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Soft Vision OCR Using Flutter Framework

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Abstract: The focus of the project is OCR. The acronym for this is "Optical Character Recognition." An input device called OCR is used to read printed text. Character by character, OCR optically reads the text, transforms it into a machine-readable code, stores it in the system memory, and then creates a document out of it. Optical character recognition (OCR) technology was employed to convert printed text into editable text. OCR is a very useful and common method in many applications. Techniques for segmenting and preparing text can affect the accuracy of OCR.

Text retrieval from the image may occasionally be difficult due to its complex backdrop, style, size, and orientation variations. This technology can identify text contained within a digital picture. Text recognition in scanned documents and images is a widely used feature. OCR can be used to turn an image or a physical paper document into a text-rich, readable electronic version.

Index Terms **- Flutter Framework, Dart, Flutter, Android.**

I. INTRODUCTION

the text and graphic components in document images and extracting the desired information as a human would be the goal of document image analysis. It is possible to define two categories for document image analysis. Textual processing works with an image document's textual components.

Here, some tasks include figuring out the document's skew (any tilt at which it may have been scanned), locating columns, paragraphs, text lines, and words, and using optical character recognition (OCR) to recognize the text and potentially its attributes like size, font, etc.

The non-textual line and symbol elements of line diagrams, such as the boundaries between text sections, business logos, etc., are handled by graphics processing. Images make up the third main component of documents, but other than identifying where they are on a page, other image processing and machine vision techniques are typically responsible for further analysis of these.
The several megabytes of initial data are removed after these text and graphics analysis techniques are applied, producing a much more condensed semantic description of the document

Literature survey:

There are programs available these days that can only recognize English characters. The characters are identified and saved in ASCII format. The mechanical or electronic conversion of images of handwritten, typewritten, or printed text (typically captured by a scanner) into machine-editable text is known as optical character recognition, or OCR for short

OCR is a branch of artificial intelligence, machine vision, and pattern recognition research. Even though scholarly research in the field is still ongoing, applying tried-and-true methods is now the main emphasis of OCR. At first, digital character recognition which uses scanners and computer algorithms—and optical

character recognition—which uses optical methods like mirrors and lenses—were thought to be distinct disciplines. Since true optical techniques

o read a particular font, early systems needed to be trained—that is, given known samples of each character. These days, it's typical to find "intelligent" systems that can accurately recognize the majority of fonts. Certain systems can even replicate formatted output that closely resembles the original scanned page, down to the non-textual elements like columns and images

PROPOSED SYSTEM:

The open-source Flutter UI (User Interface) software development kit, developed by Flutter Google, is used to implement the system. Using a single codebase, it can generate natively compiled desktop, web, and mobile applications.

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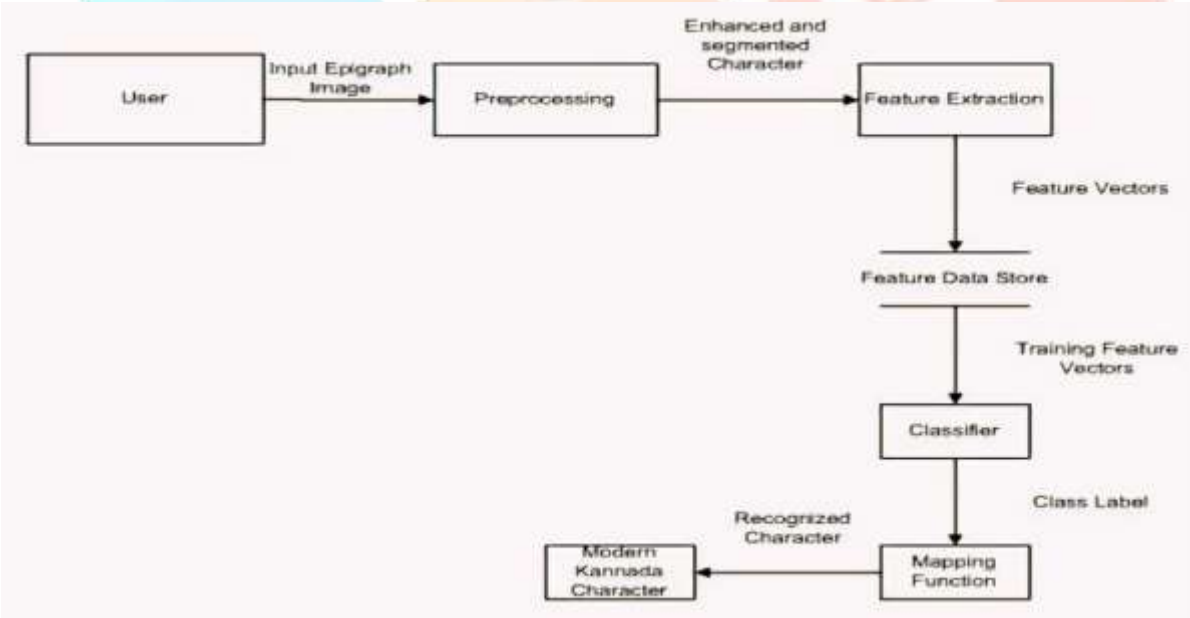
Dart is well known for its simplicity, speed, and productivity. Its features include a strong type system, support for asynchronous programming, and Just-in-Time (JIT) compilation, which enables speedy development cycles

