Homework Document

In the following document, please find your homework assignments for the MIT-Chile Research Workshop.

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From Words to Online Content Moderation (NLP & Explainable AI)

Lecturer: Belén Saldías
Date: January 10, 2023
DUE: January 6th

Intended Learning Outcomes

By the end of this session, students will be able to:

- Analyze and understand opportunities to develop technology that enables human-centered content moderation.
- Understand text-based sentiment analysis, through interaction with Natural Language Processing (NLP) methods.
    - Basics of NLP
    - Explainable AI methods
- Reflect on ethical considerations that apply to their current research.

Homework

1. Pre-readings
[Required] Word2Vec and WordEmbeddings

- Bag-of-words model: https://en.wikipedia.org/wiki/Bag-of-words_model
- Tf-idf: https://en.wikipedia.org/wiki/Tf–idf
- Mikolov, T., Chen, K., Corrado, G., & Dean, J. (2013). Efficient estimation of word representations in vector space. arXiv preprint arXiv:1301.3781. https://arxiv.org/pdf/1301.3781.pdfi—%20ì„œ

[Recommended]

- Beyond sentiment analysis:

Perspective API: Overview, Key Concepts, Scores, Attributes & Language, Model Cards, Training Data, FAQs
https://developers.perspectiveapi.com/s/about-the-api
https://www.perspectiveapi.com/

- Human-AI collaboration: Green, B., & Chen, Y. (2019). The principles and limits of algorithm-in-the-loop decision making. Proceedings of the ACM on Human-Computer Interaction, 3(CSCW), 1-24. https://dl.acm.org/doi/abs/10.1145/3359152

2. Complete the prompts in this form: https://forms.gle/qobN79DVteRxX5uh9

Explainable AI on Biomedical Data

Lecturer: Denis Parra
Date: January 11, 2023
DUE: January 3th

Course Description

In this course you will learn about different AI applications and tasks in the biomedical domain using text and images, as well as XAI methods to explain their predictions.

Intended Learning Outcomes

In this session, you will learn:

- how to model, train, predict, inspect and explain results of biomedical text classification (Pubmed articles' titles and abstracts)
- how to model, train, predict, inspect and explain results of medical image classification (X-rays)

Homework

We are gonna read an article collaboratively about **Human-centered AI design in a medical imaging application.**

Instructions:

1. Create a free account in app.perusall.com
2. When you are asked for the course code, enter PARRA-MRG8R
3. Click on the document "CheXplain: Enabling Physicians to Explore and Understand Data-Driven, AI-Enabled Medical Imaging Analysis" (Xie et al, CHI 2020)
4. Some questions you might want to answer during and after reading the article are:
    a. What is the problem addressed and how is motivated in the article?
    b. What is XAI, CDDS and what role do they have on this research?
    c. What is CheXpert and how does it work?
    d. What was the methodology followed to conduct this research?
    e. Which key aspects were important under each iteration of the process described?
    f. How were the users of the systems involved in this research?
    g. What are the conclusions and main take-away messages from this research into your own research?
5. Read the paper and add at least 5 comments in different pages of the document
6. Write answers and discuss on the comments of other people. You need to add at least 3 commentaries on other people's comments
7. You have until January 3rd 2023 to complete this assignment

Data Visualization for Research and Storytelling

Lecturer: Maggie Hughes
Date: January 12, 2023
DUE: January 6th

Intended Learning Outcomes

By the end of this session, students will be able to:

- Choose ways to visualize data responsive to the qualities of your data
- Be able to use design and storytelling to communicate your findings
- Understand how to find patterns in your data

Homework

Collect and Visualize a week in your life
In *Dear Data*, Giorgia Lupi and Stefanie Posavec collect data each week over a year throughout their lives. The data can range from how many times someone heard or said "sorry" that week, to how they spent their time on social media. Explore examples from *Dear Data*.

After reviewing their work, anytime between now and the homework due date, collect a small data set from your life. The data set can be anything, but should be unique to you. With this data set, create a visualization. This visualization can be hand drawn, a physical representation of the data, a digital representation, or whatever you like. Please include a title, brief description, and key with your visualization.

Once ready, please submit the design in this form and answer the subsequent questions.

The Intersection of Brain-computer Interfacing (BCI) and Artificial Intelligence

Lecturer: Angela Vujic
Date: January 13, 2023
DUE: January 6th

Intended Learning Outcomes

- Be able to describe brain-computer interfaces (BCIs) and electroencephalography (EEG)
- Be familiar with one method of how to design a BCI
- Be familiar with how to preprocess ("clean up" noise from) EEG signals, perform feature extraction and classification
- Learn machine and deep learning methods for EEG signals

Homework

Please complete the readings and answer the questions at this link.