatisfied.

Only one response were very satisfied.

4. What features or improvements do they suggest for current applications:

High recognition needs is consistent with the challenges.

They also need the ability to edit the extract text.

Most Desired Features in Arabic Handwritten Text Extraction Tools

Desired Features	Number of Mentions
Integration with messaging & cloud apps	5
Downloading in multiple formats (PDF, TXT)	11
Support for multiple handwriting styles	11
Ability to edit extracted text before saving	12
High-accuracy text recognition	15

"We need archival-standard formats like searchable PDFs and TXT for metadata tagging."

- L. S., Archivist

"A batch processing feature to scan multiple submissions at once would be amazing. "
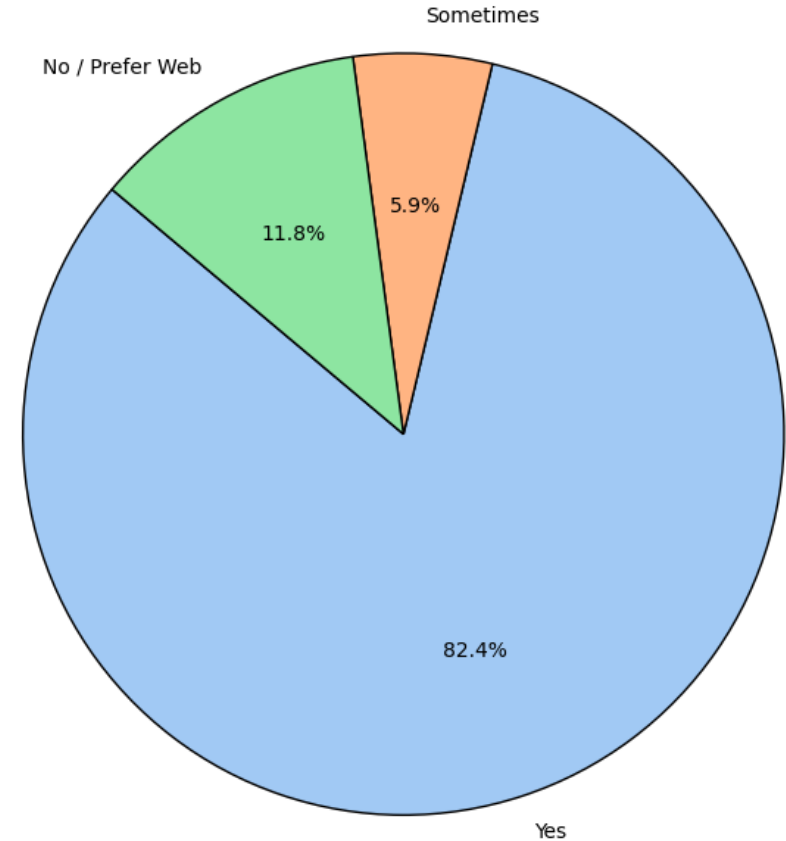
- A. H., Educater

5.1 What is the market demand?

Most of the participants would use such applications.

11.8% of them would prefer to use a web app instead.

Others could be protentional users in some cases.

