Automatic Organiser of Snapped Notes into Subject- Wise Classification – Snap-To-PDF AI

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Abstract: This study presents SnapToPDF AI, a system that uses methods for document processing to allow conversion of notes in different forms into organized files. The system combines approaches that extract text from images, process language data, and use methods for sorting text into categories to provide a process that works without significant input from users. Current methods for scanning documents provide basic functions for changing paper materials into digital forms but these approaches do not include features that organize content or assess relevance to specific areas of study. SnapToPDF AI addresses these limitations by using methods that extract text, prepare data, classify content by meaning, and create compiled documents. The system includes features for changing content, combining multiple files, improving summary generation, and allowing use without network connections, and it provides a complete approach to managing documents for individuals in educational settings and work environments. This work describes the structure of the system, the procedures that it follows, the evaluation that was conducted, and the findings that show the effectiveness and precision of methods using these approaches for processing notes.

Index : OCR,NLP,Document,Digitization,AI-Classification,PDF Generation,Handwritten Notes,Text Extraction.

I. INTRODUCTION

Academic settings and work contexts show high levels of information in physical form, and this pattern appears despite use of devices for digital work. Individuals in study settings use notes that involve writing by hand, and individuals in work settings use notes from discussions, summaries from gatherings, and technical figures that appear in physical form. Devices for taking images allow quick recording of information, and these devices contain large numbers of images in storage, but these images remain without organization, without processing, and without connection to work that involves study or structure. This situation produces difficulties in finding important information, in maintaining connection across time, and in developing materials for study or documents that show structure in digital form.Applications for scanning on devices exist, and examples include CamScanner, Adobe Scan, and Microsoft Lens, but these applications function as tools that provide digital scanning. The applications record images and improve image features and then produce files in PDF form. These tools lack features that provide processing without user action, and users must provide names for files, must organize pages that relate to the same topic, must assign content to categories, and must arrange materials into documents that show structure. This work that involves user action becomes difficult to maintain as the number of notes increases. Information that involves writing by hand presents particular difficulties, and this form of information remains important in academic work, particularly in fields that involve engineering, medicine, and research. SnapToPDF AI provides features that address these limitations, and the system presents an approach to processing documents that goes beyond traditional methods for scanning. The approach combines recognition of text from images, processing of language using computational methods, and models using deep learning to produce conversion of notes in handwritten and printed form into PDFs that show structure, that allow searching, and that appear organized by subject. The system performs extraction of text with high accuracy, and it also applies analysis examining meaning to determine context and to assign content to relevant subjects or topics in academic work without requiring user action. This feature reduces work that involves manual steps in substantial ways, and it allows users to develop organized collections of digital materials without effort.

II. LITERATURE SURVEY

1. **Handwritten Document Segmentation**
   A study by Bhagya and Hiremath (2020) presents an approach for dividing written material in documents that uses analysis of areas showing importance. This method shows effectiveness in finding areas with text. The approach does not provide organization by subject or means for higher forms of grouping. The study also does not include methods for making an index of content.

2. **NLP-Based Document Classification**
   Work by Ravi et al. (2024) describes a model using analysis of meaning for organizing material written by students. This approach demonstrates strong results in grouping by meaning. The method requires resources that operate through networks and depends on clear results from systems that convert images to text. These requirements limit how well the approach works with material written by individuals.

3. **Handwritten Notes Clustering**
   Research by Gogoi and Barman (2024) develops a system that uses context for grouping written material. The approach shows effectiveness for combining content that shows similarity. The work does not provide means for creating portable documents or methods for keeping material. It also does not include features that allow use in applications. These limitations affect how widely the system can be used in practice.

4. **Text Region Classification in Notes**
   A study by Roy et al. (2022) presents a method that finds blocks of written text. The work focuses on finding areas at the level of individual sections. It does not provide organization of complete documents or intelligent methods for making an index.

5. **Multimodal Document Processing**
   Work by Audebert et al. (2019) examines networks using multiple forms of data that combine information from text and visual features. These networks provide classification of documents. The approach demonstrates high levels of accuracy. The system requires substantial resources for processing that make it difficult to use without network connections.

