

Handwritten Words Recognition

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Handwritten

Words

Recognition

Marhuritin

Words

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Kalyan

Lakshmanan

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Why?



- Digitize my notes
- Use Cases
 - Captcha Solver - Security
 - Document/Form digitization - \$ / archival
 - Personality clustering - graphology

How?

Handwriting recognition

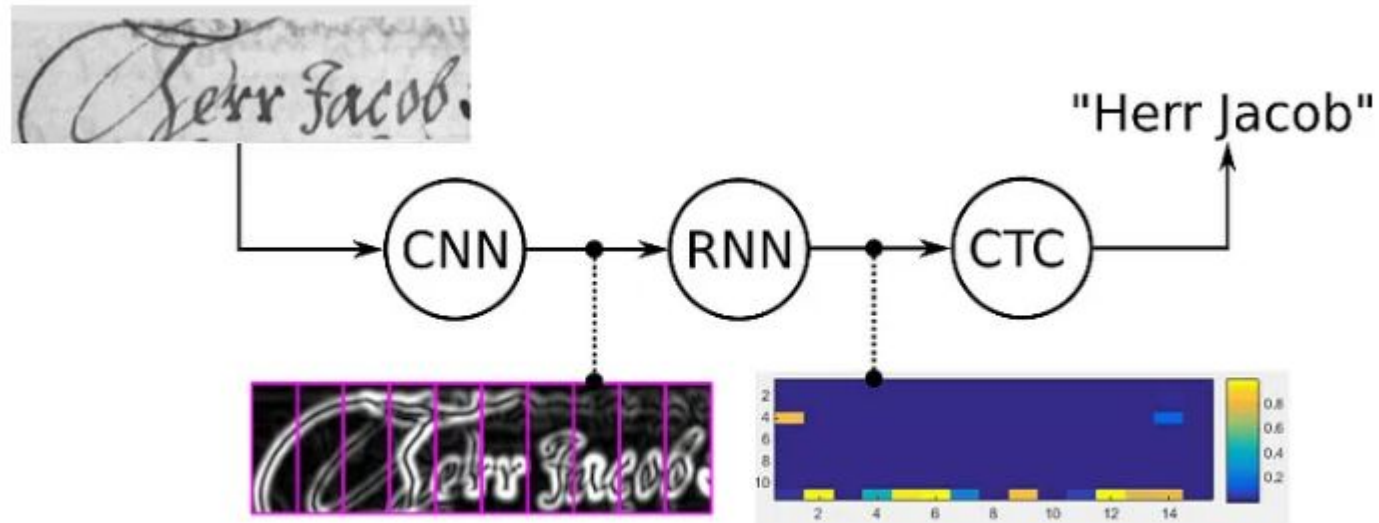


Fig. 1: Overview of a NN for handwriting recognition.

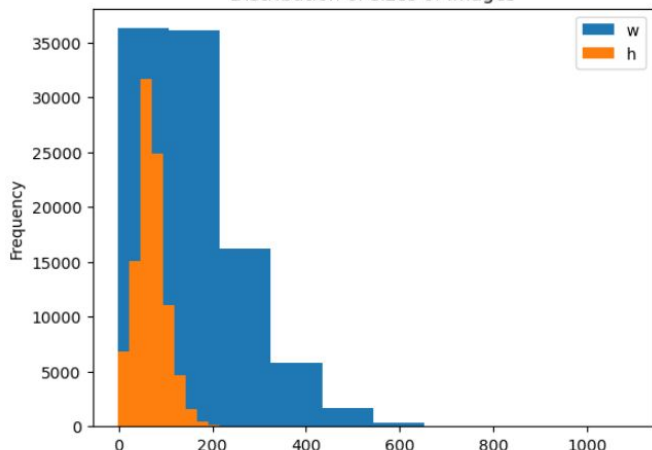
Data

- IAM Dataset
- 1539 documents
- > 13000 lines of text
- Used as a benchmark
- 96,456 words