Willingness to Use a Mobile App for OCR

- Sometimes — 5.9%
- No / Prefer Web — 11.8%
- Yes — 82.4%

"A mobile app would be ideal because I can snap a photo of my notebook immediately after class."
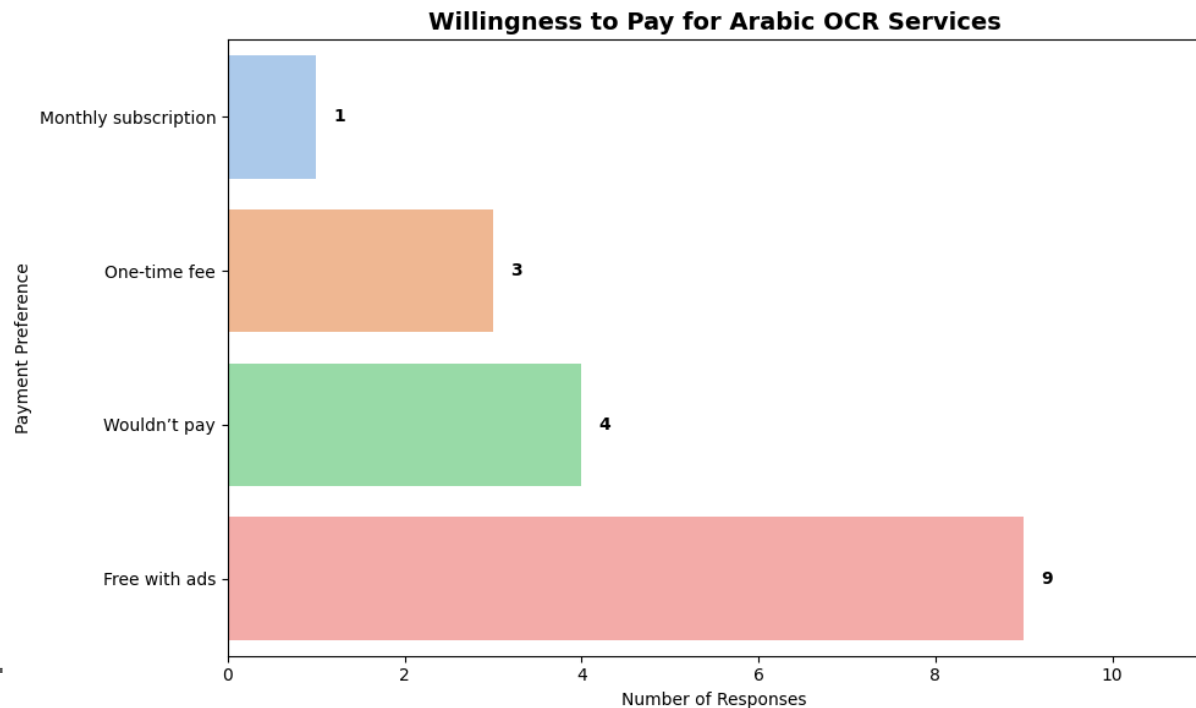
- N. A., Student

5.2 Are they willing to pay?

Most of the participants, expects the app to be free with ADS.

Some would not pay.

3 of which will pay one time.

Only 1 monthly subscription.

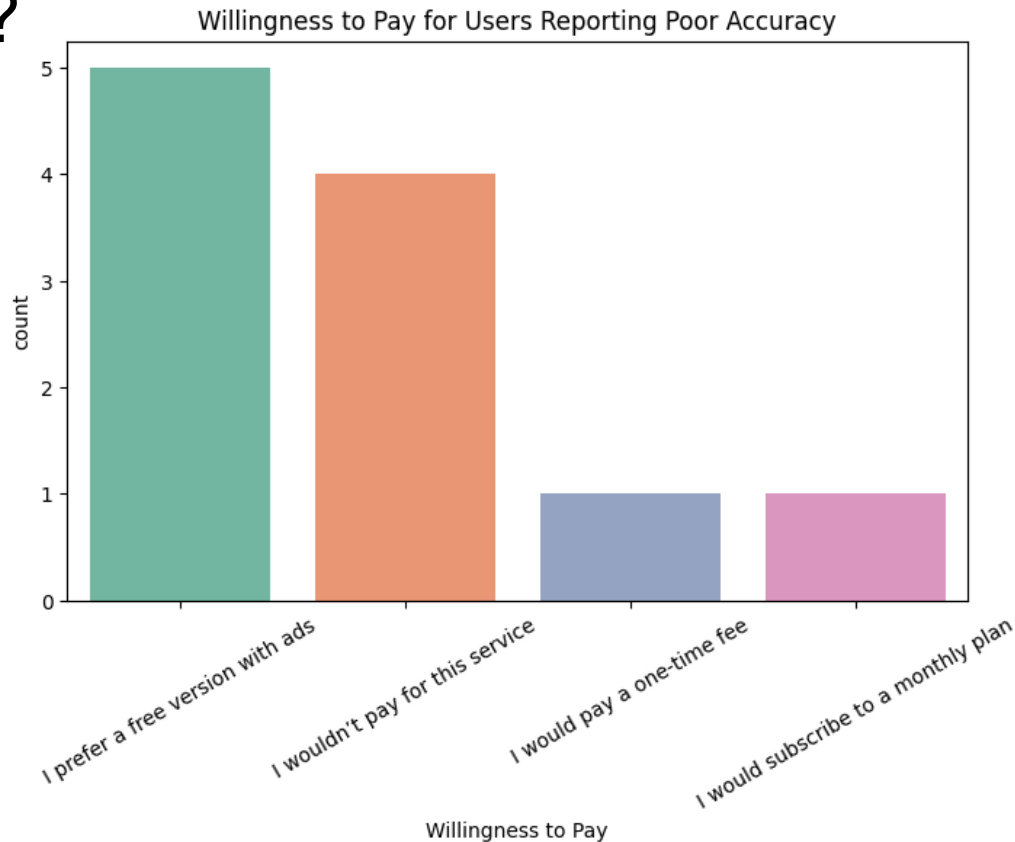**Willingness to Pay for Arabic OCR Services**

6. Do those who poorly rate accuracy also unwilling to tolerate a high price?

Those who reports poor accuracy are unwilling to tolerate high prices.

