Optical Character Recognition

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EDUCATION

Bachelor’s Degree, Mathematics (2011 - 2015)
Universitas Indonesia

Master’s Degree, Computer Science (2016 - 2018)
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Nara Institute of Science and Technology

EXPERIENCE

Data Scientist at **Kofera Technology**
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VP Data Science at **Volantis Technology**

Outlines

01

What is OCR?

Definition and History

02

How does OCR Works?

Technique and Types

03

Applications of OCR

04

Hands On

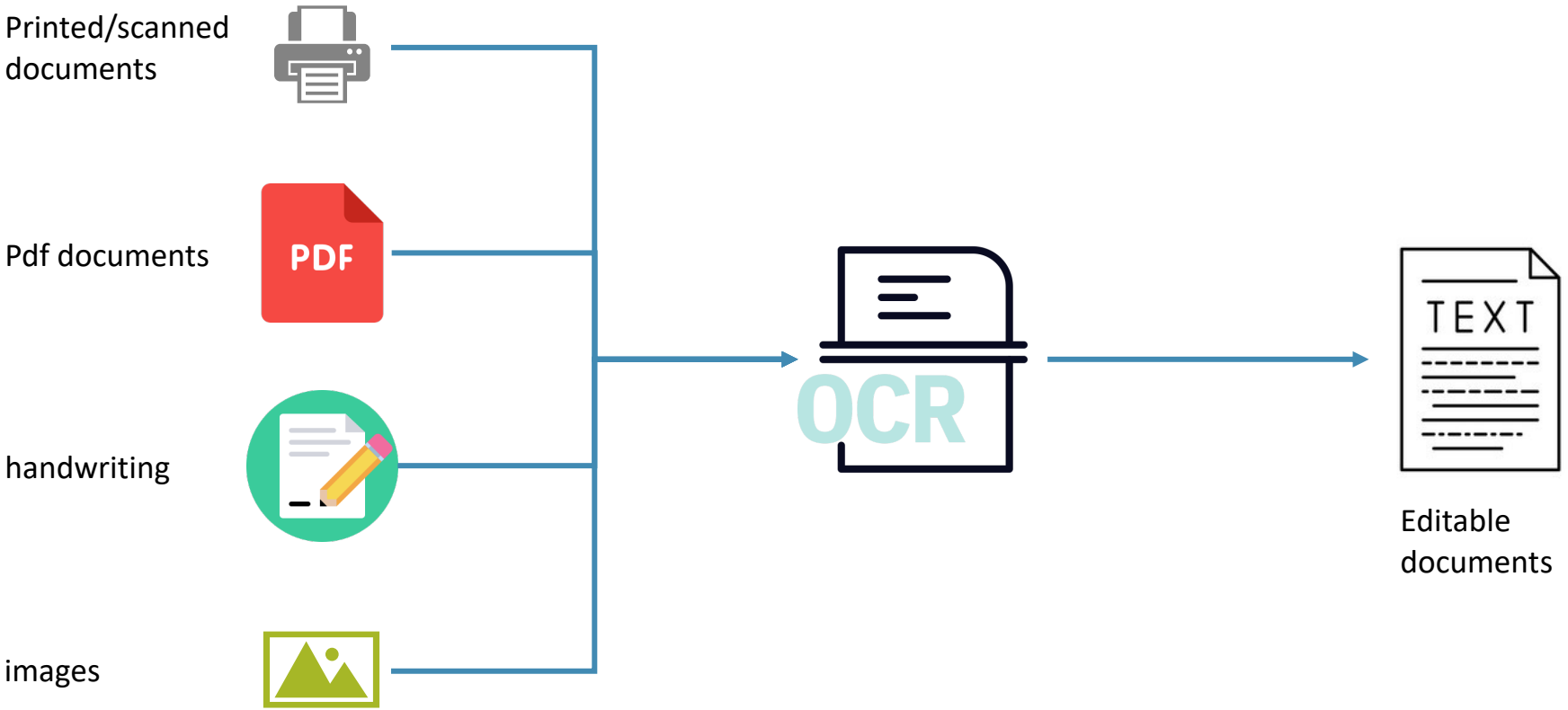
OCR with Tesseract

What is OCR?

