Master's Project

Bias and Fairness in Digital Archival System

Rafael Biehler
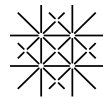
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Abstract

Todo

Contents

University
of Basel

Center for
Innovative Finance

Plagiatserklärung

Ich bezeuge mit meiner Unterschrift, dass meine Angaben über die bei der Abfassung meiner Arbeit benutzten Hilfsmittel sowie über die mir zuteil gewordene Hilfe in jeder Hinsicht der Wahrheit entsprechen und vollständig sind. Ich habe das Merkblatt zu Plagiat und Betrug vom 22. Februar 2011 gelesen und bin mir der Konsequenzen eines solchen Handelns bewusst.

Rafael Biehler

1 Time Management

The following chart depicts my schedule from today (15.12.2023) to the submission date (12.02.2024). Research and Writing are spread around to each three weeks, because in this time I will be studying and working on other lectures as well. Writing and the final review process are relatively short, as I will be able to work full-time.

2023	2024		
12	01		02
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9

Research — Weeks 1–3
Experiments — Weeks 4–6
Writing — Weeks 7–8
Review — Week 9

1.1 Milestones

1. **Research:** Be familiar with the basics of bias and fairness metrics. Know about the most recent methods of evaluating bias and fairness in similar contexts, like generative AI models. At the end of this block, I should have a clear plan of how I should structure my experiments.

2. **Experiments:** Write code to test my plan in action. Calculate numbers which could indiciate performance. Run more tests to challenge my resulsts, like a trial against randomly generated content.

3. **Writing:** Write the report for the search.

4. **Review:** Review the report together with Fynn to make sure it is acceptable for handing in.

2 Introduction

In the context of Galleries, Libraries, Archives, and Museums (GLAM), a prevalent challenge is the imbalance between the volume of work and the available staffing. This often leads to a substantial amount of image data being left unlabeled or uncategorized. To mitigate this issue, there is increasing interest in the use of multimedia retrieval systems that enable querying image data by using natural language descriptions.

The image retrieval system works by first classifying images into categories, which can then be searched with text. How bias and fairness in classification tasks can be measured is still not entirely clear. How these feature extraction models perform under the

In the GLAM context, a unfair image classification could lead to discrimination against a section of the population. To illustrate this problem, we will look into the discrimination of the First Nations people of Canada in the GLAM context, to see if and how much they are affected by any biases.

We will measure the effectiveness of other already well-known metrics, and see how they can be applied to our problem. We will then introduce our own metric, that allows us to accurately describe the existence of biases and fairness problems for classification tasks.

TODO: Write exact content of paper

3 Background

Todo

4 Methods

Todo

5 Discussion

Todo

References