In the contrast, they expect free versions with tolerating ads.

Two are welling to pay either monthly or one time service.

Willingness to Pay for Users Reporting Poor Accuracy

8. Are those who demand high accuracy also unwilling to tolerate a high price?

Willingness to Pay - High Accuracy Demanders
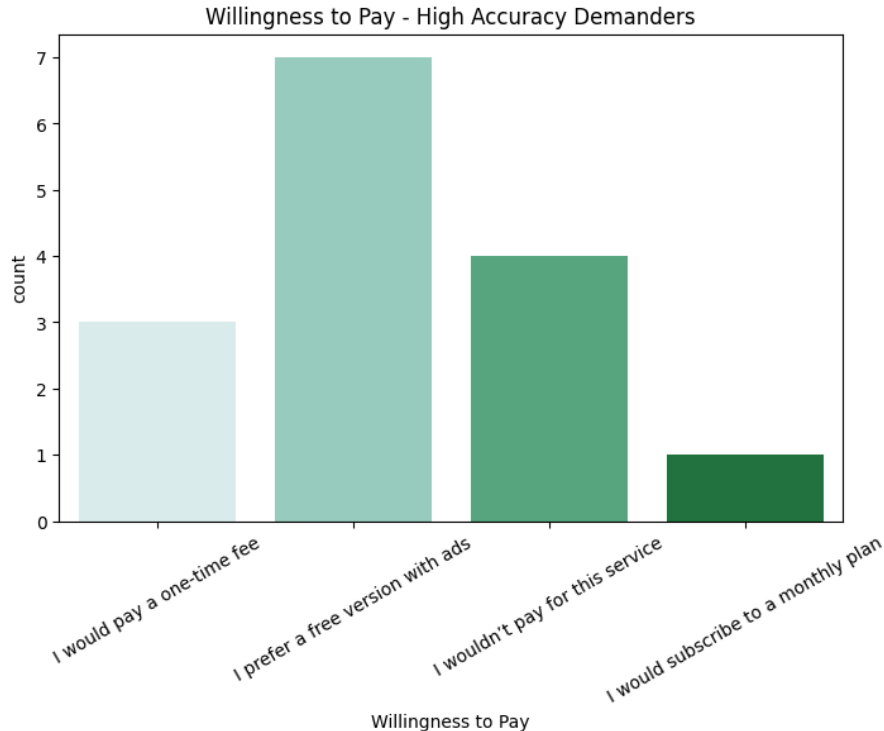
The majority would prefer the free version with ads.

Some wouldn't pay at all.

Some are willing to pay a one-time fee.

Only one would subscribe monthly.

