BD and AI: Social and Evaluation Research – Prof. Mazzeo

Sentiment analysis of Social media discourse:

a case study of Cecilia Sala on BlueSky and YouTube

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Key context

> **Focus:** the case of Cecilia Sala, a 29-year-old Italian journalist detained in Tehran on December 19, 2024, for alleged violations of Iranian laws

> **Arrest context:** occurred shortly after Italy detained an Iranian engineer, sparking diplomatic efforts led by PM Giorgia Meloni to secure Sala's release

Themes in analysis

> Sala's work highlights international negotiations and the risks faced by journalists in crisis zones

> Social media discourse reveals:

- Gender-based biases and stereotypes
- Professional critiques faced by women in public roles

Exploring social media platforms

Research goals

1. Analyze social media framing of international negotiations
2. Examine gendered language and sentiment towards Sala as a woman journalist
3. Study perceptions of journalists in high-risk environments

Platforms Compared

BlueSky

1. **Decentralized platform** fostering **text-based,** participatory dialogue
2. **Early-stage community** reduced algorithmic influence
3. Focus: sentiment patterns and cultural framing of discourse

YouTube

1. **Established platform** emphasizing **visual and performative content**
2. **Amplifies narratives** via video engagement and viewer interactions
3. Focus: sentiment shaped by visuals and gendered professional critiques

Data collection and preprocessing

Data sources

YouTube: 1,113 comments from 10 videos related to Cecilia Sala's case, selected based on keywords such as **"Cecilia Sala," "Meloni," "Abedini," "journalism," and "woman."**

BlueSky: 1,480 posts retrieved via BlueSky's API, covering a timeframe from 15/12/2024 to 15/01/2025, using the keyword **"Cecilia Sala."**

Preprocessing steps

- Applied **text cleaning** with regex to remove punctuation, links, emojis, and anomalies
- Used **spaCy NLP** for lemmatization to standardize text
- Calculated relative **term frequency** to highlight recurring linguistic patterns and their association with sentiment and emotions

Analytical methods

Sentiment analysis

Model: **tabularisai/multilingual-sentiment-analysis**

- Categories: Very Positive, Positive, Neutral, Negative, Very Negative
- Goal: measure overall public opinion polarity

Emotion analysis

Model: **MilaNLProc/feel-it-italian-emotion**

- Categories: Joy, Sadness, Anger, Fear
- Goal: capture emotional engagement with themes of gender, journalism, and international events

Tools and insights

Pretrained models from Hugging Face tailored for Italian text classification

- Combined sentiment and emotion analysis for a comprehensive understanding of public discourse:

1. **Sentiment analysis: evaluated evaluative stances**
2. **Emotion analysis: explored psychological and affective reactions**
3. Enabled nuanced insights into audience perceptions across YouTube and BlueSky platforms