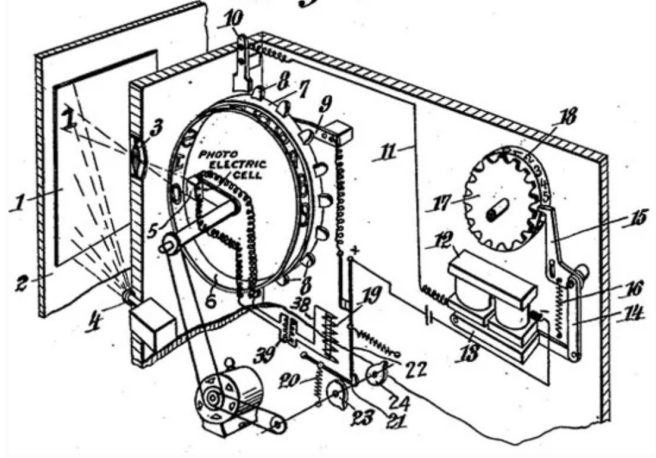
Definition and History

What is OCR?

Optical character Recognition is a technology that enables machine to read text in image, printed or handwritten text and convert it into digital text.



History



1914

Optophone
Edward Fournier D'Albe

a machine that converts printed words into musical tones in order to read documents aloud to blind people.

1928

Basic OCR “reading Machine”
Gustav Tauschek

Create a mechanical device that can read characters and numbers on an image and convert them to printed characters and numbers on paper.

1949

Photocell-based Machine
L.E. Flory and W.S. Pike

read text to blind people at a rate of 60 words per minute

1974

Kurzweil Reading Machine
Raymond Kurzweil

trained with images of each character and could only recognize one font at a time. The goal is to develop a machine-learning device for the blind that can read text aloud in text-to-speech format.

1980s

Tesseract
Hewlett-Packard

Google has now sponsored an open-source OCR project that can work with text in 60 languages.

Now

There are numerous OCR systems with various methods and applications.

How does OCR Works

Technique and Types

How does OCR Works

01

Preprocessing

- Physical data into digital data
- Convert into black-and-white version

02

Text Recognition

- targeting one character, word or block
- Two approach: pattern recognition or feature recognition

03

Postprocessing

Convert the extracted text data into computerized file

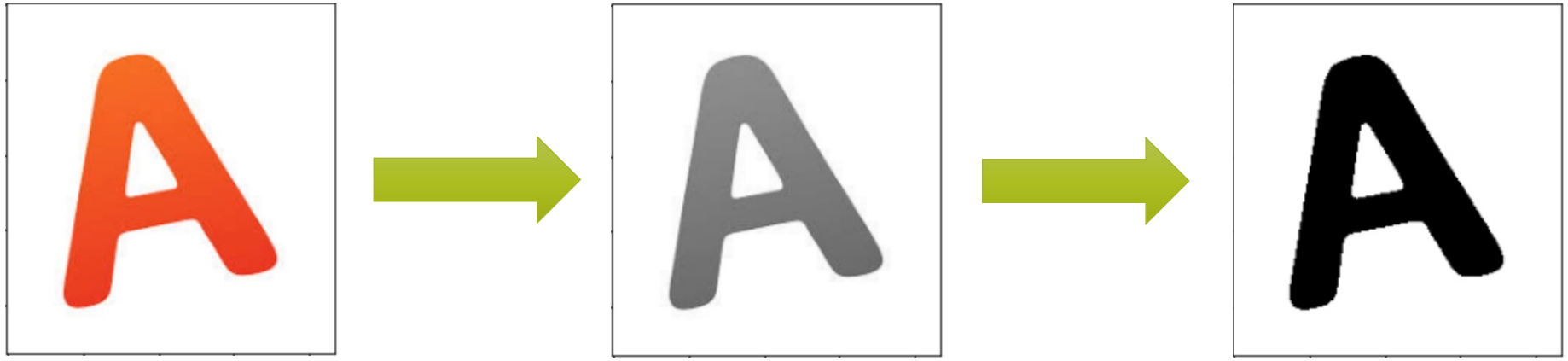
How does OCR Works

01

Preprocessing

- Physical data into digital data
- Convert into black-and-white version

The black-and-white image is analyzed for light and dark areas, with dark areas identified as characters that must be recognized, and light areas identified as background. The dark areas are then processed to find alphabetic letters or numeric digits.



