NLP02 CS-Insights – State of the art in Computer Science Publications

Background

DBLP is the largest open-access repository of scientific articles on computer science and provides metadata associated with publications, authors, and venues. We retrieved more than 6 million publications from DBLP and extracted pertinent metadata (e.g., abstracts, author affiliations, citations) from the publication texts to create the DBLP Discovery Dataset (D3). Now, on CS-Insights we devised a system (back- and front-end) to explore our dataset and uncover all the trends regarding computer science publications. As CS-Insights is an ongoing project we need to fix it's open issues and extend its functionalities.

Goal

- Solve existing issues in CS-Insights-Roadmap

Tasks

- Work on project roadmap for CS-Insights
  - Backlog and additional features
- Propose extension for CS-Insights
  - Authors features (e.g., h-index)

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NLP13 Do Machines Have No Heart?

Background

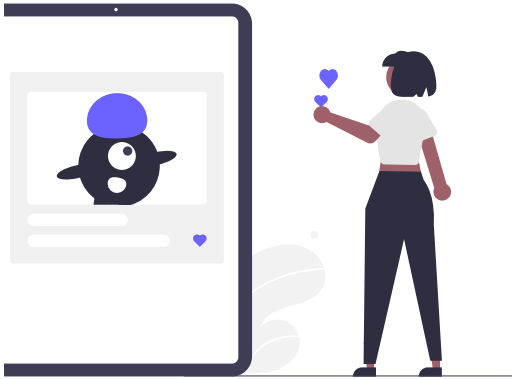
This project proposes an analysis of the sentiment embodied in text generated by large language models (LLMs), such as GPT-4. Using sentiment analysis methodologies, we aim to assess the sentiment polarity (positive, negative, neutral) and emotion classification (joy, anger, surprise) inherent in machine generated text across a diverse prompts and contexts. The proposed study will focus on understanding how LLMs, despite their lack of emotional states or personal perspectives, can potentially generate text embedding a wide spectrum of sentiment expressions. A significant aspect of our research will be identifying any sentiment inconsistencies in the model outputs, particularly in the face of ambiguous or complex prompts and comparing with existing human experiments

Goal

- Explore the sentiment embedded in LLM using machine-generated text and comparing it with human behavior

Tasks

- Literature review on sentiment/emotion analysis on language models
- Probe selected LLM to generate text following prompts/instructions
- Sentiment analysis and exploration of LLM's output
- Correlation between human and machine text



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NLP14 Paraphrase Types: Data and Task Generation

Background

Current paraphrase generation and detection systems are yet unaware of the lexical variables they manipulate. Generative models cannot be asked to perform certain types of perturbations, and detection models are unable to understand which paraphrase types they detect or learn limited language aspects (e.g., primarily syntax). The shallow notion of what composes paraphrases used by these systems limit their understanding of the task and makes it challenging to interpret detection decisions in practice. Thus, we need to leverage existing datasets and tasks used in Paraphrasing with more granular information so we can assess the problem better and develop more robust techniques.

Goal

- Extend current datasets used in paraphrase related tasks to include paraphrase types

Tasks

- Literature review on paraphrase types (atomic paraphrase types)
- Probe existing LLM to generate/classify pair sentences including selected paraphrase types (e.g., prompting, few-, or zero-shot) using the ETPC dataset as a reference
- Correlate (e.g., BLEU, similarity, ROUGE, BERTScore) generated paraphrase with existing data and select the best paraphrase types
- Extend the best paraphrase types to generate/classify new data from other paraphrase datasets
- Propose new tasks for the BIG-bench and/or GEM benchmarks based on Paraphrase Types

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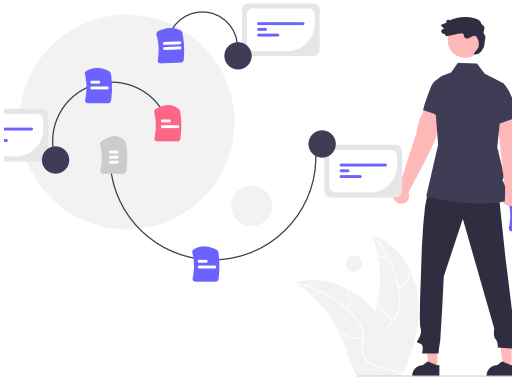
NLP15 The Paraphrase Type Taxonomy

Background

This project proposes an extensive literature review to identify and critically evaluate various paraphrase types that have been proposed in linguistic, computational, and educational domains. By synthesizing these diverse perspectives, the project aims to develop a cohesive framework that categorizes paraphrase types based on linguistic features, context, and communicative intent. Through rigorous analysis and categorization, the project aims to establish a comprehensive taxonomy of paraphrase types. Furthermore, the research team plans to develop an open-access online repository, where the findings and the framework will be made available to the public, promoting collaboration and further research in this domain.



