

L&T NEUROHACK HACKATHON
PROBLEM STATEMENT 2

Transforming Handwritten Notes into Insights

TEXT SUMMARIZATION TOOL

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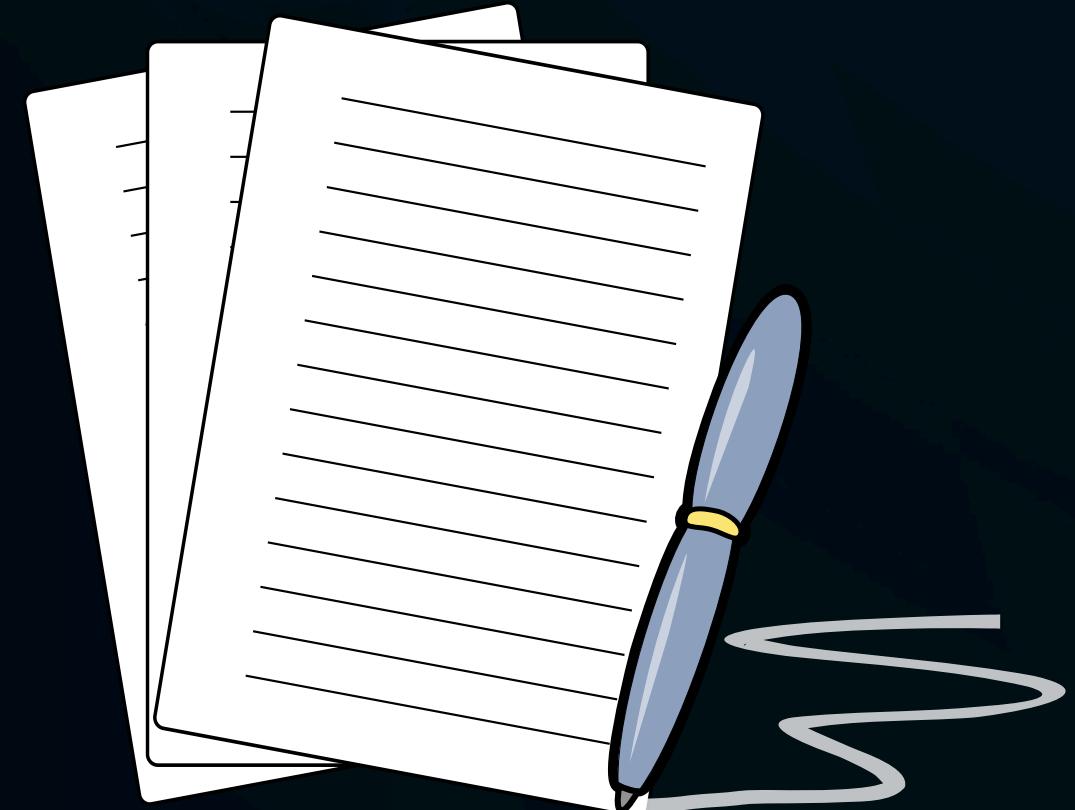
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Problem Statement

Develop an innovative text summarization tool that can efficiently process and summarize handwritten texts, all while operating offline.

Challenges

- Diverse handwriting recognition
- Summarizing long texts
- Privacy and offline functionality
- Resource constraints (low latency, efficient use of RAM)



Technical Breakdown

Technology: Tesseract OCR- For handwriting
Recognition

Handwriting Styles: Convolutional Neural
Networks (CNNs)

Accuracy Improvements & Preprocessing: noise
removal, contrast adjustment, preprocessing
techniques

Summarization (NLP Algorithm)