6. **OCR Advances**
   A review by Memon et al. (2020) provides comprehensive examination of methods for converting images to text. This work describes challenges that occur in systems processing material written by individuals. The review provides support for using improved methods for preparing data in systems such as SnapToPDF AI.

III. EXISTING SYSTEM

Current approaches to document scanning provide basic features that include the process of cutting images, improving image quality, and producing files in PDF form. These approaches show significant limitations in multiple areas.

- The systems require individuals to sort scanned notes by hand and to provide names for these notes.
- No approach provides classification that organizes content by subject in an automatic way.
- The accuracy that these systems show for text recognition from handwritten material remains limited.
- Popular applications that provide scanning features require payment for certain functions.
- The approaches lack features that summarize text or that allow retrieval of content using AI-based methods for organization.
- No focus on needs specific to academic work appears in these systems, and no feature that compiles structured PDF files for study purposes exists in current approaches.
- The gaps that these limitations create indicate that existing systems fail to provide adequate support for students and professionals.

These individuals require methods to organize large amounts of handwritten material, but current approaches do not meet these requirements in a way that supports this work.

IV. PROPOSED SYSTEM

The platform that involves SnapToPDF AI provides an approach for changing notes to organized forms using methods that operate with limited input from individuals.

- The system uses Tesseract OCR to extract text from images that show handwritten forms and printed forms.
- Images receive processing that removes noise and increases contrast to improve quality for further analysis.
- The platform includes classification of text using BART and models using rules to determine categories.
- This classification allows organizing content by subject to create structure in documents.
- The system produces PDF files using pdf-lib without requiring manual steps.
- Individuals can edit documents and merge documents and rearrange pages within the platform.
- The approach allows export when offline and requires limited resources for deployment.

The process shows how raw images that contain notes change to academic documents that include organization. The system indicates that automation can reduce the work that individuals perform to digitize notes.

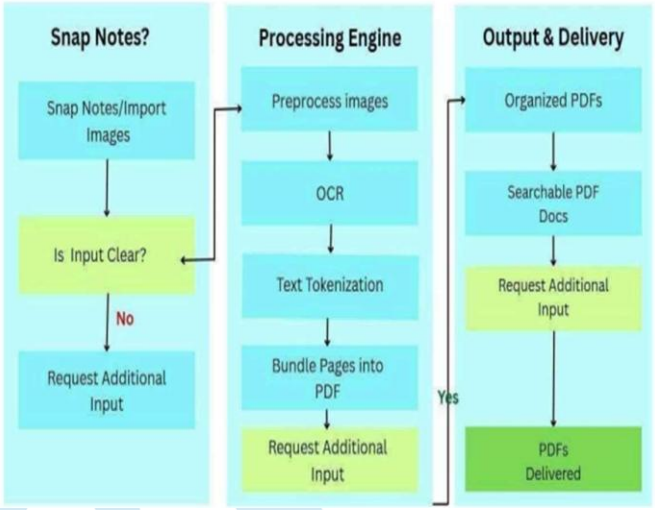

Fig 1:Architectural Diagram

V. METHODOLOGY

The development of Snap-to-pdf-ai followed an approach that combined different methods from work in building programs, understanding thinking, and using systems that process information. The design required examining what the program needed to do and what features it needed to provide.

Requirements came from examining how individuals in academic work use materials and organize information. The analysis focused on features relating to correct processing, clear use, and operation without extensive input from users. These requirements included functions the system performs and other features relating to how it operates.

The System design used a structure with separate parts that handle different functions. This structure includes components for capturing images, recognizing text in images, determining categories for content, creating PDF documents, and storing results. Each component performs specific operations and connects to other components in the system.

Processing-images before analysis involves several operations. The system converts images to forms without color information. It applies methods that reduce unclear elements in images. The process includes operations that establish boundaries between text and background. It also corrects images that show text at incorrect angles.

For OCR, Tesseract.js provides the method for extracting text. This component processes both text that individuals write by hand and text that appears in printed form. The system handles multiple images in sequence. It also processes documents that contain multiple pages of content.

The Classification uses patterns that the system identifies in text.DistillBert performs operations that identify meaning in text. This component examines semantic features and assigns content to categories. Categories include subjects such as Physics, Math, and Computer Science.