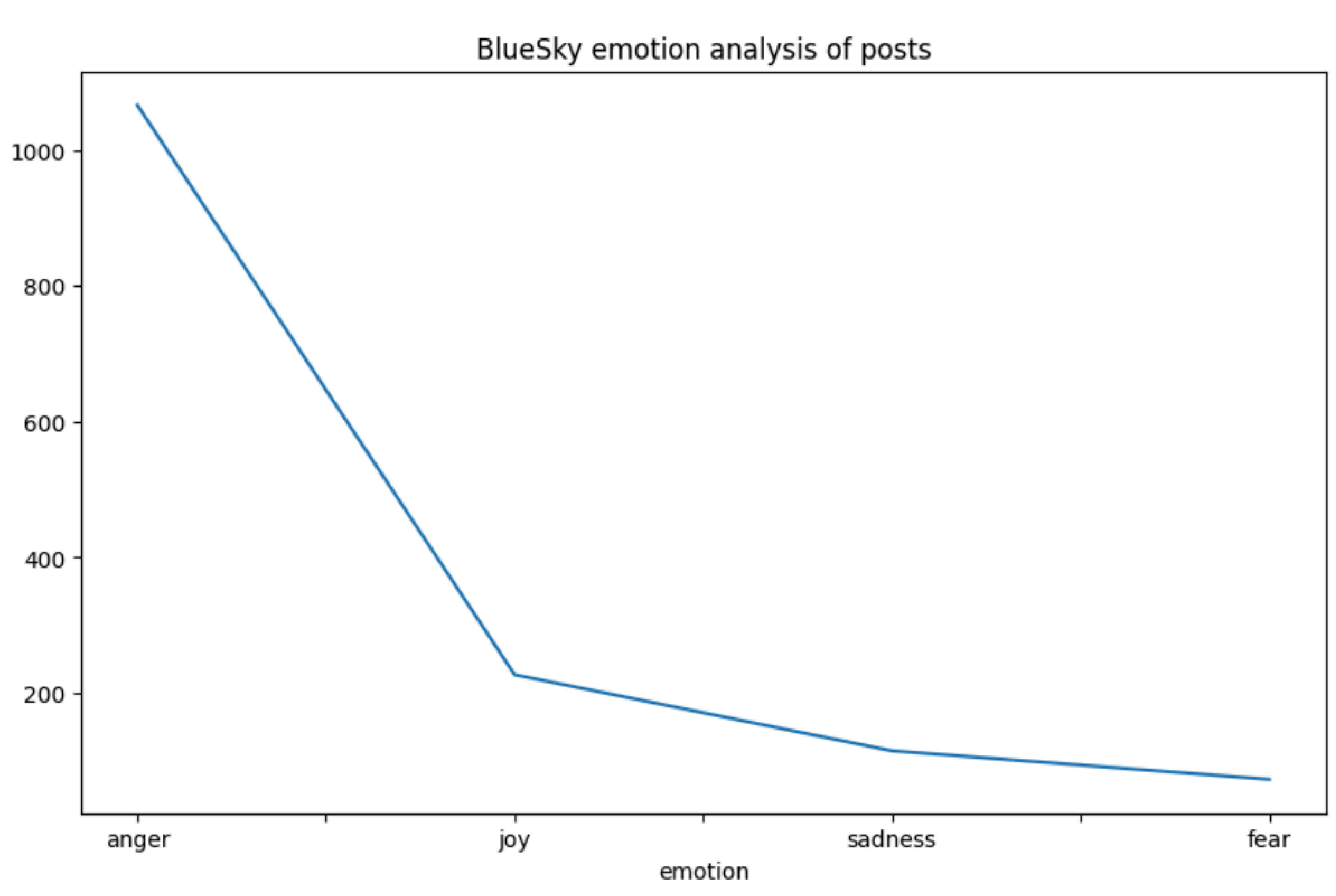
BlueSky analysis and results

Emotion analysis results

- **Anger dominates**: over 1,000 instances recorded, reflecting frustration or criticism
- **Joy**: second most frequent, indicating limited positive engagement
- **Sadness and Fear**: highlight concerns, grief, and apprehension, adding complexity to emotional responses

Key insights

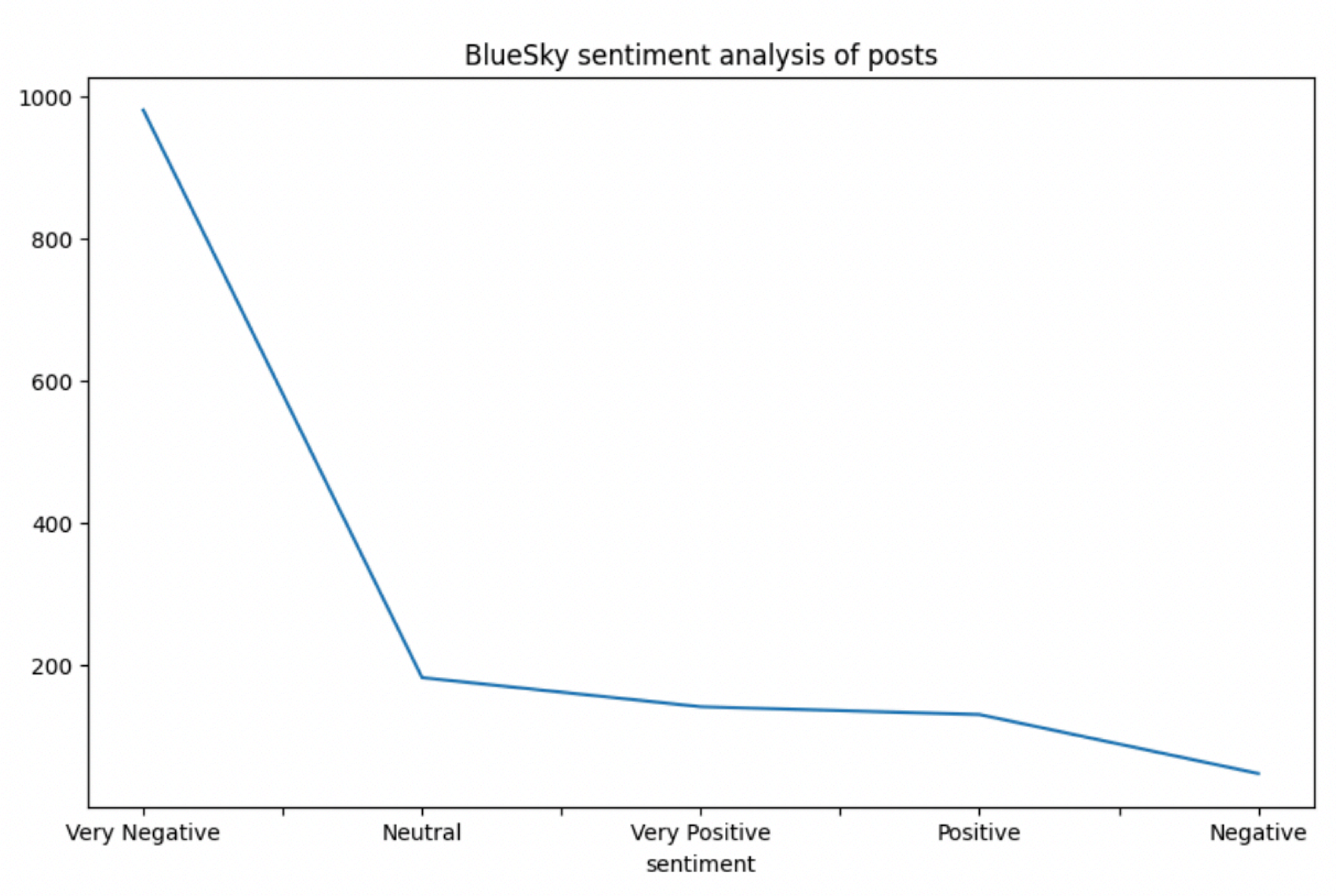
- Emotional discourse reflects sensitive topics like:
  - **Gender issues**
  - **Journalism in conflict zones**
  - **International negotiations**
- Multifaceted emotional landscape with anger as a central theme