Goal

- Investigate and (re)organize available taxonomies and language models used in paraphrase types

Tasks

- Investigate available taxonomies used in paraphrase (types)
- Critical evaluation of existing ones (agreement and disagreements between them)
- Investigate available models used in paraphrase generation and detection
- Propose a new taxonomy (with definitions, examples, and instructions) for paraphrase types (generation and detection)

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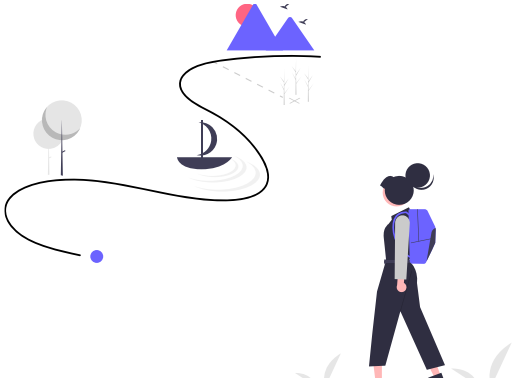
NLP17 LLMs and the Search for the Holy Prompt

Background

The advancements in the capabilities of large language models (LLMs) have ushered in a new era in artificial intelligence, with applications spanning diverse sectors (e.g., healthcare, education, entertainment). However, extracting precise and desired information from these models is not trivial. An emerging understanding of "prompt engineering" plays a crucial role in determining the efficacy, precision, and utility of the response from LLMs. Investigating the importance of prompt engineering is hence crucial, not only to improve the practical deployment of LLMs but also to delve deeper into understanding the intricacies of their internal representation and response mechanisms.



Goal

- Systematically explore and quantify the impact of prompt engineering on the performance of LLMs in paraphrase-related/text generation tasks and develop best practices for finding the best prompts

Tasks

- Literature Review: Examine existing literature on prompt engineering
- Empirical Study: Design experiments using various prompts across multiple tasks to measure the variability in LLMs' performance based on prompt differences.
- Framework Development: Construct a framework or guideline, based on empirical results, for crafting effective prompts that maximize desired outcomes when interacting with LLMs.
- Evaluate models, tasks, and prompts in selected tasks

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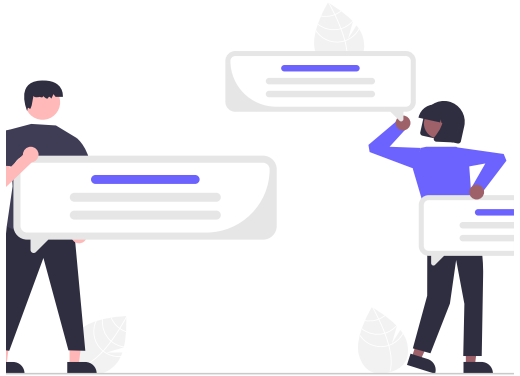
NLP18 It's not What you say it, but How you say it

Background

Large language models (LLM) have revolutionized Natural Language Processing (NLP) due to their ability to understand and generate human-like text. Their efficacy in producing meaningful outputs relies significantly on the way they are prompted. The same way as people, by slight alterations in prompts can lead to considerable differences in the generated content, which may affect both the quality and the nature of the response. This also raises the questions if specific models have a certain bias towards prompts. This phenomenon underscores the need for an in-depth analysis of the relationship between prompts, output and LLMS.



Goal

- Analyze how varying prompts influence the outputs of LLMs across selected NLP tasks and derive insights that can guide effective prompting strategies. Understand the differences between prompt alternation and selected LLM

Tasks

- Literature Review: Examine existing research and documented observations on how prompts influence large language models (select models and tasks)
- Experimental Design: Create a diverse set of prompts for selected NLP tasks. This set should include varied lengths, tones, styles, and implicit biases. (manual or auto)
- Data Collection: Use the selected prompts on consistent LLMs and collect/evaluate the outputs for each prompt (against gold standard)
- Analysis and Interpretation: Evaluate the data to discern patterns and relationships between prompt variations and model outputs.

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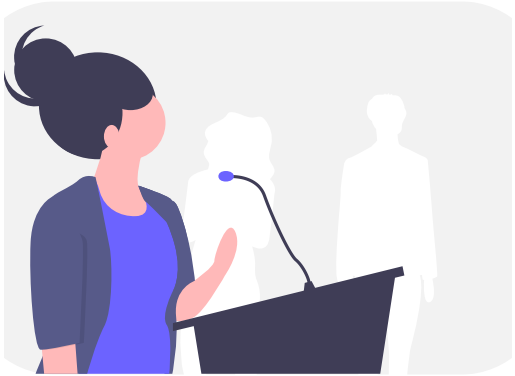
NII

NLP19 What Are We Talking (and Doing) About in the EU?

Background

In an era with so much data available, knowing what to extract and how to structure it is essential for solving any problem. The structured compilation of extensively discussed topics at the European Union Parliament not only empowers policymakers, researchers, and analysts with a comprehensive overview of the legislative landscape but also grants citizens a clear overview of the issues that shape their continent. This project is not just a technical undertaking, but a venture that lays the foundation for transparency, accountability, and progress. This project focuses on the organization and exploration of the European Parliament's Open Data into meaningful structures so further investigations can be carried out.



Goal

- Analyze and organize the (selected) data of the European Parliament's into a more accessible way so specific investigations can be carried out.

Tasks

- Understand the structure of the European Parliament's Open Data Portal
- Identify major categories and topics we would like to gather and organize data (specific lexicons might be used to curate such data)
- Implement a solution to extract, categorize, and store data on selected topics from minutes, plenary sessions, speakers, etc;
- Propose sub-topic organization for the data
- Provide an initial (data science) analysis on selected topics

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