PDF Compilation , it creates PDF documents from processed content. These documents combine text that the system extracted with images from the original materials. The PDF documents allow searching for specific content. They support features including bookmarks, modifications to individual pages, and options for changing how content appears. The compilation process structures information in forms that users access easily.

Implementation : These tools combined to create the complete system, that is:

- The system used Node.js for operations that occur on servers.
- Storage used MySQL for maintaining data.
- Tesseract.js provided OCR functions.
- DistillBert and methods using specific rules performed NLP operations.
- React.js for that component that react with user.
- The pdf-lib tool generated PDF documents.

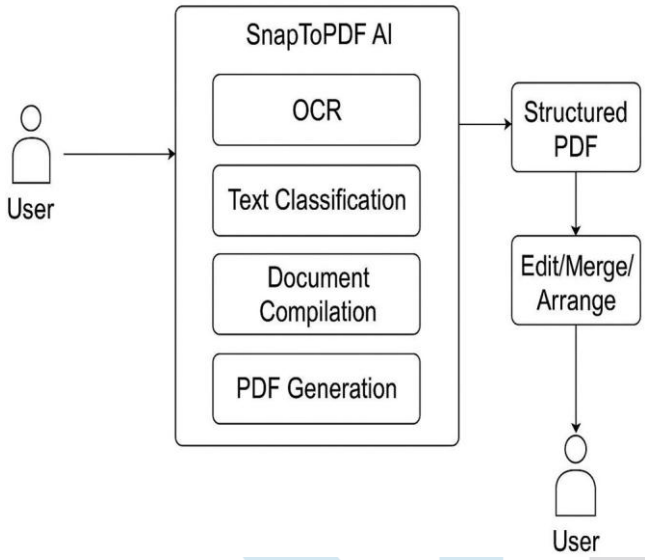

Fig 2: Data –Flow Diagram

VI. RESULTS AND DISCUSSION

The system received testing across different forms of notes. Analysis examined printed text and text written by hand in the study.

Results for recognition show accuracy of **96%** for printed material. Text written by hand shows accuracy of **91%** in the testing. Processing of images before recognition improved the accuracy that the system demonstrated in extracting text from notes.

The model using meaning to assign subjects shows performance in the analysis. It assigns categories for Physics and Math and CS with accuracy across the different subject areas that the testing examined.The accuracy of the model satisfied **86%**

Individuals using the system provide responses in the study. Satisfaction with how the system functions reaches **83%** in reports from these individuals.

Satisfaction with the structure that the system creates in PDF format shows **89%** in the data. Agreement that the system reduces effort required for manual work appears at ninety-one percent among users in the study.

Efficiency measures for the system show results in processing time. Recognition combined with assignment to categories completes within **3 to 5 seconds** for each page that the system.

This performance meets the targets that the study established for processing speed. The SnapToPDF AI application demonstrates strong technical performance, practical usability, and scalability for future enhancements. Its modular architecture also ensures.

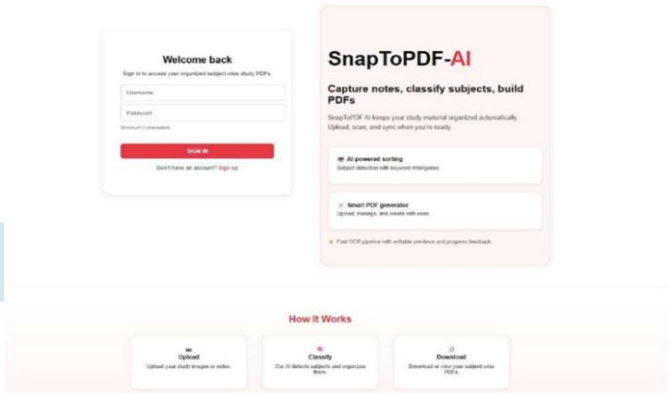

Fig 3: Sign-up and Login Page

Shows SnapToPDF AI interface for user login and Sign-Up feature overview. The interface provides entry point for users. This allows access to the platform. It includes features that support management of digitized notes.

