SIGNATURE EXTRACTION SYSTEM

PRESENTED BY

STUDENT NAME: KISHORE R

COLLEGE NAME: SRIRAM ENGINEERING

COLLEGE

DEPARTMENT: COMPUTER SCIENCE AND

ENGINEERING

EMAIL ID: KISHORE2KK5@GMAIL.COM

AICTE STUDENT

ID:STU67E15E48EA7251742822984



OUTLINE

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PROBLEM STATEMENT

In many administrative and legal processes, extracting signatures from scanned documents is crucial for verification and digital processing. Manual extraction is time-consuming and error-prone, creating a need for automated methods that accurately detect and separate signatures from complex document backgrounds.

PROPOSED SOLUTION

 The proposed solution aims to automate the extraction of handwritten signatures from document images using image processing and machine learning techniques. The approach includes:

Image Pre-processing:

Convert images to grayscale and apply binarization for effective background removal.

Connected Component Analysis:

Identify and isolate significant components within the image.

Noise Removal:

Filter out small and overly large components to reduce noise and enhance signature isolation.

Output Generation:

Save the processed signature images to a specified directory.

SYSTEM APPROACH

The project utilizes the following technologies and libraries:

- Python for scripting and processing logic
- OpenCV for image processing
- Scikit-Image for component analysis and filtering
- Matplotlib for visualizing results
- NumPy for efficient numerical operations

ALGORITHM & DEPLOYMENT

- The signature extraction process involves:
- Loading the input image in grayscale.
- Binarizing the image using a fixed threshold.
- Applying connected component analysis to label distinct regions.
- Calculating average component size to determine noise thresholds.
- Removing small and excessively large components based on calculated thresholds.
- Converting the processed labels back to a binary image.
- Saving the output to a designated directory.

Deployment can be managed locally or on cloud platforms, making it scalable for batch processing of document archives.

RESULT

The algorithm successfully extracts signatures from document images, providing cleaner, isolated outputs suitable for verification and archival purposes.

RESULT (OUTPUT IMAGE)

500

600

Koplow

200

300

400

500

100

Largest component: 2766.0 Average component area: 28.998706338939197 Small size threshold: 186.30567362779522 Large size threshold: 3353.5021253003138 Original **Extracted Signatures** The Honorable Orrin G. Hatch United States Senator Chairman, Committee on the Judiciary United States Senate Washington, D.C. 20610-6275 100 100 -I am enclosing answers to the questions of Senators Leahy and Kohl that you forwarded to me on July 28, 1997. The answers have been prepared as responses by all of the companies that are parties to the settlement, thus they reflect a joint industry response rather than the response of only one company or a personal response by se. Each of the digaretts manufacturers has determined to respond to Senator Kennedy's questions will be allowed to decompany responses to those described to the delivered today or tomorrow to you and to Senator Kennedy and to the company responses to those Senator Kennedy and to the senator Kennedy and the senator Kennedy 200 200 -I personally regret the delay that has been entailed in responding to these questions. I would have boped that responses could have been completed earlier than now. The sttention that members of the Committee have paid to this matter is deeply appreciated. I hope that the tardiness of the responses has not excessively complicated the work of the Committee. 300 MGK/tv 400 400

500

200

400

500

CONCLUSION

This project effectively automates the signature extraction process, significantly reducing manual effort and potential errors. It lays the foundation for further advancements, such as integrating machine learning for more precise extraction.

FUTURE SCOPE

• Integration with OCR for complete document analysis.

Real-time processing capabilities for live document scanning.

• Enhanced noise filtering using deep learning for complex backgrounds.

REFERENCES

- OpenCV documentation
- Scikit-Image documentation
- Python image processing tutorials
- GitHub project repositories

GitHub Link:

Thank you