System Design for Increasing Adoption of AI-Assisted Image Tagging in Wikimedia Commons

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Abstract

In this research, we investigate system designs to increase the adoption of AI-assisted image tagging in Wikimedia Commons. Objectives include investigating cognitive distinctions, identifying areas of agreement on AI-generated tags, exploring design strategies for contributor adoption, and highlighting features for an engaging AI-assisted tagging experience. Anticipated outcomes include improved contributor acceptance and experience with AI-assisted image tagging, along with enhanced metadata quality, ultimately benefiting the accessibility, searchability, usability, and multilingual support of Commons.

Introduction

Wikimedia Commons is a WMF project like many Wikipedia editions and Wikidata. It makes available multimedia resources that can be freely 'copied, used, and modified[1].' However, a lack of structured, machine-readable metadata about media files has hindered its accessibility, searchability, usability, and multilingual support.

WMF researchers have attempted to introduce computer-aided image tagging[2] to address this issue. AI algorithms hold the promise of analyzing a large volume of images and automatically generating standardized and consistent tags in multiple languages in a relatively short time. Additionally, these algorithms allow users to provide feedback, maintaining a balance between automation and human oversight.

Our prior research [14] revealed low adoption of AI-assisted tagging by contributors. Participants reported unsatisfactory performance of computer-aided tagging tools and resistance to changing their existing workflow of creating and maintaining the local category system.

In this project, our aim is to build interfaces that enhance Commons contributors' acceptance and usage of AI-assisted tagging. Our research questions are:

- Investigating the cognitive distinctions between AI algorithms and Commons contributors when it comes to labeling images.
- Understanding where Commons contributors agree with image tags generated by AI.
- Exploring strategies for designing AI-assisted tagging interactions that Commons contributors would accept and adopt.
- Identifying features, such as gamification elements, that have the potential to make AI-assisted tagging an engaging experience for Commons contributors.

[1] https://commons.wikimedia.org/wiki/Commons:Welcome

[2] https://commons.wikimedia.org/wiki/Commons:Structured_data/Computer-aided_tagging

The successful conclusion of this project would improve the acceptance and usage of AI-assisted tagging in Commons. Commons contributors will experience a more efficient, accurate, and user-friendly interface for adding metadata to multimedia resources. The enhanced metadata quality will improve searchability and usability, benefiting various WMF projects. Introducing multilingual AI-generated tags ensures a more inclusive experience for contributors and users across different language communities within Wikimedia. The improved metadata and tagging systems will yield more accurate search results, facilitating the discovery and sharing of enriched multimedia content for internet users.

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Related work

Wikimedia Commons is understudied and underappreciated. Our previous study [14] aimed to understand Commons, its contributors, and its relation to other WMF projects. This study received coverage in the research newsletter[3], and the comments from Wikipedians who discussed it expressed appreciation for our efforts to investigate some of the less explored aspects of Commons. Despite its significance for WMF projects and internet users, Commons faces challenges in content search and reuse, especially for non-English users, due to insufficient structured metadata. The Structured Commons project[4] aimed to address this but encountered low adoption due to unsatisfactory computer-aided tagging tools and resistance to changing the existing category system. Our study identifies a gap in understanding how to develop AI-assisted tagging interactions accepted by Commons contributors. To bridge this, our project engages the Commons community in a co-design process for contributor-algorithm collaboration.

Methods

Interview Commons contributors to explore cognitive distinctions and understand their perceptions, concerns, and preferences regarding AI-assisted tagging. Identify areas of agreement on AI-generated tags.

Co-design and develop AI-assisted tagging system prototypes with contributors. Iteratively test with contributors and users, refining the interface, features, and functionality based on feedback.

Collect data on user interactions with the AI system prototype. Analyze behavior, patterns, engagement, and feedback to evaluate usability and effectiveness.

Expected output

- Insights to inform system design for WMF.
- AI-assisted tagging system prototypes for Commons.
- Scientific publications in peer-reviewed journals and conferences (e.g., CSCW, CHI).

Risks

AI algorithms can introduce bias, resulting in inaccurate or unfair tagging, especially in sensitive content areas like medical images [11] or diverse cultural contexts. Contributors may resist workflow changes and be reluctant to adopt the new AI-assisted tagging system, particularly if they've had unsatisfactory experiences with similar tools before.

[3] https://meta.wikimedia.org/wiki/Research:Newsletter/2023/August

[4] https://commons.wikimedia.org/wiki/Commons:Structured_data

Community impact plan

We'll actively engage Wikimedia Commons contributors, especially in image categorization, using a user-centered co-design for the AI-assisted tagging system. Simultaneously, we'll seek input from the broader Wikimedia community. Regular research updates will be provided through our project page, and we'll utilize community channels and mailing lists to gather insights and address concerns. Within the AI-assisted tagging system, a feedback mechanism will engage Commons users, enabling them to validate, correct, and comment on AI-generated tags. We'll monitor this feedback for continuous improvement.

Evaluation

Contributor Adoption and Usage:

- Measure the percentage increase in AI-assisted tagging system adoption and usage by Commons contributors.
- Assess the frequency and volume of AI-generated tags applied by contributors compared to previous methods.

Contributor Satisfaction:

- Gather feedback to evaluate contributors' satisfaction with the new AI-assisted tagging system.

Contributor Efficiency, Accuracy, and Consistency:

- Measure contributors' time efficiency in tagging images using AI-assisted tools compared to traditional methods.
- Evaluate the accuracy and consistency of tags applied by contributors, comparing AI-generated tags to manually created ones.

User Satisfaction with Metadata:

- Collect user feedback on the quality and relevance of metadata associated with multimedia content.

Budget

Ph.D. student stipend: $48,500
Participant compensation: $1,000
Total: $49,500

Prior contributions

Yihan Yu is a Ph.D. candidate in UW HCDE. Her thesis work focuses on semantic image annotation and Wikimedia Commons. She has prior research studying Wikimedia Commons [14] that resulted in two CSCW publications [15, 16].

Dr. David W. McDonald, who will advise Ms. Yu on this project, has been publishing research about Wikipedia since 2007 [1]. He has publications related to governance [2], barnstars [3, 5], vandalism detection [4], wikiprojects [6, 7], the category system [8], promoting donations to WMF [9], bias in deletion [10], medical images in Commons [11], and cross-language collaboration [12, 13]. The proposed work builds upon work that Dr. McDonald conducted with Ms. Yu.

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