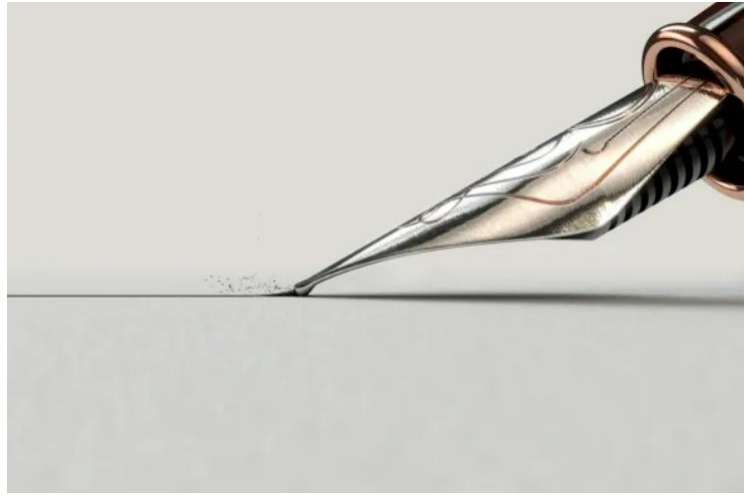


Handwriting Detection Analysis

Omisha Mondal DS 4002 Fall 2023



Handwriting is a useful tool essential for the development of communication. Handwriting can reveal a great amount of information about someone, beyond the text they write, such as their emotions, the way in which they wrote, and how long they have been writing for. Handwritten text is also still present in various fields, so it is necessary to find ways to analyze these written texts.

Handwriting Detection Analysis is a fascinating method of image classification that can decipher handwriting present on images. It allows people to reduce the time spent on manual tasks such as form validation, translation, and can be further applied to many other fields, such as Computer Science, Forensics, the medical fields, and more.

In this assignment, you will create a model that analyzes images of handwritten text. You will use the IAM Handwriting Database, which contains the image data in a very organized manner. This will be a great opportunity for you to familiarize yourself with image data, a skill you can use further on in your life, such as in your research projects, career, and more. You will begin by doing a short exploratory data analysis on different features of handwriting analysis. Then, you will also use a pre-trained machine learning model in order to create your final model, which will detect the accuracy of your handwritten text. Finally, the culmination of your case study will be to create a presentation on your findings.

Your goal is to create a final presentation that includes the key aspects of your exploratory data analysis and the model that you built. Make sure to include graphs and relevant information that carefully displays the results of your research.

CS Handwriting Detection Analysis – Prepare Presentation

DS 4002 – FALL 2023 - Professor Alonzi

Due: At the end of the Project Cycle

Submission format: PDF

Group Assignment

General Description: Submit to Canvas a pdf version of your final presentation summarizing your group's work for this project. Make sure to emphasize your results from your exploratory data analysis phase and the model that you built.

Preparatory Assignments: MI1,MI2,MI3

Why am I doing this?

This case study will allow you to create a final piece of work that highlights the previous work you have done and present it in an articulate manner. When you create something new you are the only one who knows how and why it works. The goal of your presentation is to spread the word. Given the brief nature of this work we are focusing on getting people motivated/hooked, and quickly explaining why this is a step forward. You will undertake this exercise as the first part of practicing the sharing of knowledge. Without this step all the work you have done is for nothing.

- Course Learning Objective: prepare findings for presentation to your peers
- Course Learning Objective: Collaborate with peers to implement your project plan

What am I going to do? Your group will produce a set of slides for the presentation, and this presentation will be given by your group leader (see PR1). The presentation need not be long, we are aiming for 10 minutes, which means about ten slides. It makes it harder to be brief, there is a famous quip that is along the lines of “If I had more time, I would have written you a shorter letter”. It does need to cover all the essential pieces, from motivation and context, to describing your data, through analysis, and on to the next steps. The key is to think carefully about the important pieces for the audience and then present those in a coherent way. Making the supporting visual materials is a critical step.

Tips for success:

- Make sure to read through all attached materials and utilize the sources given on the GitHub link.
- Use as little text as possible and as many figures as possible. These slides will be presented by your group leader, and they can expand upon them orally.
- Make your figures as large as possible.
- Make sure your content is logical. If something doesn't make sense, fix it. If something didn't work during your exploration, explain why. Making mistakes is part of the learning process, and your final presentation should focus on how you were able to continue with your project beyond the challenges you encountered.

