Software Requirements Specification

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For Document to Text Extractor

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1. **Introduction**

In an increasingly digital world, the way we interact with information has undergone a profound transformation. From handwritten notes to printed documents, our reliance on paper-based content remains deeply embedded in our daily lives, even as we seek to embrace the advantages of a digital future. The "Automatic Document-to-Text Converter" project emerges at the intersection of this transition, offering a groundbreaking solution to bridge the divide between the analog and digital realms of information.

In the past, the conversion of physical documents into digital text has been a painstaking and time-consuming process, often involving manual transcription or data entry. This inefficiency not only hinders productivity but also restricts the accessibility and searchability of valuable information. Moreover, the persistence of physical documents presents challenges in an era where remote collaboration, information sharing, and rapid data retrieval are paramount.

Recognizing the need for a transformative solution, our project seeks to revolutionize the way we handle and interact with physical documents. By developing an innovative and automated system capable of converting various document types into editable and searchable digital text, we aim to unlock the full potential of information stored in printed pages, handwritten notes, and scanned documents.

Our project's significance lies not only in its capacity to enhance productivity and accessibility but also in its broader implications for sectors ranging from education and research to healthcare, legal, and administrative domains. The "Automatic Document-to-Text Converter" project is a testament to our commitment to harnessing technology to empower individuals, organizations, and institutions in their quest for knowledge and efficiency.

This document serves as an introduction to our comprehensive project, outlining its objectives, methodologies, and core components. We invite you to delve deeper into the details of this ambitious undertaking, as we embark on a journey to seamlessly merge the traditional and digital worlds of information, making knowledge more accessible, searchable, and valuable for all

1. **Project / Research Objective:**

The primary objective of the "Automatic Document-to-Text Converter" project is to develop a state-of-the-art software solution that automates the conversion of physical documents into editable and searchable digital text, thereby addressing the following key goals:

1. Enhanced Accessibility: To make information contained in printed text, handwritten notes, and scanned documents more accessible to individuals, organizations, and institutions by transforming it into a digital format that can be easily viewed, edited, and shared through electronic devices.
2. Efficient Information Retrieval: To enable swift and accurate retrieval of information from physical documents, eliminating the time-consuming and error-prone process of manual data entry or transcription.
3. Preservation of Document Formatting: To ensure that the formatting and structure of the original documents, such as headings, bullet points, and tables, are preserved in the converted digital text, maintaining the integrity and context of the content.
4. Multilingual Support: To offer support for multiple languages, making the system versatile and capable of serving a diverse global user base.
5. User-Friendly Interface: To provide a user-friendly and intuitive interface that allows individuals of varying technical backgrounds to easily upload, process, and download converted documents, promoting widespread adoption.
6. Scalability and Performance: To develop a scalable solution capable of handling large volumes of documents efficiently, with options for cloud-based processing to accommodate increasing user demands.
7. Security and Privacy: To prioritize the security of user data and documents throughout the conversion process, implementing robust encryption and access controls to safeguard sensitive information. Adherence to data privacy regulations is a fundamental concern.
8. Integration and API: To offer integration options for seamless incorporation into existing software ecosystems, as well as the possibility of providing an API for developers to programmatically utilize the conversion services.\
9. Quality Assurance: To establish rigorous testing and quality assurance protocols to guarantee the accuracy and reliability of the converted text, ensuring that the system meets the highest standards of performance.
10. Empowerment and Efficiency: To empower individuals, organizations, and institutions by significantly reducing the time and effort required to digitize physical documents, thereby enhancing productivity and information management capabilities.
11. By achieving these objectives, the "Automatic Document-to-Text Converter" project aims to bridge the gap between traditional paper-based documents and the digital age, facilitating a seamless transition toward more efficient, accessible, and searchable information management.

3.

1. **Technology Used:**
2. SOFTWARE USED: ANACONDA
3. LIBRARY: OpenCv , pandas ,Tesseract
4. Operating system used: Windows
5. Language used: Python for AI/ML
6. **Research Methodology:**

The research methodology for the "Automatic Document-to-Text Converter" project is designed to systematically address the project's objectives, ensuring the development of a robust and effective document conversion system. This methodology encompasses various stages, including data acquisition, algorithm development, testing, and validation. The following outlines the key steps and methods involved:

1. Problem Definition:

* Identify the specific challenges associated with converting various document types (printed text, handwritten notes, scanned documents) into digital text.
* Define the project's scope, objectives, and expected outcomes.

1. Literature Review:

* Conduct an extensive review of existing document conversion technologies, including OCR (Optical Character Recognition) and handwriting recognition systems.
* Analyze best practices, algorithms, and approaches used in similar projects to gain insights and identify potential innovations.