BlueSky analysis and results

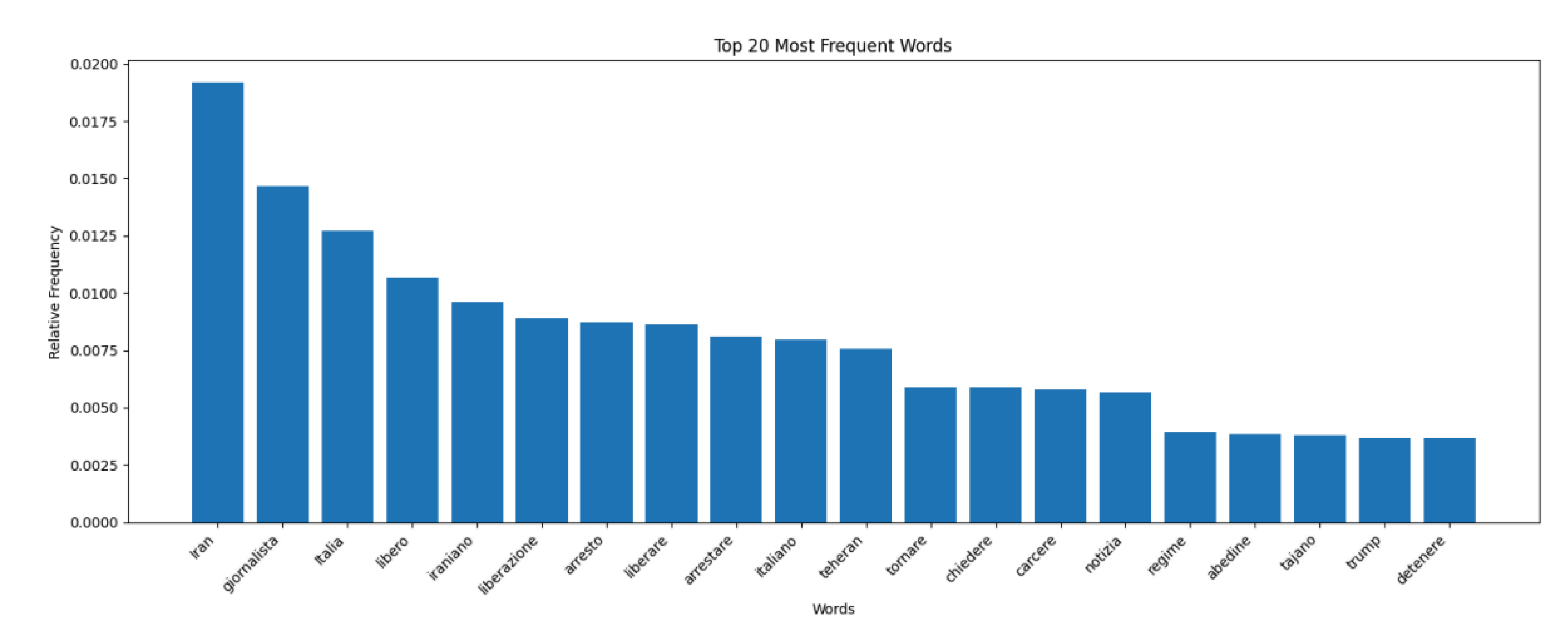
Sentiment analysis results

- **Very negative sentiment is predominant** (~950 posts), showing strong public reaction to Cecilia Sala's arrest
- **Contextual analysis is crucial:** Negative sentiment reflects genuine **responses to a high-profile event, not systemic bias**