Developers who have experience with languages like Java, JavaScript, will find it easy to pick up Dart

SYSTEM ARCHITECTURE:



An OCR system's system architecture consists of multiple interconnected layers that cooperate to effectively and accurately convert images into machine-readable text

The Input Layer, which manages image acquisition via web or mobile interfaces and direct integration with scanners and cameras, is where the architecture starts

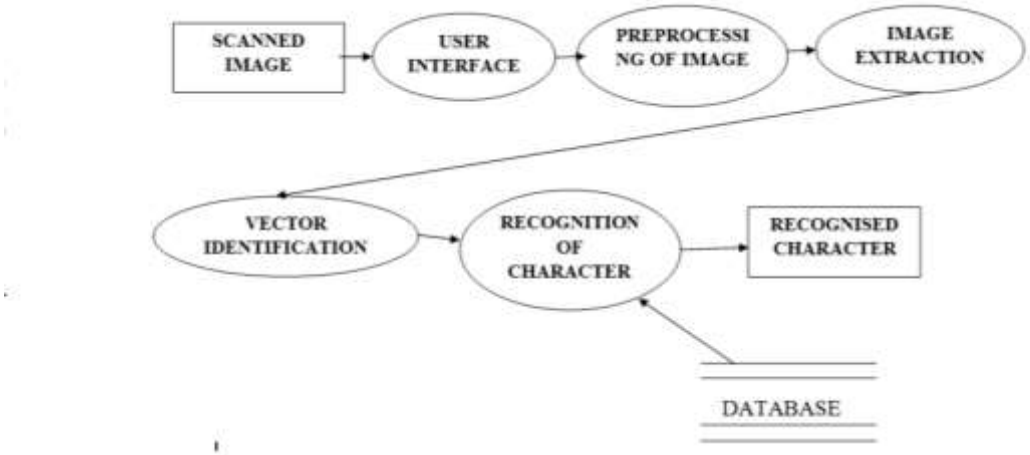
The processing Layer comes next, where it applies skew correction, contrast adjustment, and noise reduction to improve the quality of the image. After that, the Text Recognition Layer processes the text regions that the Text Detection Layer identified using techniques like edge. detection and machine learning, and OCR algorithms turn those regions into text.

This text is polished by the Postprocessing Layer, which also fixes typos and unifies formatting. The Output Layer then handles the recognized text, providing interfaces for downloading and viewing the findings as well as integrating with other systems via APIs

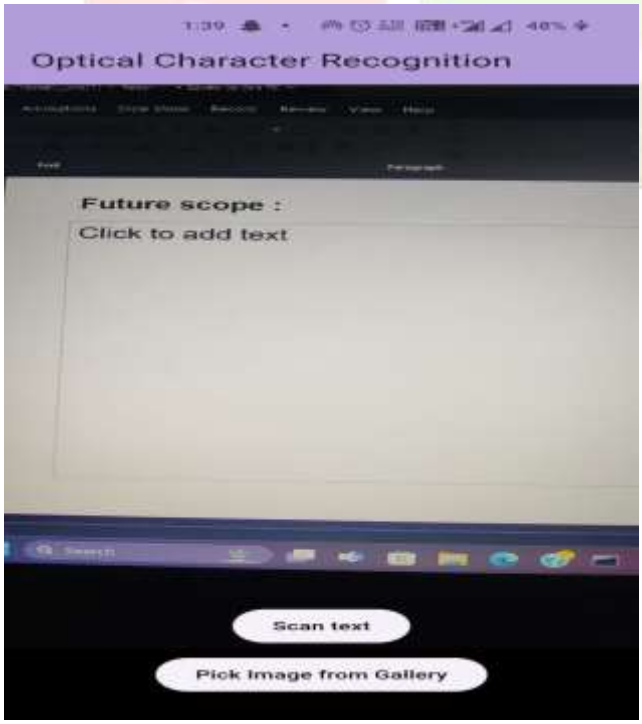
While the Integration Layer guarantees interoperability with other applications, the User Interface Layer offers a smooth platform for user interaction.

