RUTGERS

WINLAB | Wireless Information Network Laboratory

Writer Identification using Neural Networks

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ABSTRACT

The purpose of this project is to use neural networks to identify the writers of handwritten inputs in order to better detect forgery-related issues. By using personalized training data we aim to train neural networks to both classify the character and to identify the writer of the letter.

BACKGROUND

Handwriting analysis relies on the unique features of each writer's characters. However, they are often not trained to recognize deliberate forgery attempts seeking to mimic users' handwriting. In training the neural network toward that purpose, it can more accurately discern minute differences between handwriting samples and increase precision.
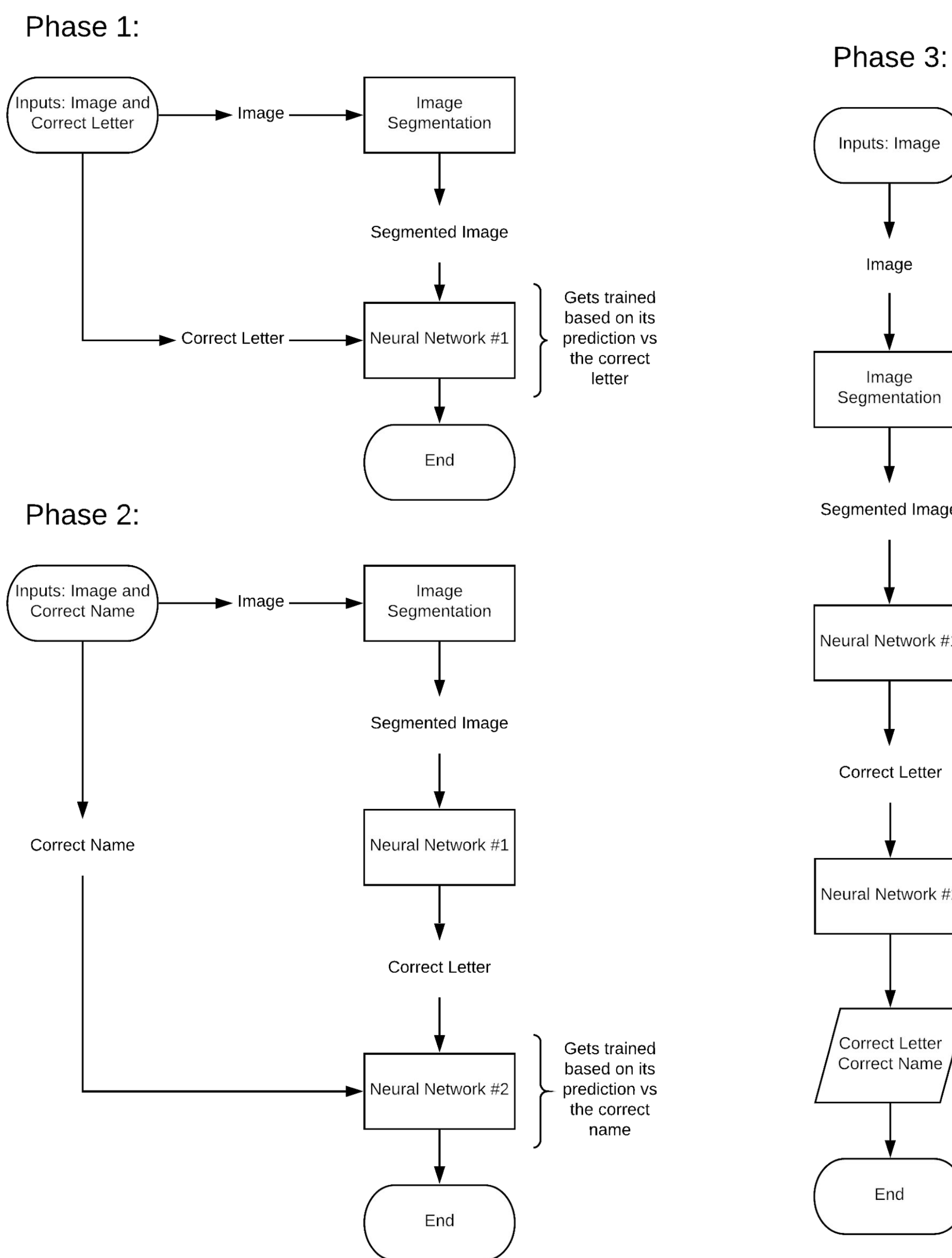

Phase 1:

Phase 2:

Phase 3:
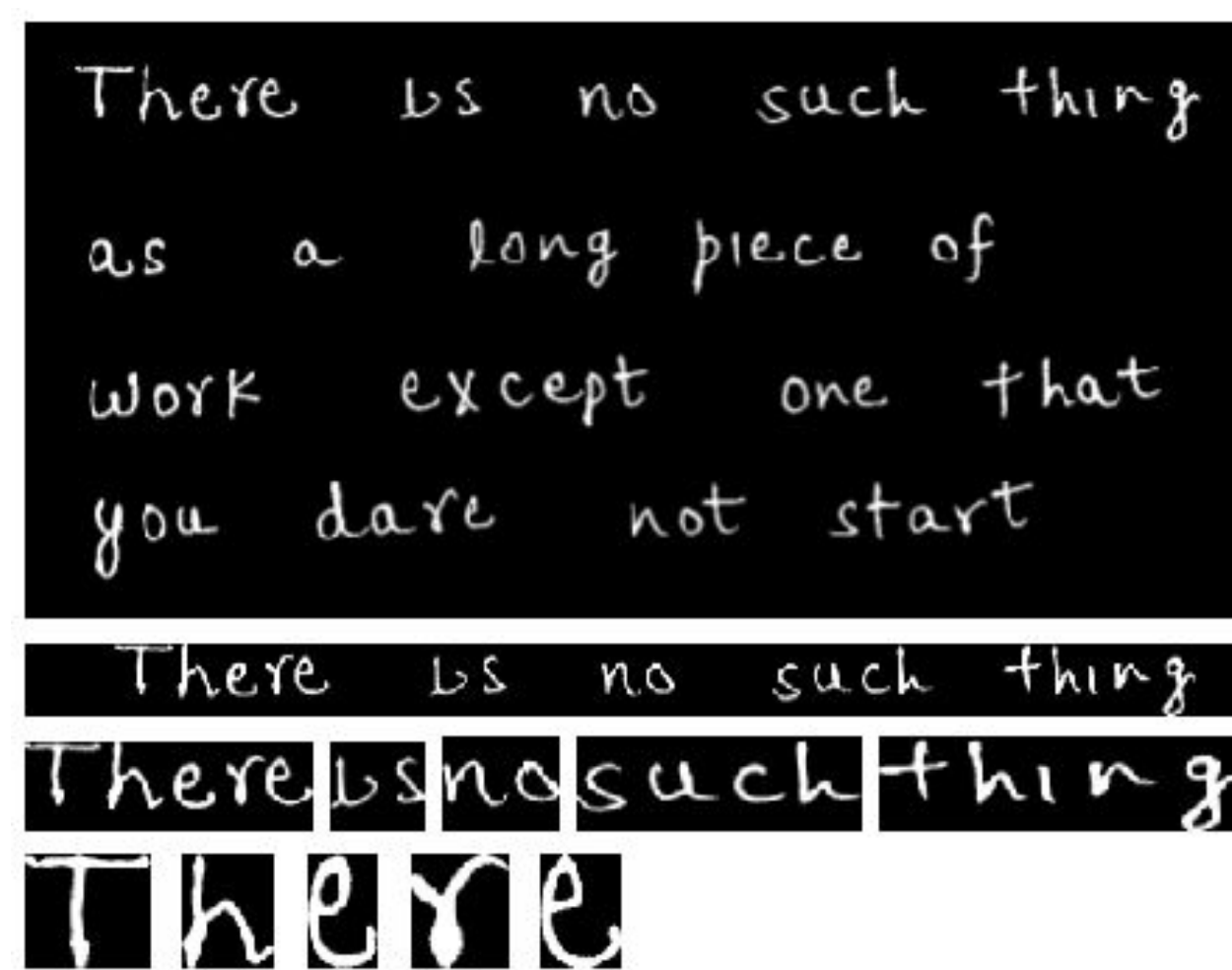
METHOD

➤ Multiple neural networks
➤ First neural network trained to classify written characters
➤ Output from first neural network fed into second neural network
➤ Uses information as character to process into network and identify writer

TOOLS

- Python Libraries
  - matplotlib — plotting
  - numpy — matrices and vectorization
  - Pillow — image processing
  - pathlib — file path identification
  - scipy — matlab data reading
- Segmentation Library — handwritten word separation
- Tensorflow — accuracy comparison testing
- E-MNIST data set —NN1 training data

RESOURCES

Nielsen, Michael A. "Neural Networks and Deep Learning." *Neural Networks and Deep Learning*, Determination Press, 2 Dec. 2015, neuralnetworksanddeeplearning.com/chap1.html.

Ujjwal, Ajeet. "Character Segmentation of Handwritten Text." Github Repository, 2016. https://github.com/ajeet-ujjwal/Character-Segmentation-of-Handwritten-Text

"EMNIST: an extension of MNIST to handwritten letters." CoRR, abs/1702.05373, . Cornell University Library, 1 Mar. 2017, https://arxiv.org/abs/1702.05373v1. Accessed 14 Aug. 2018.

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