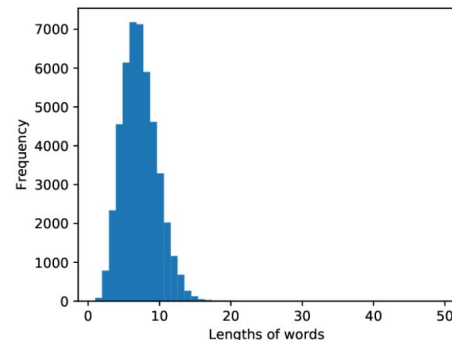
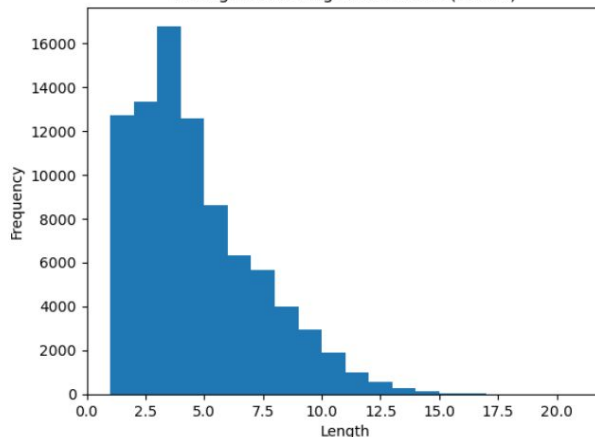


industrie, Mr. Böhm commented icily. „let us have a
industrie icily
let have

Distribution of sizes of images



Histogram of Lengths of Labels (Words)

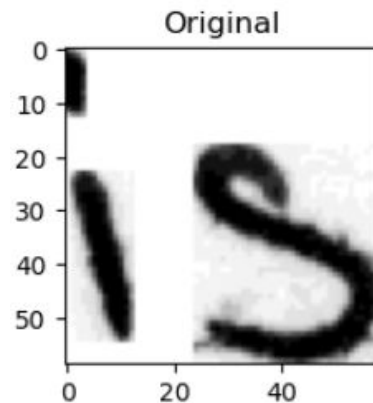


Processing / Data Pipeline

- TENSORS
- Images
 - Resize, Pad, Normalize
- Labels
 - Tokenize, Pad
- 78 char classes

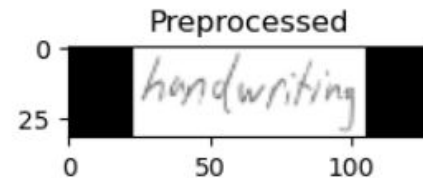
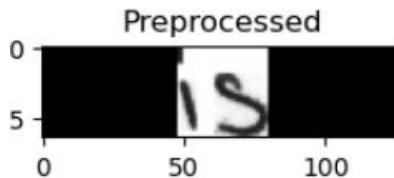
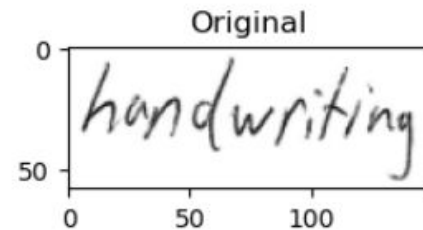
Tensor

Tonyor



Flow

Flow



Connectionist Temporal Classification

- sequence-to-sequence tasks where you have an input sequence (image of handwriting) and an output sequence (a sequence of characters).

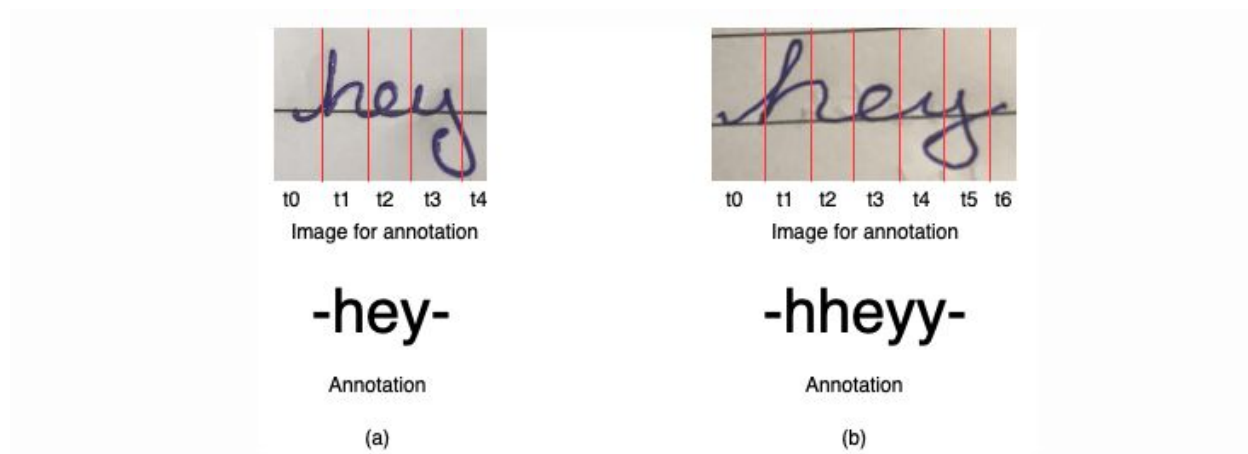


Fig2 (a) Shows the annotation for a case when each character takes up one time-step (b) Shows the annotation for a case when a few characters take up more than one time-step