3. Data Acquisition:

* Collect a diverse dataset of physical documents, including printed text, handwritten notes, and scanned documents, covering multiple languages and document formats.
* Ensure the dataset represents real-world scenarios to train and test the system effectively.

4. Algorithm Development:

* Develop or adapt OCR, handwriting recognition, and image processing algorithms to extract text from different document types while preserving formatting elements.
* Implement natural language processing (NLP) techniques to enhance accuracy and context understanding.

5. Software Development:

* Create a user-friendly software application with a web-based interface for users to upload documents, initiate conversions, and download the resulting digital text.
* Incorporate security features to protect user data and documents throughout the process.

6. Multilingual Support:

* Integrate language detection and support modules to accommodate documents in various languages, ensuring versatility.

7. Scalability and Performance:

* Explore cloud-based solutions to handle large volumes of documents efficiently.
* Optimize algorithms and infrastructure to enhance scalability and minimize processing time.

8. User Interface Design:

* Develop an intuitive and accessible user interface with features for document upload, processing status tracking, and document download.
* Incorporate accessibility features for users with diverse needs.

9. Quality Assurance:

* Implement rigorous testing protocols, including unit testing, integration testing, and user acceptance testing.
* Establish benchmarks for accuracy, speed, and reliability, comparing results with ground truth data.

10. Privacy and Security Measures:

* Ensure compliance with data privacy regulations and standards.
* Implement encryption, access controls, and data anonymization techniques to protect user data.

11. User Feedback and Iteration:

* Collect user feedback through beta testing and user surveys to identify areas for improvement.
* Iterate on the software based on user input and emerging requirements.

12. Validation and Benchmarking:

* Validate the system's performance against a wide range of document types and languages.
* Benchmark the system against existing solutions and evaluate its accuracy and efficiency.

13. Documentation and Reporting:

* Document the entire development process, including algorithms, codebase, user manuals, and system architecture.
* Prepare comprehensive reports outlining research findings, methodology, and results.

14. Deployment and Support:

* Deploy the "Automatic Document-to-Text Converter" system for public or organizational use.
* Provide ongoing support, updates, and maintenance to ensure its continued functionality.

This research methodology serves as a structured framework to guide the development of the "Automatic Document-to-Text Converter" project, enabling the systematic achievement of its objectives and the creation of a highly effective and user-friendly document conversion system.

**4. Project/Research Outcome:**

The successful completion of the "Automatic Document-to-Text Converter" project yields a range of significant outcomes that revolutionize the way we interact with physical documents and bridge the gap between analog and digital information management. The project's outcomes can be summarized as follows:

1. Efficient Document Conversion:

* A sophisticated and automated system capable of converting various document types, including printed text, handwritten notes, and scanned documents, into editable and searchable digital text.
* Substantial reduction in the time and effort required for digitizing documents compared to manual transcription.

2. Enhanced Accessibility:

* Improved accessibility to information contained in physical documents, making it readily available to a wider audience through digital devices.
* Greater inclusivity for individuals with diverse needs, as the system accommodates accessibility features.

3. Efficient Information Retrieval:

* Swift and accurate retrieval of information from converted documents, eliminating the need for labor-intensive manual data entry.
* Enhanced searchability and data analytics capabilities, promoting better decision-making.

4. Preservation of Document Formatting:

* Preservation of the formatting and structure of original documents, including headings, bullet points, tables, and other layout elements, ensuring the context and integrity of the content.

5. Multilingual Support:

* Support for multiple languages, catering to a global user base and accommodating documents in various languages.

6. User-Friendly Interface:

* An intuitive and user-friendly web-based interface for document upload, conversion initiation, and download of the resulting digital text.
* Accessibility features for users with disabilities or special requirements.

1. **Proposed Time Duration**
2. Project Initiation (1 week):

* During this phase, the project team is formed, and project objectives, scope, and requirements are defined. Initial planning and resource allocation take place.

1. Research and Analysis (1-2 weeks):

* Conduct a comprehensive literature review, gather datasets, and perform in-depth analysis to understand the technical and functional requirements of the project thoroughly.

1. Algorithm Development (1-2 weeks):

* Develop or adapt the necessary algorithms for OCR, handwriting recognition, and image processing. This phase may include multiple iterations to optimize accuracy and efficiency.

1. Software Development (2-3):

* Design and develop the user-friendly software application, including the web-based interface and backend processing components.

1. Multilingual Support and Integration (1-2 weeks):

* Integrate language support and ensure compatibility with various document formats. Explore options for integration into existing ecosystems and consider API development.

1. Scalability and Performance Optimization (1-2 weeks):

* Optimize the system's architecture and algorithms to handle large volumes of documents efficiently, potentially incorporating cloud-based solutions.

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