How does OCR Works

02

Text Recognition

- targeting one character, word or block
- Two approach: pattern recognition or feature recognition

Pattern Recognition

- trained text in various fonts and formats
- Compare and recognize character in input data with trained data

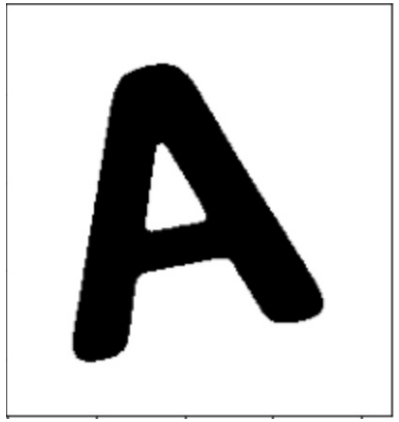
Feature Recognition

- the algorithm employs rules based/train AI on specific character properties.
- Some example of a feature is the number of angled, crossing, or curved lines in a letter.

How does OCR Works

Pattern Recognition

- trained text in various fonts and formats
- Compare and recognize character in input data with trained data



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How does OCR Works

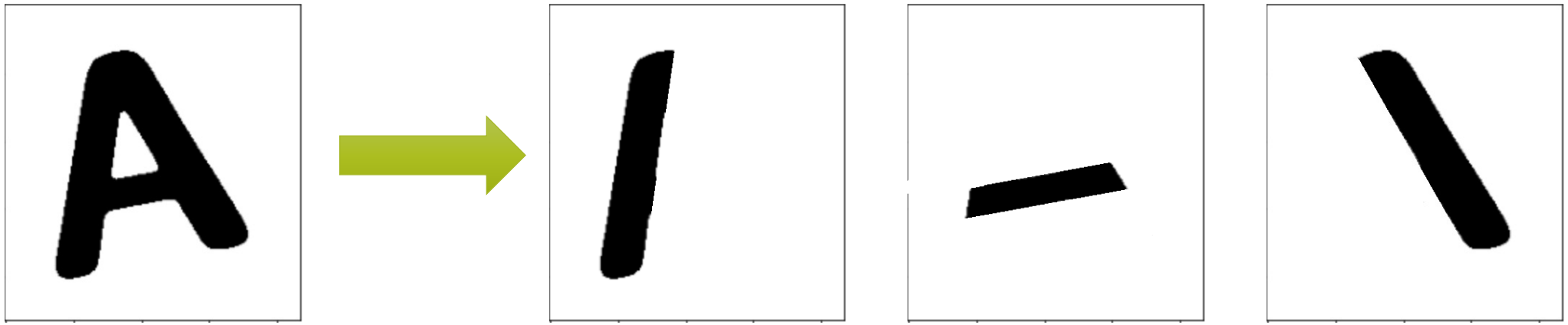
Feature Recognition

- the algorithm employs rules based/train AI on specific character properties
- Some example of a feature is the number of angled, crossing, or curved lines in a letter.

Example :

- two angled lines that meet in a point in the middle at the top
- there's a horizontal line between them about halfway down

that's a letter A



Applications of OCR

Applications of OCR

Banking

process and verify paperwork for loan, deposit checks, and other financial transactions. Fraud detection.

Healthcare

process patient records, including treatments, tests, hospital records, and insurance payments.

Logistics

track package labels, invoices, receipts, and other documents more efficiently.

Communication

One such example is Google Translate OCR technology that allows users to read in any language.

Transportation

Number plate recognition.

Legal

affidavits, judgements, filings, statements, wills and other legal documents, can be digitised, stored, databased.

Hands On

OCR with Tesseract :

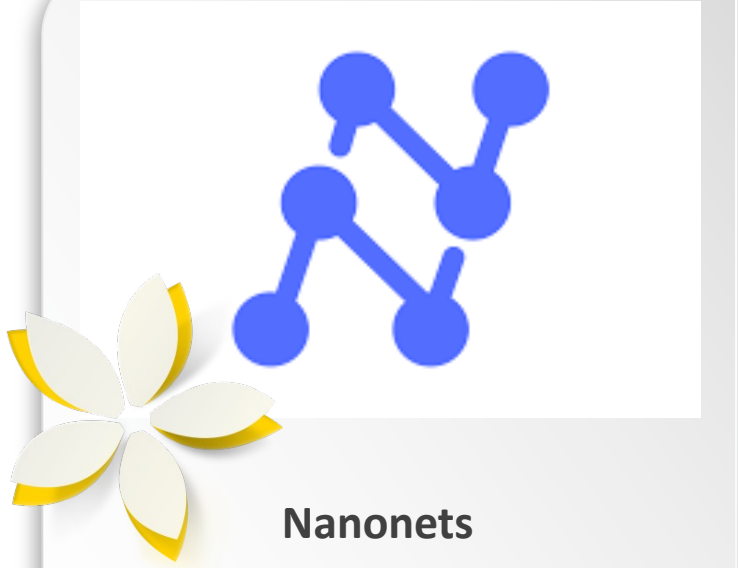
https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/33418.pdf