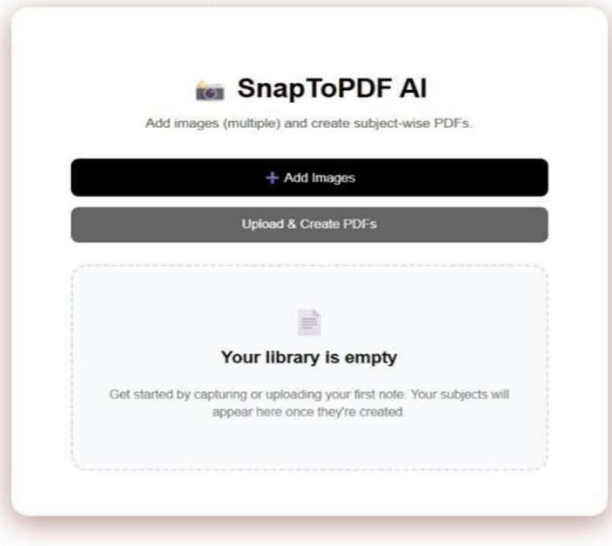

Fig 4: Upload Image and Create PDF's

SnapToPDF AI interface for image upload and library function. This interface allows users to add multiple note images to the system. The approach includes process that generates PDFs organized by subject. This occurs with single action from users.

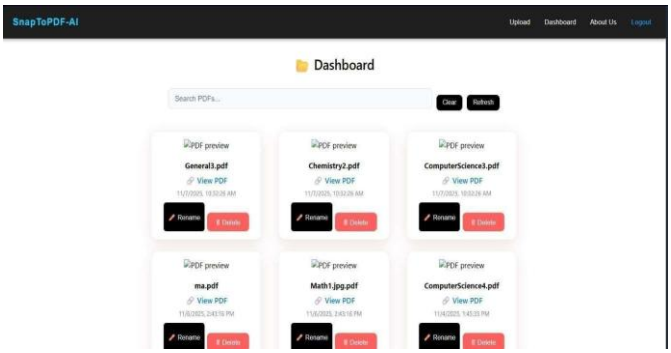

Fig5:DashBoard Page

The dashboard displays PDFs that organize content by subject. These appear in structured format. It allows searchable access to documents. Users can preview documents. They can rename and Delete the Files.

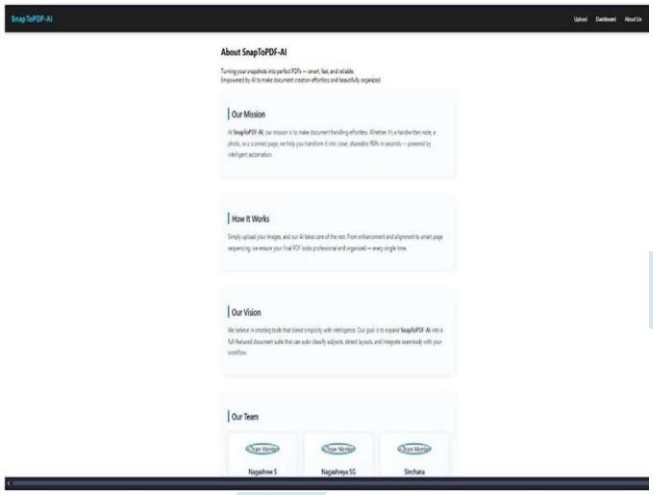

Fig 6:About Us Page

This presents overview of platform mission. It includes working methodology. The interface describes vision for the system. It presents development team information. This helps users examine purpose of platform. It supports understanding of functionality. The approach reveals goals of system.

Fig 7: Snap Bot AI

This provides interactive chatbot for users. The chatbot assists with queries that relate to document upload. It supports questions on OCR process. Users can examine subject classification function. The interface allows queries on system usage. This approach appears to provide instant guidance. It offers support within SnapToPDF AI platform.

VII. AI MODEL PERFORMANCE AND VALIDATION

The study examines results from model development using data following over time. Analysis shows patterns in measures relating to process outcomes. Initial values indicate high rates that decrease in early steps. This suggests processes that occur rapidly during development. As the procedure continues, measures show patterns that decrease gradually and these patterns remain similar across different data types.