7. Do users with privacy concerns hesitate to pay?
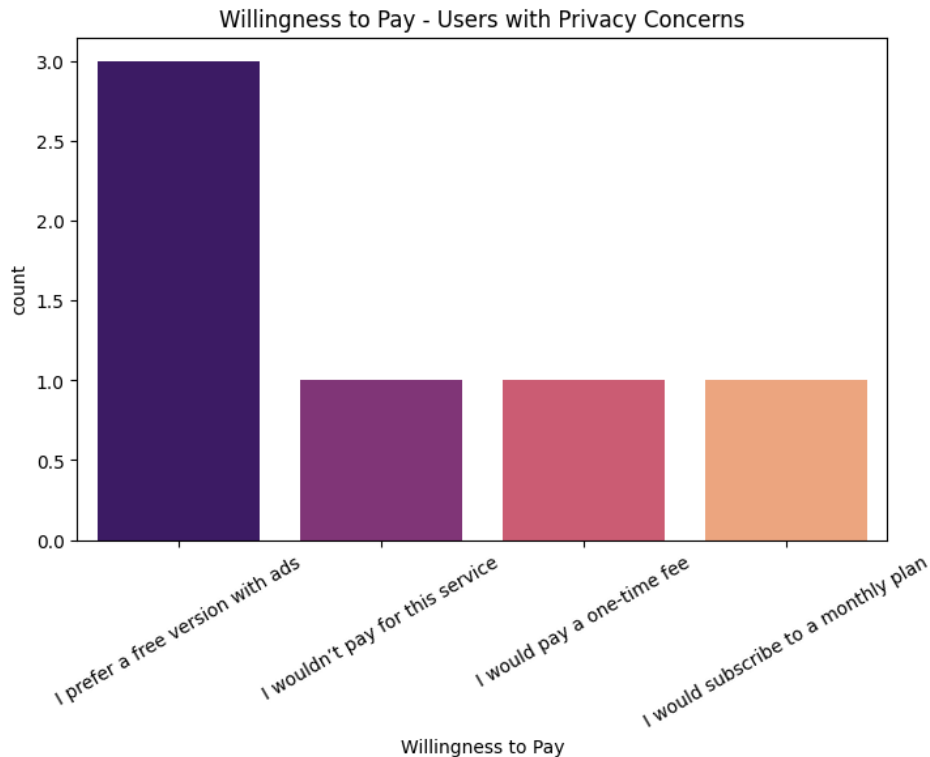

Out of 6 reported privacy concerns, half preferred the free version tolerating ads.

The other half are distributed equally. As one would not pay, another would pay a one-time fee and the last would monthly subscribe.

9. Are these who struggle with recognition accuracy more frequent users?

Usage Frequency of Users with Recognition Accuracy Issues
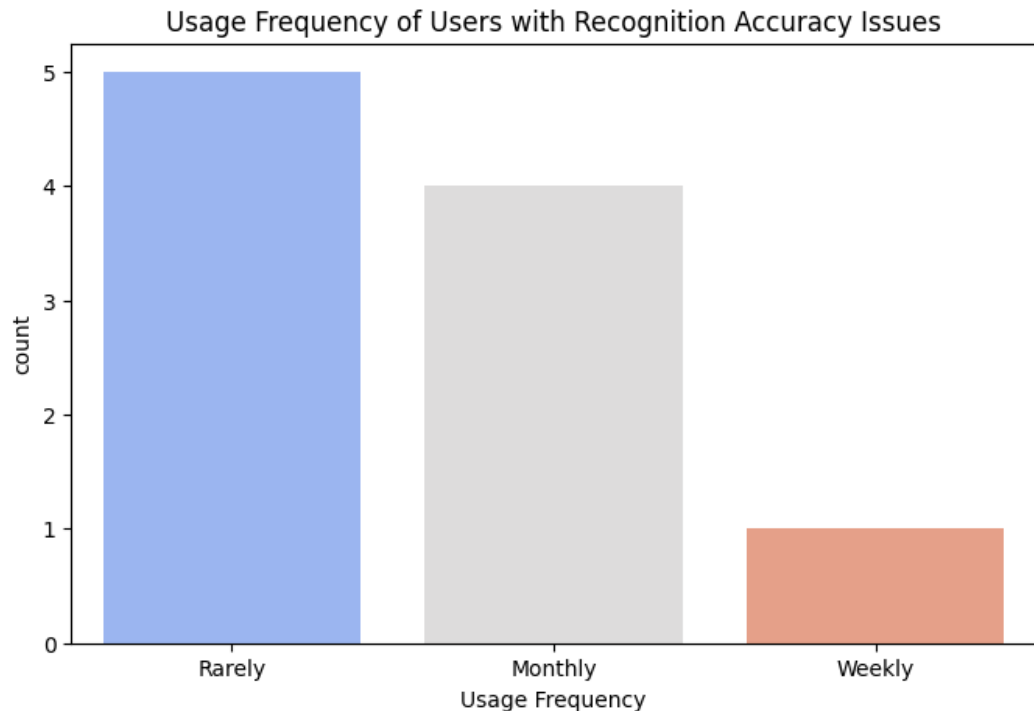
It seems that participants who rarely use such tools are the ones who struggle to find a high accuracy recognition.

Meanwhile frequently users such as monthly and weekly are also reporting accuracy issues.

10. Is personal use associated with lower sharing needs?

For those who use such tools for personal reasons, there is an almost equal distribtion of how important sharing feature is.

But two of which does not seem to value such feature.