BlueSky analysis and results

Bar Chart analysis

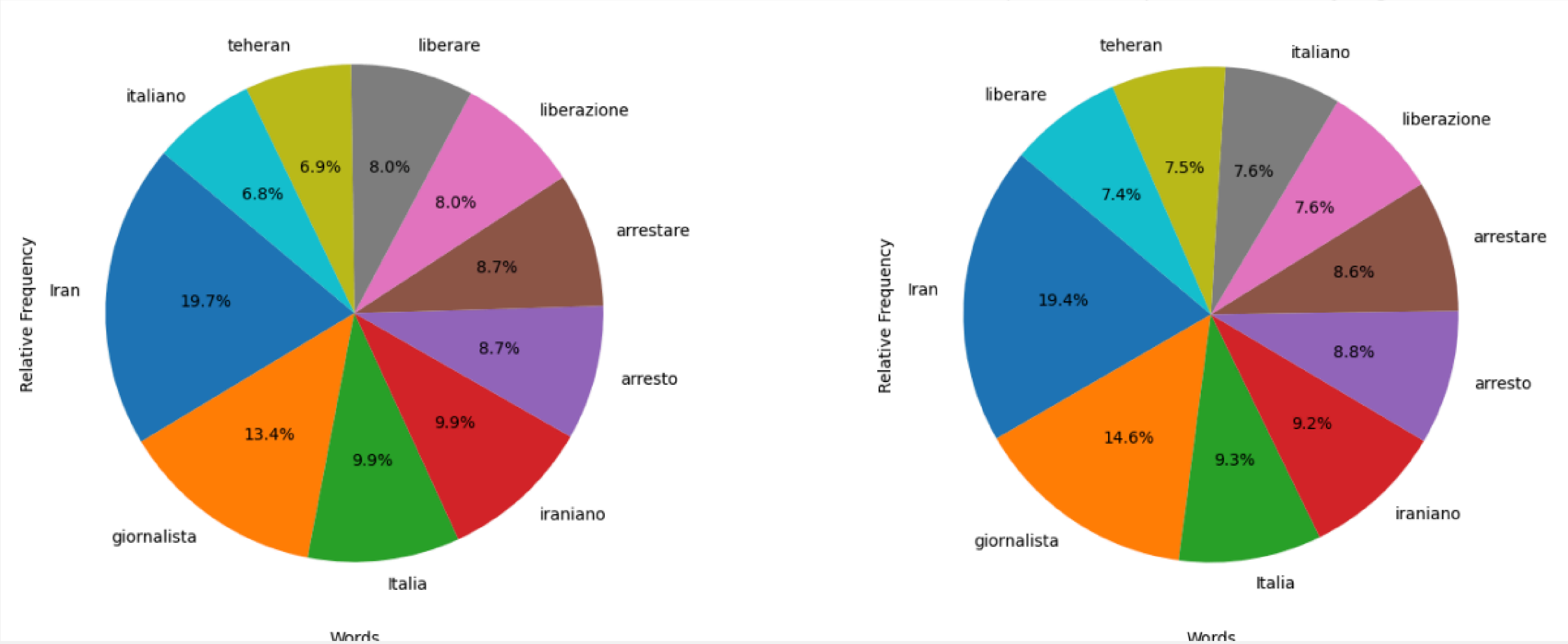


Top 20 words reflect thematic focus:

- Geopolitical context: **“Iran,” “Teheran,” “regime.”**
- Journalistic role: **“giornalista”, “notizia”**
- Detention and freedom: **“arresto”, “liberare”**

BlueSky analysis and results

Pie Chart analysis



Anger and very negative aentiment words:

- **"Iran" (19.4–19.7%)** and **"giornalista" (13.4–14.6%)** dominate, reflecting focus on journalism and the Iranian context
- Legal terms like **"arresto" (arrest)** and **"liberazione" (freedom)** underscore discussions on detention and human rights

Conclusions:

1. Key themes: media freedom, geopolitical tensions, and calls for justice
2. Data provides a quantitative foundation to understand public priorities and framing in sensitive international and gendered issues.