Throughout, the Security Layer safeguards data with strong authentication and encryption techniques, while the Logging and Monitoring Layer keeps track of system performance and logs events. This well-organized design guarantees the OCR system's security, scalability, and

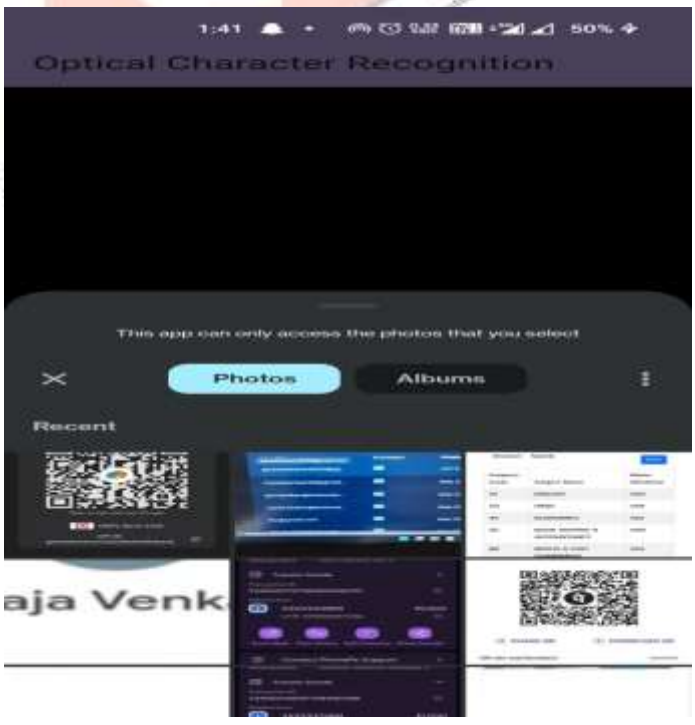
Data flow:-



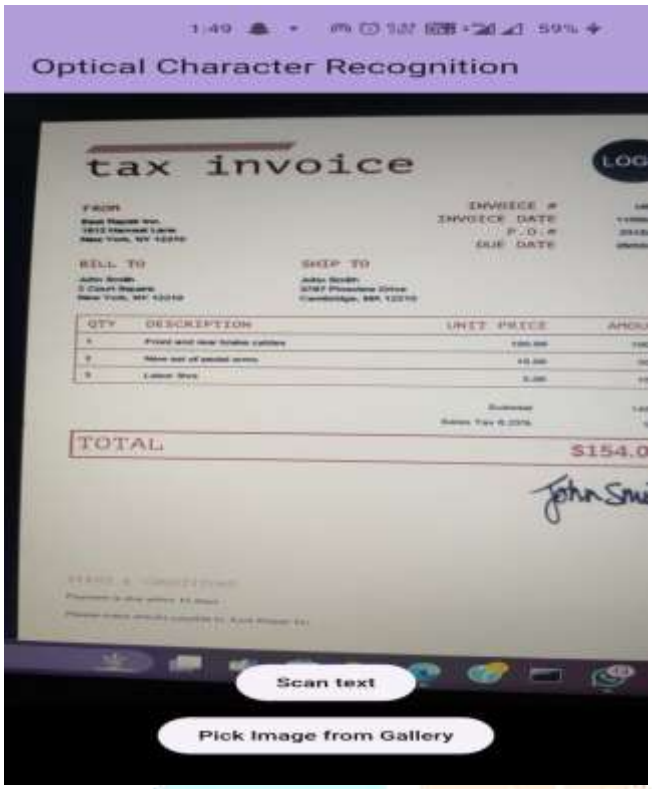
Result: -



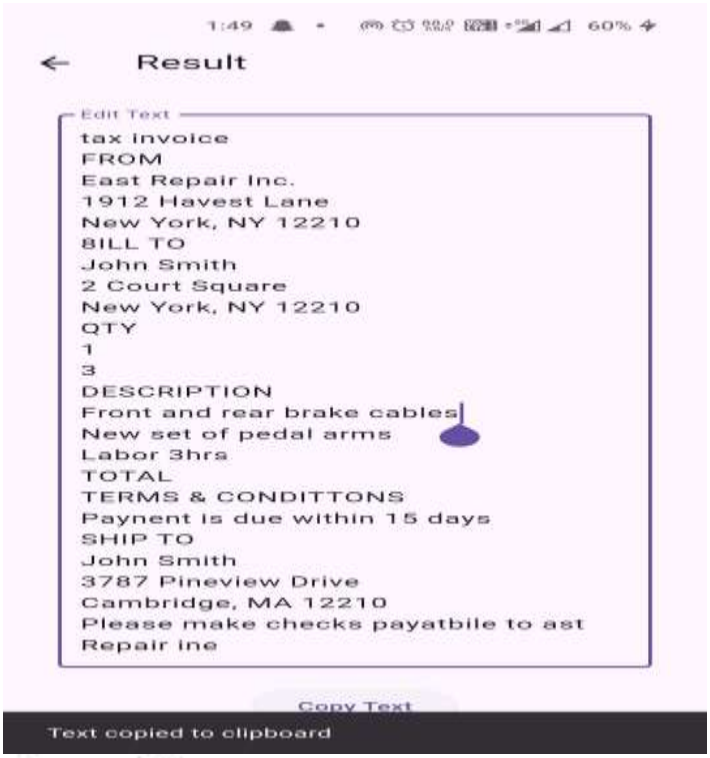
1. Click any Image Photo



2. Select Image From Gallery



3. Pick image From Gallery Or click by camera



4. Photo Image Data Which Converted In Text

Methodology: -

This research project aims to design and assess an OCR (Optical Character Recognition) system for text document digitization from printed sources. This section describes the methodology that was employed to accomplish this goal, including the procedures for data collection, analysis, and research design.

In order to create and evaluate the OCR system, this study uses an experimental research design. To ensure thorough evaluation and validation of the OCR system's performance, the approach combines qualitative and quantitative methods.

This research project aims to design and assess an OCR (Optical Character Recognition) system for text document digitization from printed sources. This section describes the methodology that was employed to accomplish this goal, including the procedures for data collection, analysis, and research design

It can be difficult to make sure the app functions properly on a variety of hardware and operating systems. Bugs, technical difficulties, and performance problems might make using the product less enjoyable. Frequently occurring technical issues might irritate users, which can result in unfavorable reviews and decreased app usage

processing:

- Image Acquisition: High-resolution scanners were used to scan the documents.
- Image Enhancement: To enhance the quality of images, methods including contrast modification, noise reduction, and binarization were used

Segmentation:

- Text Line Segmentation: To separate text lines from document images, algorithms were created.

Character Segmentation:

- To isolate specific characters within each text line, additional segmentation was carried out

Feature Extraction:

- Character Features: Using methods like Scale-Invariant Feature Transform (SIFT) and Histogram of Oriented Gradients (HOG), important features like edges, corners, and strokes were extracted