Results indicate that measures from development data and measures from separate data show similar patterns. This suggests the model provides results that occur across cases. The finding that patterns remain close indicates the approach does not show problems relating to fitting data used in development. Measures from separate data follow patterns similar to those from development data. This demonstrates that the method allows outcomes that occur with data not used in development. These findings suggest that the structure and the factors selected for the model are appropriate for the work.

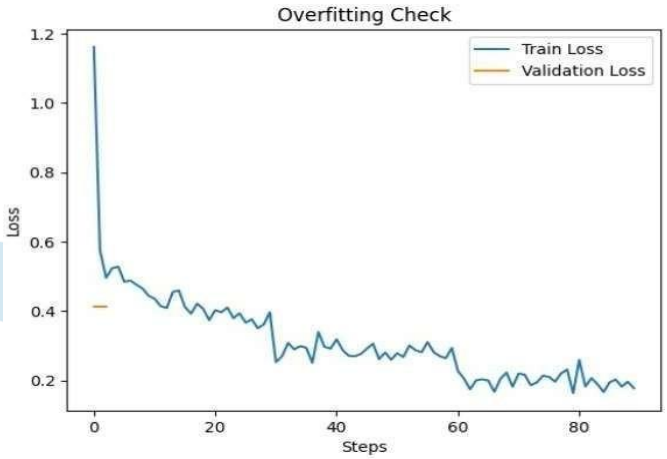

Fig 8: Overfitting check during Model Training

The study presents analysis of outcomes using a method that compares categories. Results show that the approach provides strong performance across the six categories examined. Analysis indicates that large numbers of cases show correct assignment along the main pattern. This demonstrates accuracy in outcomes.

Results show that each category provides high rates of correct identification. This indicates the model recognizes patterns that relate to particular categories. Cases showing incorrect assignment occur at low rates and these cases appear mainly between categories that show similar features. Analysis reveals that no single category shows high rates in measures relating to errors. This suggests the method provides balanced results without patterns relating to particular category types.

The pattern that shows high rates along the main structure demonstrates that the model provides similar performance across categories. This feature is important for work requiring assignment to multiple categories.

Fig 9: Confusion Matrix of Model Classification

Analysis combining measures of pattern development and examination of outcomes indicates multiple findings. The model provides high accuracy and shows results that occur across different data. Problems relating to fitting development data are limited. Results for particular categories show balance and occur consistently. These features suggest the approach is appropriate for use in settings requiring assignment to multiple categories.

VIII. CONCLUSION AND FUTURE WORK

The SnapToPDF AI system provides a process for creating documents using methods that combine different approaches. The system uses methods for recognizing text, examining features of language, and categorizing

content to address requirements in settings that include academic work and other professional contexts. Different from approaches that produce files without additional processing, this system includes steps that prepare images, examine meaning, organize content by type, and produce structured files. These steps result in work that shows improvements in speed and outcomes for individuals using the system.

The system shows value in contexts that extend from academic use. Individuals working in settings that require organizing notes from meetings, capturing content from boards, managing materials for training, or creating records for work processes find the approach useful. Features that allow changing page order, combining files, dividing content, and saving files on devices provide options for individuals requiring solutions that are compact and function in different locations.

FUTURE ENHANCEMENT:

- Development that extends the current system includes several approaches.
- Integration of models using transformer structures such as T5, BART, or structures related to GPT provides methods for producing brief summaries, identifying main points, creating study materials, and locating formulas or important ideas.
- Adding methods that convert speech to text using systems such as Whisper or Google STT allows individuals to speak notes, produce text from these recordings, and combine this content with pages that result from scanning.
- Features that enable multiple individuals to add notes, make changes, and work on the same file or collection at the same time create processes similar to approaches in Google Docs but designed for academic materials.
- Development also includes approaches for settings with limited network access.
- Using models that are compact and optimized in formats such as ONNX or TFLite for recognizing text and examining language features ensures that functions work without network connections on devices that include mobile and desktop systems.
- Features that synchronize content across devices using protected storage systems provide access from mobile devices, computers, or tablets.
- Recognition of diagrams and extraction of formulas using models that detect symbols used in mathematics, equations, or shapes and format these elements in digital form represent additional development directions.

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