How will I know I have Succeeded? You will meet expectations on CS Handwriting Detection Analysis – Prepare Presentation when you follow the criteria in the rubric below.

Spec Category	Spec Details
Formatting	<ul style="list-style-type: none"> About 10 slides PDF format for submission to collab Generate the slides through the program of your choice Slide numbers (except for title slide) Order <ul style="list-style-type: none"> Title & Outline Motivation/Context/Hypothesis/Research Question/Modeling Approach/Goal/Etc. Data Explanation/Acquisition Analysis Plan and Justification Tricky Analysis Decision Bias and Uncertainty Validation Results/Conclusions Next Steps References/Resources/Acknowledgements Closing Slide General note: Each section can take as many slides as it needs to unless specifically indicated as 1 slide. General note: Do not take the exact slide count as critical. When you practice you can time out the talk to hit the 10-minute mark. Some slides need more, and some slides need less time.
Title & Outline	<ul style="list-style-type: none"> 1 slide Goal: Hook your audience and make the group that did the work clear <ul style="list-style-type: none"> Include: Group name and members and leader Include: Course and Date Title <ul style="list-style-type: none"> Package your most important finding in headline format Outline <ul style="list-style-type: none"> Indicate the major parts of your presentation
Motivation/Context/Hypothesis/Research Question/Modeling Approach/Goal/etc.	<ul style="list-style-type: none"> 1-2 slides Goal: Explain why your hypothesis is an important question Motivation/Context <ul style="list-style-type: none"> Share relevant information with the audience so that they can understand what you are investigating Share relevant information so that they can understand why this matters Hypothesis <ul style="list-style-type: none"> Restate hypothesis Research Question <ul style="list-style-type: none"> Restate

	<ul style="list-style-type: none"> Modeling Approach <ul style="list-style-type: none"> restate
Data Acquisition/Explanation	<ul style="list-style-type: none"> Goal: Your audience understands the key features of your data set and challenges if they are relevant. High-level summary of data set: <ul style="list-style-type: none"> Share the information from your data dictionary in a condensed way. Leave out most details but be prepared to answer follow-up questions. State the format (e.g.: text, image, etc.) State the size and necessary techniques if applicable Discuss how your data set was acquired. Include relevant licensing or ethical concerns.
Analysis Plan and Justification	<ul style="list-style-type: none"> Goal: The audience will understand the pipeline you created. Show the diagram for your analysis pipeline Highlight any particularly challenging components Show any diagnostic or validation work done
Tricky Analysis Decision	<ul style="list-style-type: none"> Goal: Identify and describe a decision you made in the analysis that was non-trivial. Every project has moments in analysis where you just need to make a decision, but the 'right' answer is not obvious or may not even exist. This slide is about one of those moments. Think about a judgement call you had to make in your project and describe why it matters and why it was tricky Describe the impact of your decision E.G.: What evaluation metric to choose, how many epochs to use, what data to exclude from analysis.
Bias and Uncertainty Validation	<ul style="list-style-type: none"> Goal: This slide is designed to explain the difficulties in your data set List biases you consider and ones you correct for Describe how you came to determine the uncertainty in the values you report
Results and Conclusions	<ul style="list-style-type: none"> 1 slide Goal: Summarize the results Address the hypothesis Share relevant figures and findings
Next Steps	<ul style="list-style-type: none"> 1 slide Describe new lines of exploration discovered during the project Describes improvements that could be made Describe New questions that have arisen
References/Resources/Acknowledgements	<ul style="list-style-type: none"> Provide citations as necessary Provide links to resources used (e.g.: your GitHub page) Acknowledge contributions and assistance
Closing slide	<ul style="list-style-type: none"> 1 slide

	<ul style="list-style-type: none"> • Goal: Finish on a slide with an image you want people to remember • This slide will sit up while people are asking questions, pick something memorable • It can be a repeat from earlier • Don't be afraid to return to an earlier slide if a question takes you there.
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Acknowledgements: Special thanks to Jess Taggart from UVA CTE for coaching on making this rubric. This structure is pulled direction from [Streifer & Palmer \(2020\)](#).