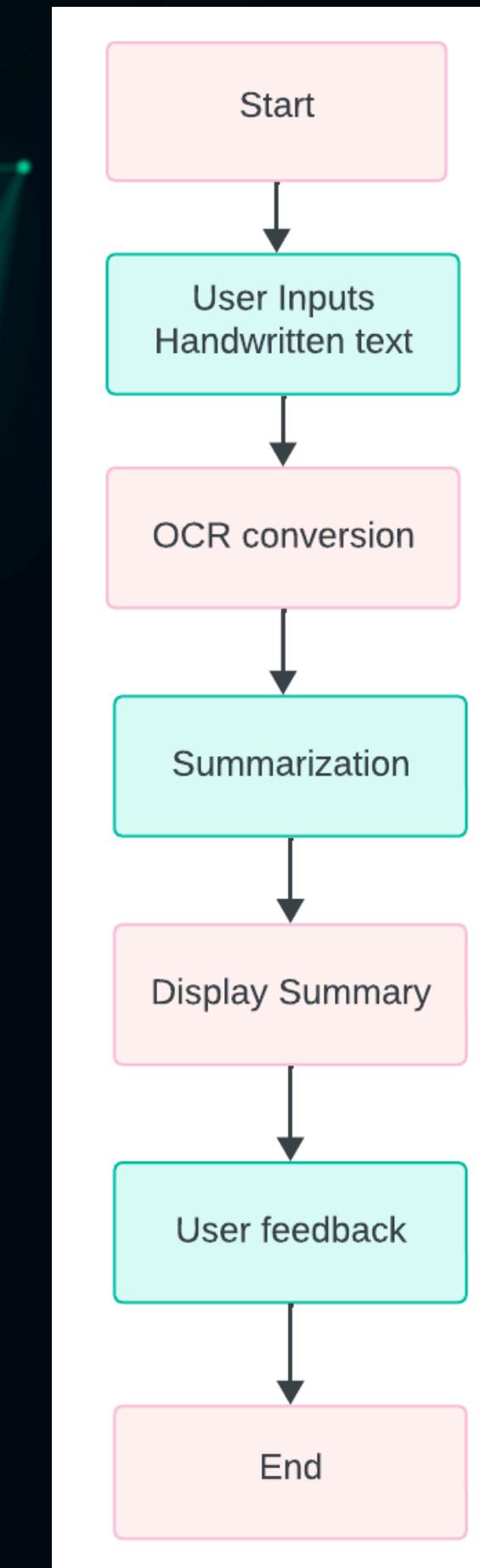


INNOVATION

- Highlighting Important Sentences
- Smart Error Correction: If OCR misreads a word, the tool will suggest possible corrections.
- Batch Processing Mode Users can upload multiple files or documents at once



WORKFLOW DIAGRAM



WORKFLOW DIAGRAM

A

Incorrect file type uploaded

B

Select desired formats

Converts handwritten text into machine-readable text

Smart Error Correction

Batch Processing

Text Preprocessing

Summarization Algorithm

Highlighting Important Sentences

Summary Display

Downloadable Output

Offline Functionality

Resource Efficiency

Error Handling for Handwriting Variability

User Feedback System

Batch Mode

DATASETS

- Handwriting Recognition(OCR)

This dataset consists of more than four hundred thousand handwritten names collected through charity projects.

- MSRA Text Detection 500 Database (MSRA-TD500)
- NEOCR: Natural Environment OCR Dataset
- IAM (IAM Handwriting)

USER INTERFACE (UI)

Features:

1. Drag-and-Drop Document Upload
2. Document Preview Pane
3. Real-Time Summarized Output Display
4. Adjustable Summary Length
5. Handwriting Style Selector
6. Summary Export Options
7. Interactive Feedback System



REAL WORLD APPLICATION:

Educational Sector :

- Lecture Summarization: Converts handwritten lecture notes or spoken discussions into concise summaries, aiding in study materials and revision by ensuring key points are captured accurately.

Healthcare Industry :

- Medical Record Management: Transforms handwritten patient notes and prescriptions into digital summaries, streamlining electronic health records for easy access and organization.

Legal Documentation :

- Case Summaries and Transcriptions: Converts handwritten legal notes and discussions into summarized formats, simplifying document management and aiding in efficient case preparation.

Feature	Existing Systems	Our System
Handwriting Recognition	Often limited to specific handwriting styles; accuracy varies.	Supports diverse handwriting styles with CNNs for improved accuracy.
Text Summarization	May not combine summarization and handwriting recognition effectively.	Integrates handwriting recognition with advanced NLP algorithms for precise summarization.
Speech-to-Text	Some tools offer it but usually require internet access and are cloud-based.	Provides offline speech-to-text, ensuring privacy and efficient local processing.
Offline Functionality	Most systems operate online, posing privacy risks and requiring a stable internet connection.	Operates fully offline, prioritizing privacy and ensuring data security.
User Interface (UI)	Often lacks customization and real-time interaction.	Features a user-friendly, customizable UI with drag-and-drop functionality, real-time summaries, and summary length adjustment.
Batch Processing	Typically processes one document at a time.	Supports batch processing, allowing multiple files to be uploaded and processed simultaneously for efficiency.
Error Correction	Limited error correction features, often requiring manual input.	Incorporates smart error correction, suggesting fixes when OCR misreads words.

Future Scope

- Smart Error Correction: Implementing an advanced error correction system that suggests corrections when the OCR misreads words.
- Batch Processing Mode: Introducing a feature where users can upload and process multiple files simultaneously, enhancing productivity.
- Resource Optimization: Focusing on improving performance with low latency and efficient RAM usage to make the tool suitable for devices with limited resources.
- Speech-to-Text Integration: Plan to integrate a speech-to-text feature that allows users to convert spoken words into text, which can then be summarized along with handwritten notes.

CONCLUSION

Our tool transforms handwritten notes and speech into concise summaries, enhancing user productivity and accessibility. By leveraging advanced technologies like Tesseract OCR, and NLTK algorithms, it offers high accuracy in text recognition and summarization while operating offline to prioritize privacy and optimize resources. Future enhancements, such as speech-to-text capabilities and batch processing, aim to broaden the tool's versatility. With its user-friendly interface and customizable features, our solution stands as a comprehensive and efficient method for summarizing information quickly and reliably.

THANK YOU!

FOR YOUR ATTENTION