Prediction: a



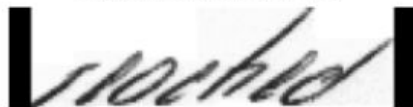
Prediction: We



Prediction: a



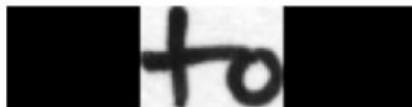
Prediction: reached



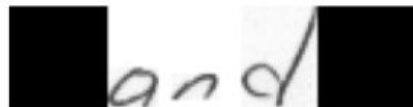
Prediction: of



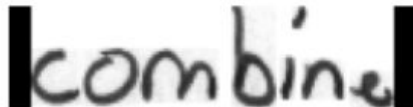
Prediction: to



Prediction: and



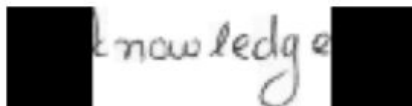
Prediction: combines



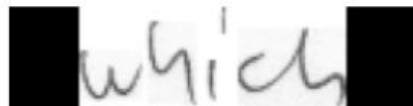
Prediction: it



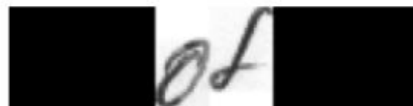
Prediction: kmaulledge



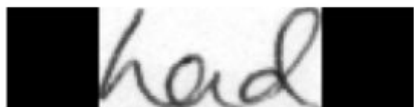
Prediction: which



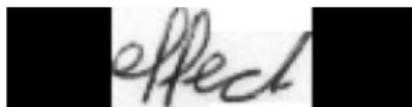
Prediction: of



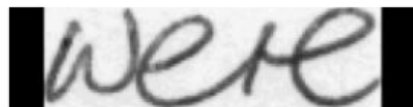
Prediction: had



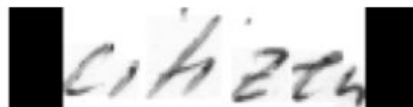
Prediction: effecd



Prediction: were

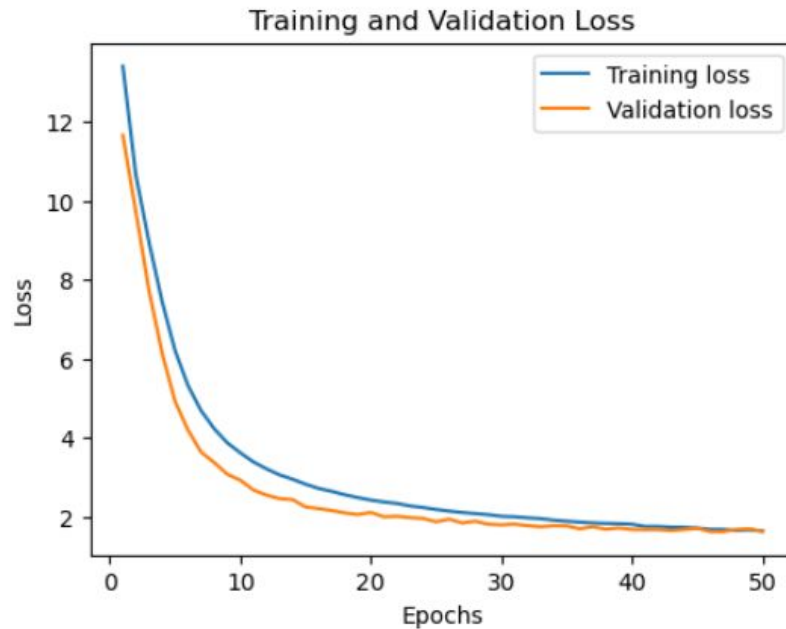


Prediction: citien



Edit Distance

- measure of the similarity between two strings
 - Insertions / deletions / substitutions



Streamlit

streamlit

Improvements

- Preprocessing Pipeline - PIL to Tensor
- Bounding Box
- Automated Cropping
- Train on more data
- Fine tune to my handwriting
 - Image augmentation
- Implement word segmentation for future pages

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If