Importance of Sharing - Personal Use
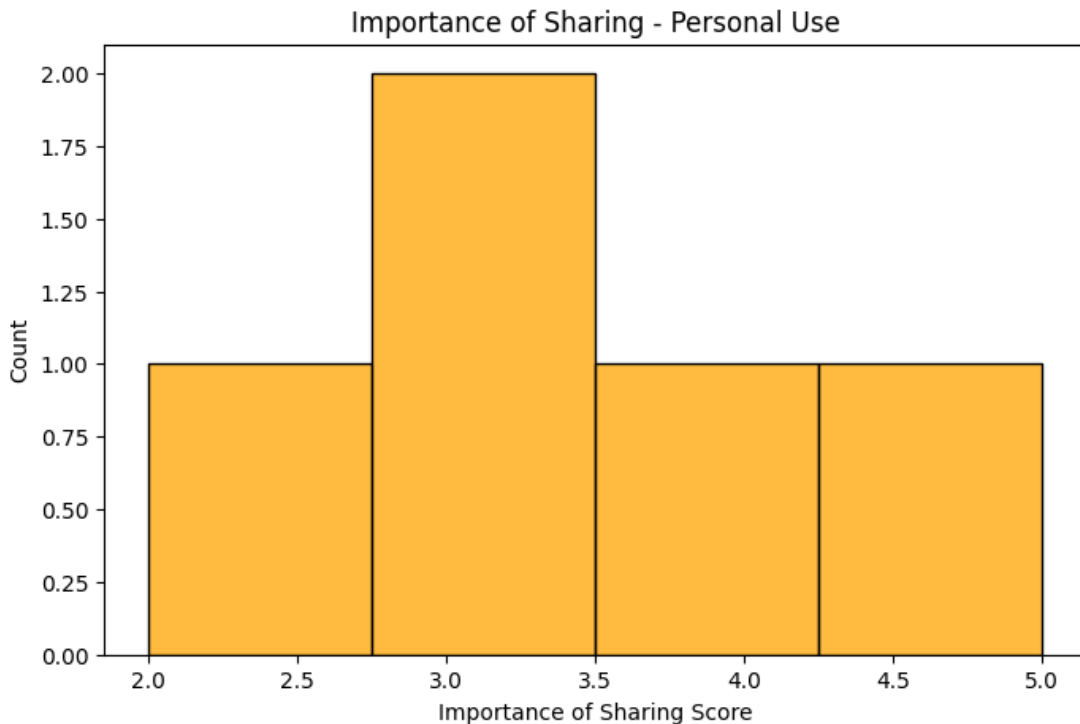
Key findings summary

- **82% willing to use a mobile app**, 12% prefer web-based tools.

- **53% are dissatisfied with recognition accuracy**. That's **their top challenge is poor recognition accuracy** followed by limited support for different handwriting styles.

- The **demand is for high accuracy recognition**, and the need for **editable extracted text** with multi format.

- Majority prefer **free version with ads**. Small group are **up to monthly subscription**.

Recommendations

- Focus on the AI model for reaching a very high recognition accuracy with diverse handwriting support.

- Add the editable extracted text feature.

- Monetization strategy recommended is free version with ads, with offer to premium upgrade as a one-time fee with additional features.

- Maintain privacy of documents.

- Target education and archivist users.

- Allow batch processing feature for multiple documents.

Next Steps

- Develop and launch mobile app with a future option of web-based version.

- Make a marketing strategy to pursue education users and archivist, as well as banking and transactions users.

- Conduct iterate able enhancement in the developed features demanded to make continuous improvements in the application.

Appendix

Affinity diagram

Affinity Diagram online link

Arabic Handwriting Recognition Technology

Sondos Aabed

Users

Desired features

Challenges and painpoints

Educators

Students

Archivists

Accuracy improvements

Batch Processing

Handwriting Quality

Arabic Limitations

P1: "Receive a lot of handwritten assignments every semester"

P2: "Take handwritten lecture notes in Arabic"

P4: "Digitizing crucial for preservation & searchability"

P1: "Handle messy handwriting, academic jargon"

P1: "Batch processing of student submissions"

P2: "Apps misunderstand many words due to unclear handwriting"

P1: "Most OCR tools aren't trained on Arabic scripts"

P1: "Need to digitize responses to archive, check plagiarism"

P2: "Want to convert notes to digital text before exams"

P4: "Work with old Arabic handwritten letters, official documents"

P2: "Work well even if notes are messy or written quickly"

P4: "Bulk processing for archives"

P4: "Historical handwriting styles hard to interpret"

(P2, P5): "No apps explicitly mention Arabic handwriting"

P3: "Need digitized notes for thesis"

P4: "Support older handwriting styles"

P5: "Casual handwriting isn't neat, OCR struggles"

P3: "OCR apps confuse my shorthand & abbreviations"

P5: "Recognize casual notes/short phrases"