Youtube comments and results

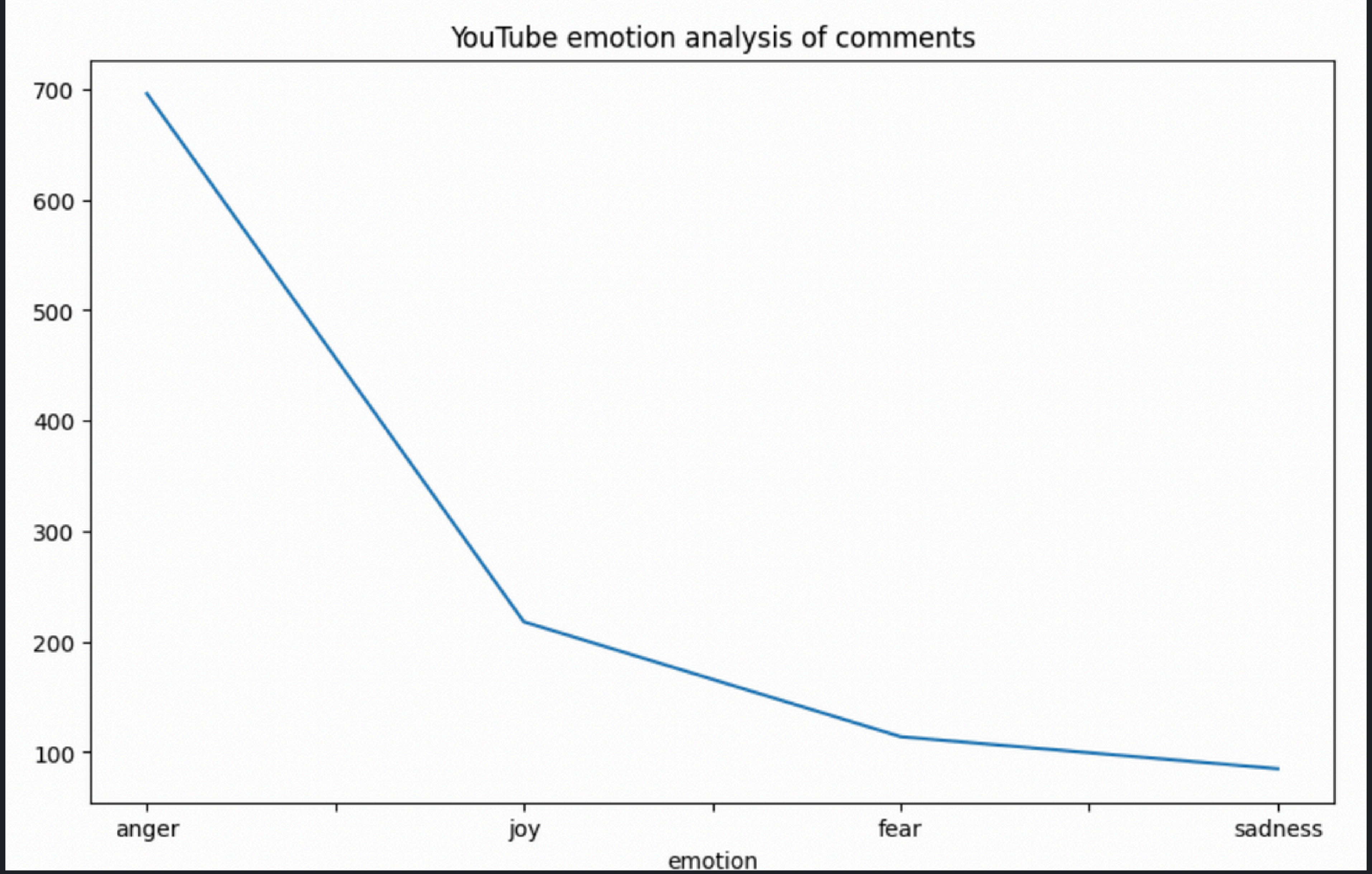
Focus area

- Emotion analysis: distribution of anger, joy, fear, sadness
- Sentiment analysis: spectrum from Very Negative to Very Positive