Some OCR Platforms

Some OCR Platforms

Google Document AI

https://cloud.google.com/document-ai/docs/drag-and-drop

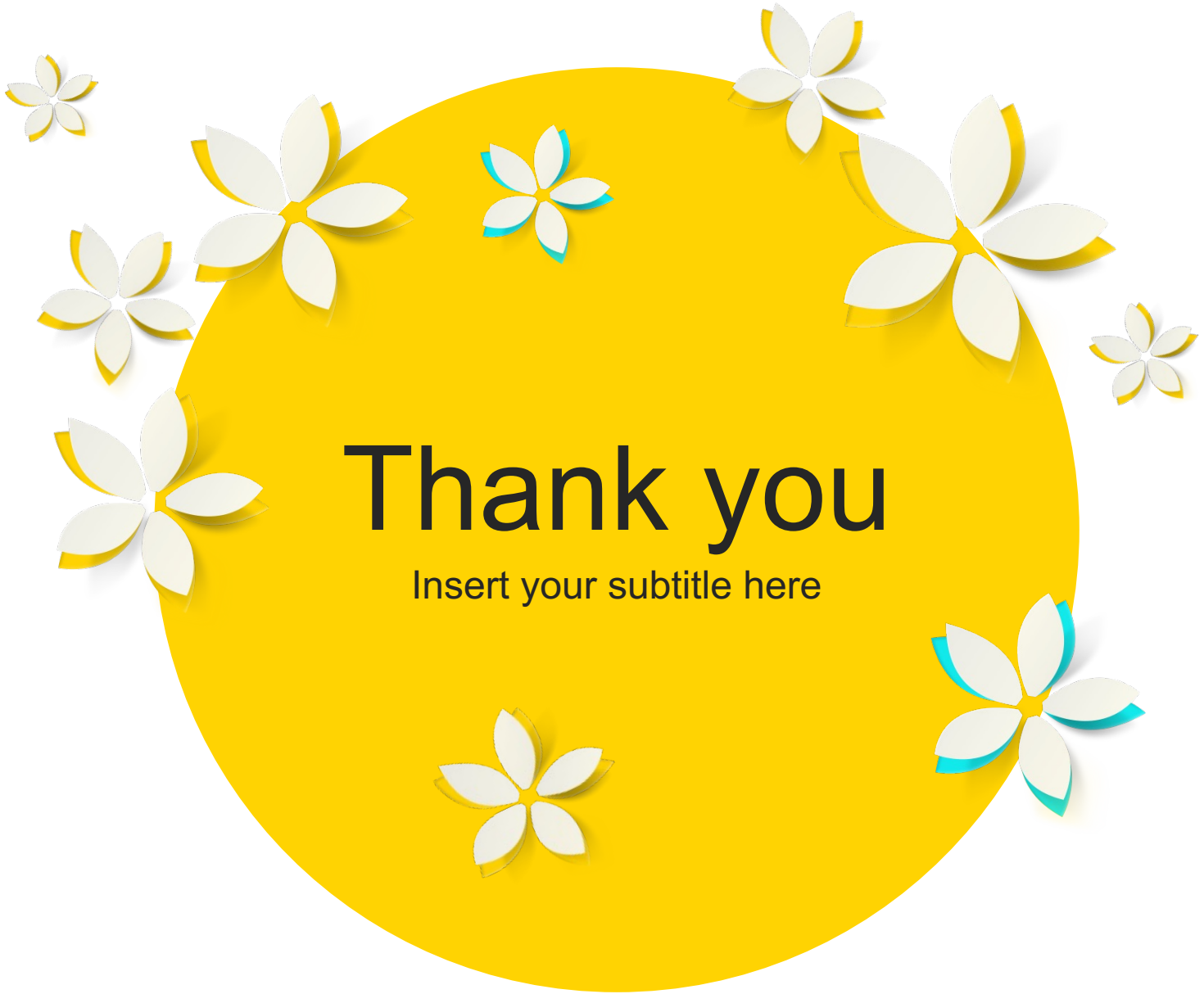


Nanonets

https://nanonets.com/blog/ocr-with-tesseract/

Adobe

https://experienceleague.adobe.com/docs/document-cloud-learn/acrobat-learning/getting-started/scan-and-ocr.html?lang=en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