KhattTech: An Arabic Handwritten Recognition Mobile Application

Research plan – UX Nanodegree Project one

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Background

KhattTech is an Arabic Handwritten Recognition (AHR) mobile application designed to extract Arabic text from handwritten images. Users can provide image input either by capturing a photo or uploading an image from the gallery. The system then applies image-processing techniques and a recognition model to identify and convert the handwritten Arabic text into a digital format. Users can download the extracted text in multiple formats (PDF, TXT) or share it through various platforms like email and messaging apps.

This application is used in many fields for digitizing, documentation, archiving, exporting text to translating, banking and other fields. For instance, teachers use **KhattTech** to assist them in reading their students' handwritten papers. Some students struggle to understand lecture notes that they wrote in a hurry, this app will be able to help them analyze the notes written. A general usage of **KhattTech** is making the image searchable, which assists with information retrieval and is editable, saving time and effort.

Research Goal

The main goal of this study is to evaluate the need for an Arabic Handwritten Recognition application. To determine how Arabs or non-Arabs extract the Arabic text from images. Then we want to determine what challenges might exist for them to do such a task. So, based on these findings this will determine the direction of developing such a product.

Target Audience for the Research Findings

The research findings will be primarily shared with Investors & Business Stakeholders: Interested in understanding market demand, user challenges, and product viability. For the Key Information Stakeholders Want to Know are Is there a strong need for an Arabic Handwritten Recognition (AHR) mobile application? How do users extract Arabic handwritten text, and what challenges do they face?

Key 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.

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. Do users with high privacy concerns hesitate to pay?

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

10. Is personal use associated with lower sharing needs?

Methodology

This research method will include **user interviews** and a **survey** to gather qualitative and quantitative data.

- **User Interviews:** 10 minutes in person conducted with selected participants to gain insights into their experiences and needs for Arabic Handwritten Recognition.

- **Surveys:** Distributed to a broader audience to collect structured feedback on usability, efficiency, and satisfaction.

Data will be analyzed using affinity mapping in Miro, categorizing common themes and patterns.

Recruiting Criteria

The aim is to recruit 5 participants for interviews from diverse backgrounds and genders who may have a need for handwritten Arabic text recognition or might not. No screener is needed for this research. Participants are based on Palestine.

The key recruitment criteria are:

1. **1 Educator** (Teacher, Professor): who deals with handwritten student submissions.

2. **2 Students**: who take handwritten notes and may struggle to read them later.

3. **1 Professionals in Documentation & Archiving**: who work with handwritten records.

4. **1 General user** who uses handwritten text for personal or professional purposes.

As for the surveys, it will be distributed to general users from different backgrounds. Participants are based on Palestine mainly and LinkedIn platform is used for reach different audiences backgrounds.

Interview Questions

(Conducted in person, 10-15 minutes)

Introduction

"Hi, I'm Sun Dose, thank you for taking the time to participate in this interview. We are researching Arabic Handwritten Recognition (AHR) and how users interact with such technology. This interview will help us understand your needs, challenges, and expectations. Please feel free to share your opinions. There are no right or wrong answers."

1. **Can you describe a situation where you needed to extract Arabic handwritten text from an image?**

   Rationale: Helps identify real-life use cases and user needs.

2. **What tools or methods have you used to extract handwritten Arabic text? How well did they work?**

   Rationale: Understands current solutions and their effectiveness.

3. **What challenges do you face when trying to extract handwritten Arabic text?**

   Rationale: Identifies major obstacles that users experience.

4. **How easy or difficult is it for you to find and use Arabic Handwritten Recognition applications?**

   Rationale: Explores usability and accessibility issues.

5. **If you could design the perfect Arabic Handwritten Recognition app, what features would it have?**

   Rationale: Gathers feature suggestions and expectations.

6. **How important is it for you to be able to download and share the extracted text in different formats (PDF, TXT, etc.)?**

   Rationale: Evaluates the necessity of file format flexibility.

7. **Would you prefer a mobile app, a web-based tool, or another format for extracting Arabic handwritten text? Why?**

Rationale: Understands user platform preferences.

Wrap-Up

"That concludes our interview. Thank you for your time and insights! Your feedback will help improve Arabic Handwritten Recognition applications. Do you have any final thoughts or suggestions?"

Survey Questions

(Distributed to a broader audience)

Introduction

"Hi, I'm Sun Dose, thank you for taking the time to participate in this survey. We are researching Arabic Handwritten Recognition (AHR) and how users interact with such technology. This interview will help us understand your needs, challenges, and expectations. Please answer freely. There are no right or wrong answers."

1. **How frequently do you need to extract Arabic handwritten text from images?**

   o Daily
   o Weekly
   o Monthly
   o Rarely
   o Never

   Rationale*: Understands how often users face this need.*

2. **What is your primary use case for extracting Arabic handwritten text?**

   o Education (e.g., reading student papers, taking notes)
   o Documentation & archiving
   o Personal notetaking & organization
   o Translation purposes
   o Banking/financial documentation
   o Other (please specify)

   Rationale*: Identifies main application areas*

3. **What is your biggest challenge when trying to extract Arabic handwritten text?**

   o Poor accuracy in recognizing text
   o Difficulties with image quality (blurry, low contrast)
   o Limited support for different handwriting styles
   o No access to a reliable Arabic OCR tool
   o Privacy concerns when using online tools

- o Other (please specify)

    Rationale: Identifies the key obstacles faced by users.

4. **How satisfied are you with the accuracy of existing Arabic Handwritten Recognition tools?**

    Rationale: Measures user satisfaction with current solutions.

5. **What features would you like in an Arabic Handwritten Recognition app?**
    - o High-accuracy text recognition
    - o Ability to edit extracted text before saving
    - o Support for multiple handwriting styles
    - o Downloading in multiple formats (PDF, TXT, etc.)
    - o Integration with messaging & cloud apps
    - o Other (please specify)

    Rationale: Gathers user preferences for app improvements.

6. **How important is it for you to share extracted text through messaging apps (e.g., WhatsApp, Signal, Messenger)?**

    Rationale: Evaluates the importance of social sharing features.

7. **Would you use a mobile app for Arabic Handwritten Recognition?** *(Yes/No) If No, why not?*

    Rationale: Determines user preference for mobile solutions.

8. **If a high-accuracy Arabic Handwritten Recognition app were available, how much would you be willing to pay for it?**
    - o I prefer a free version with ads
    - o I would pay a one-time fee
    - o I would subscribe to a monthly plan
    - o I wouldn't pay for this service

    Rationale: Assesses monetization potential and user willingness to pay.

9. **Which of the following would be dealbreakers for you in an Arabic Handwritten Recognition app? (Select all that apply)**

   o   Low recognition accuracy
   o   Limited export options (e.g., no PDF or TXT)
   o   No offline mode
   o   Privacy concerns
   o   Poor app design or usability

   Rationale: *What would prevent users from using the app.*

10. **Do you have any additional feedback or suggestions for improving Arabic Handwritten Recognition technology?**

    Rationale: *Allows users to share additional thoughts and insights.*