Methodology

Frequency analysis of key terms in an Italian-language corpus

Youtube comments and results



Emotion analysis results

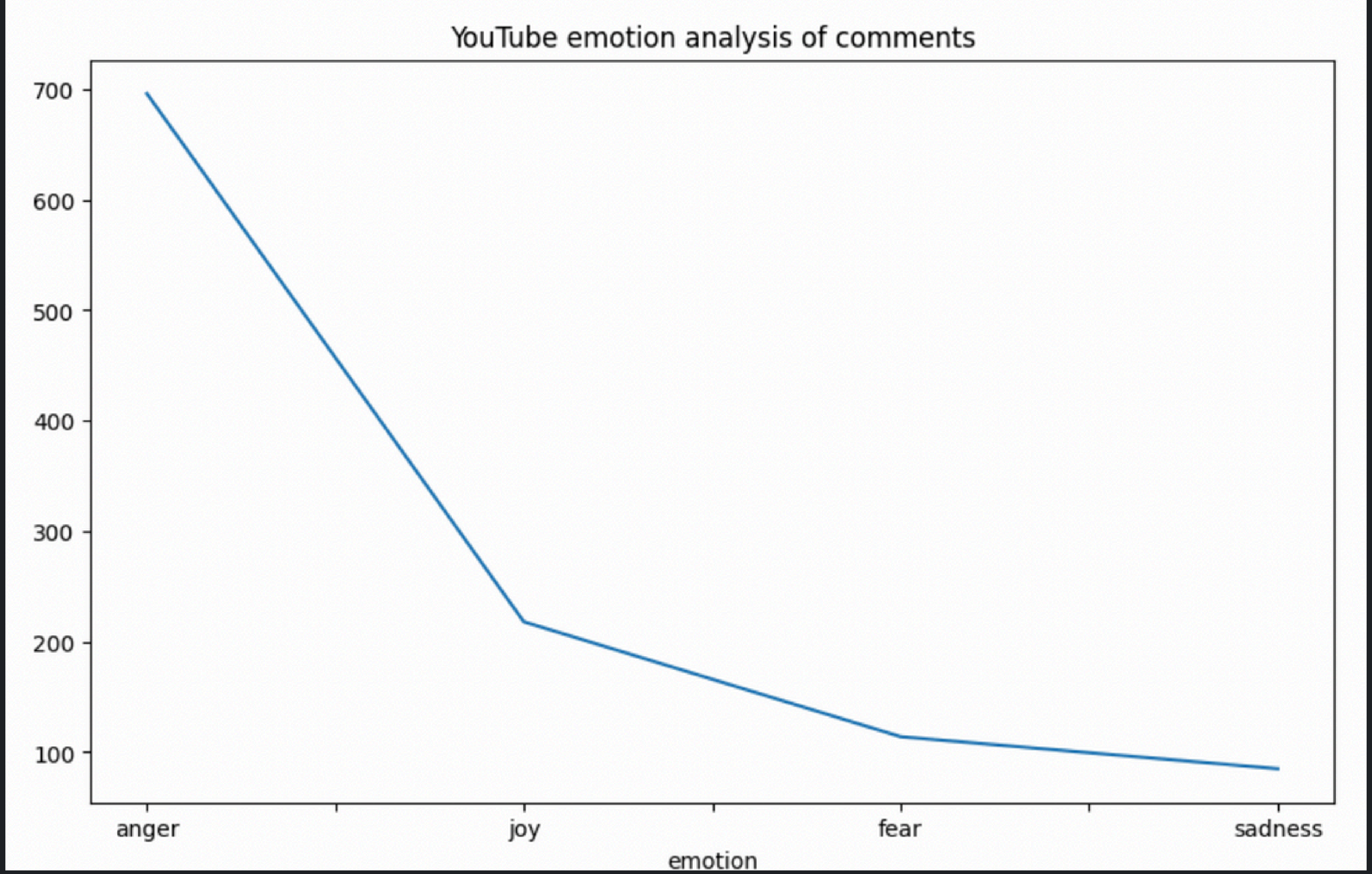
Four primary emotions analyzed:

- **Anger: predominant** with ~700 instances
- **Joy: limited presence**, fewer than 200 instances
- **Fear and sadness: minimal occurrence**, below 150 instances

Key insight

Discourse reflects strong **frustration and negativity**, with limited positive emotions

Youtube comments and results



Sentiment analysis results

Distribution pattern:

- **Very Negative: dominates** (~600 comments).
- **Neutral: moderate presence** (~200 comments).
- **Positive & Very Positive: Minimal presence** (100–150 comments).
- Negative: Lowest (~<100 comments).

Sentiment scale:

five-point system (Very Negative to Very Positive) for detailed tonal analysis

Youtube comments and results

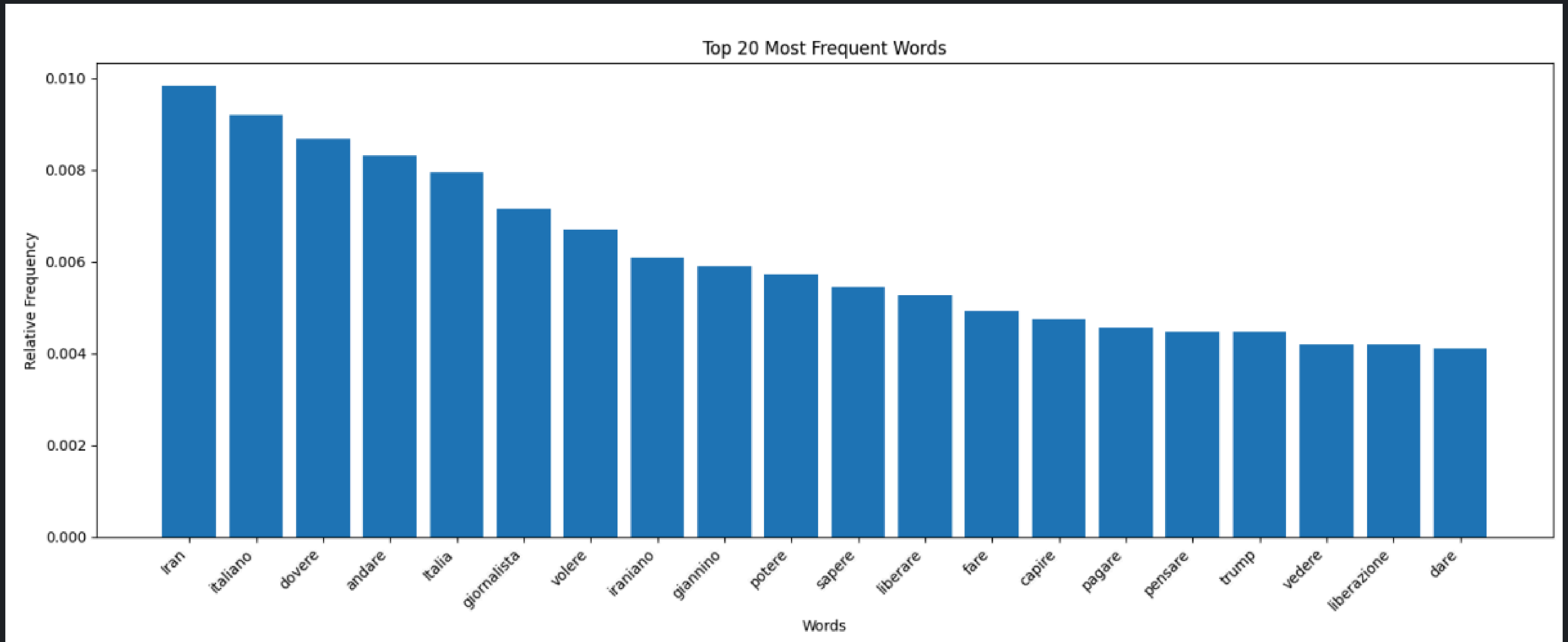
Bar Chart analysis

Most frequent terms

- **“Iran”** (≈ 0.0095): aligns with Sala’s focus on Middle Eastern affairs
- **“Giornalista”** and **“Italia”**: reflect professional identity and national context

Action-oriented verbs:

- “Liberare”, “dovere”, “andare”, “volere”, “pensare”
- Indicates themes of advocacy, movement, and press freedom