Recognition:

- Machine Learning Models: To recognize characters, a number of machine learning models, such as Long Short-Term Memory Networks (LSTM) and Convolutional Neural Networks (CNN), were trained on the extracted features. • Training and Testing: To assess the performance of the model, the dataset was split into subsets for training (80%) and testing (20%).

Future Scope:

Owing to continued research and technological advancements, OCR (Optical Character Recognition) technology is expected to see major expansions and innovations in the future. Increasing OCR accuracy through the integration of AI, deep learning, and machine learning algorithms is one major area of focus

With these developments, OCR systems will be able to manage more complicated situations, such as text extraction from damaged or low-quality documents and handwritten text recognition. Furthermore, real time processing capabilities are anticipated in future OCR systems.

Enabling real-time text extraction from camera feeds or live video streams, this technology will find use in augmented reality, video analytics, and Internet of Things devices

With the help of automatic language detection and translation techniques, OCR systems will be able to support a wider range of languages and scripts, leading to an expansion of multilingual support. Additionally, OCR systems' integration with natural language processing (NLP) technologies will allow them to recognize text in addition

Conclusion:

With the growth of digital information, optical character recognition has been around for a while and has gained significance. Given that Python is a well-liked and extensively used programming language for many different applications, including OCR, the future of OCR development using Python appears to be very bright

The following are some areas where OCR development is anticipated to grow in the future: Enhanced Accuracy: As deep learning and computer vision technologies progress, OCR algorithms' capacity to identify text in images and PDFs will only increase, resulting in even greater efficiency. Real-Time OCR: OCR systems will need to change to accommodate real-time processing capabilities as the need for processing images and videos in real-time grows

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