

ABSTRACT OF DISSERTATION

Jack Bandy

The Graduate School
University of Kentucky
2017

INTERACTIVE MACHINE LEARNING FOR WORD RECOGNITION ON
DAMAGED HANDWRITTEN DOCUMENTS

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A dissertation submitted in partial
fulfillment of the requirements for
the degree of Doctor of Philosophy
in the College of Arts and Sciences
at the University of Kentucky

By
Jack Bandy
Lexington, Kentucky

Director: Dr. your advisor, Professor of Mathematics
Lexington, Kentucky 2017

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an abstract

KEYWORDS: keywords go here

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Acknowledge people/things here

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TABLE OF CONTENTS

Acknowledgments	iii
Table of Contents	iv
List of Figures	v
List of Tables	vi
Chapter 1 Background	1
1.1 Project Components	1
1.2 Literature Review	1
Chapter 2 The First Chapter	3
2.1 The First Section	3
Chapter 3 The Second Chapter	4
Bibliography	5
Vita	7

LIST OF FIGURES

2.1 A Simple Figure 3

LIST OF TABLES

2.1	A Simple Table	3
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Chapter 1 Background

1.1 Project Components

There are two main components of the project. The first is a semi-supervised machine learning approach to document transcription, and the second is a word tracing tool for textual scholarship.

An Interactive Approach to Automated Transcription

Automated transcription is ideal and sometimes necessary for larger datasets of handwritten documents. Automated transcription for printed documents as well as handwritten documents is now on par with human performance. However, damaged historical documents present unique challenges.

I develop the following approach: given a small set of labeled samples, train a neural network in a semi-supervised manner using both labeled and non-labeled data. Once the initial model is trained, use it to create a transcription of the full document. During the transcription process, the model keeps track of difficult word images, prioritizing them for manual labeling afterwards.

Word Tracing

Once the transcription of a document is generated, many scholars wish to trace the outputted text back to the original manuscript image. Building on state-of-the-art word spotting techniques, I implement a tool that traces transcript text back to the original input image so that scholars can easily navigate and visualize transcriptions.

1.2 Literature Review

2009

- Finding words in alphabet soup: Inference on freeform character recognition for historical scripts [1].

2012

- A novel word spotting method based on recurrent neural networks [2].
- End-to-end text recognition with convolutional neural networks [3].

2013

- Handwritten word recognition using mlp based classifier: A holistic approach [4].

- Feature extraction with convolutional neural networks for handwritten word recognition [5].

2014

- A combined system for text line extraction and handwriting recognition in historical documents [6]

2015

- Efficient segmentation-free keyword spotting in historical document collections [7].
- Adapting off-the-shelf cnns for word spotting & recognition [8].
- Segmentation-free handwritten Chinese text recognition with LSTM-RNN [9].

2016

- On the Benefits of Convolutional Neural Network Combinations in Offline Handwriting Recognition [10].
- Reading text in the wild with convolutional neural networks [11].
- PHOCNet: A deep convolutional neural network for word spotting in handwritten documents [12].
- SpottingNet: Learning the Similarity of Word Images with Convolutional Neural Network for Word Spotting in Handwritten Historical Documents [13].

Surveys

- A survey of document image word spotting techniques [14].
- A survey on handwritten documents word spotting [15].

Chapter 2 The First Chapter

2.1 The First Section

Math goes here.

Here's a figure

Figure 2.1: A Simple Figure

Here	is
a	table

Table 2.1: A Simple Table

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Vita

A brief vita goes here.