Youtube comments and results

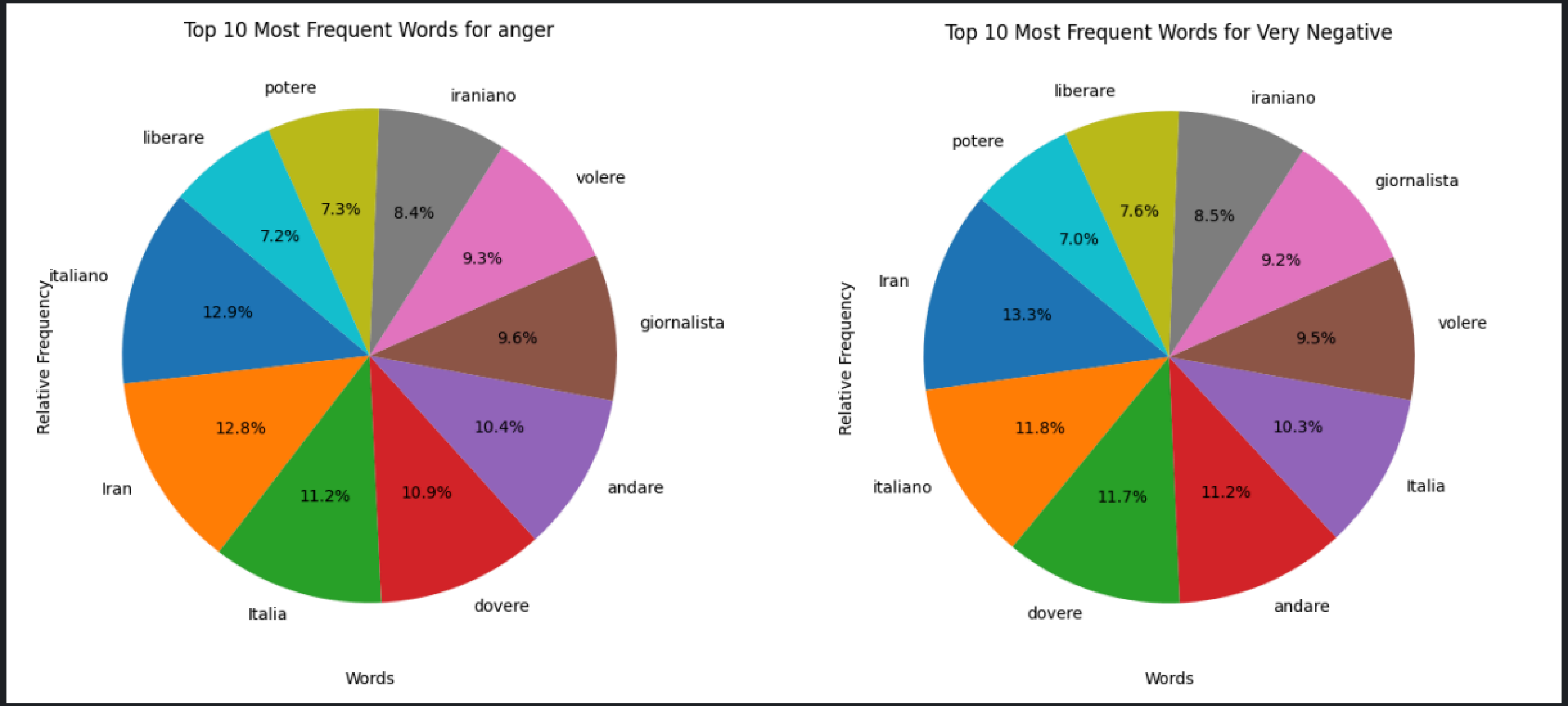
Pie Chart analysis

Themes identified:

- **Press freedom, journalist safety, and geopolitical tensions**
- Strong audience engagement with topics on **professional risks** and **international reporting**

Impact of platform dynamics:

Highlights how **gender, journalism, and audience sentiment intersect in online discussions**



Discussion

✹ Key findings

- **Sentiment and emotion analysis:** highlights **public attitudes** toward journalism, gender, and international affairs via BlueSky and YouTube comments

- **Platform-specific insights:**

1. **YouTube:** highly **polarized discourse**, influenced by **platform algorithms**
2. **BlueSky:** limited by **restricted query functionality**, leading to **incomplete datasets**

- **API constraints:**

1. **BlueSky** lacks metadata filtering
2. **YouTube** does not support date-based filtering, hindering longitudinal analysis

- **Bias in NLP models:**

1. Pretrained models misclassify complex expressions (e.g., sarcasm, irony)
2. Lemmatization errors (e.g., "Sala" → "salare") distort sentiment results

*D*iscussion

✹ Proposed solutions

- **Enhanced Data Collection:**

1. Cross-platform integration (Mastodon, Reddit, news comments)
2. Periodic scraping and historical archiving to ensure data representativeness

- **Improved NLP models:**

1. **Domain-specific training datasets** for journalism and gender discourse
2. **Customized Named Entity Recognition (NER)** to handle proper nouns

- **Advanced analytical techniques:**

1. **Topic modeling** for thematic insights
2. **Longitudinal studies** for evolving trends in sentiment and emotions

- **Ethical considerations: transparent methodologies** and **AI frameworks** to ensure responsible use of public data

Conclusion:
Big Data analytics and AI-driven NLP offer robust tools to understand digital discourse, informing academic research and policy on online communication dynamics.

Conclusions

Key findings:

- Sentiment analysis: **predominantly negative and very negative comments**, consistent with research on **gender-based digital harassment** toward female journalists.
- Emotion analysis: **dominance of fear and anger**, reflecting concerns about **press freedom, international affairs, and political discourse**
- Lexical insights: strong focus on **geopolitical topics** (e.g., "Iran") and **journalistic identity** (e.g., "giornalista"), emphasizing the relevance of the case study

Methodological insights:

- Strengths:
    - Big Data and AI-driven NLP enable large-scale, systematic textual analysis
    - Structured sentiment, emotion classification, and lexical frequency analysis provide actionable insights
- Limitations:
    - **Algorithmic biases** in NLP models
    - **Data access restrictions** and need for continuous **model refinement**

Big Data analytics and AI-driven NLP offer robust tools to understand digital discourse, informing academic research and policy on online communication dynamics.

Thank you for your attention