

Measuring Media Slant through Image Analysis

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- Ideological scaling enables addressing a range of substantial questions
- So far, focus on scaling verbal communication
- But: Political communication increasingly utilizes images, videos, and audio

News Outlets Report Differently on Same Issues



The Challenge of Scaling Images

Images have unique characteristics:

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What is in an image? How can we represent, compare and study images at scale?

Our Framework Proposal

Step 1: Complete Weighted Graphs

- Encode images with Visual Transformers (ViT) and extract embeddings from [CLS] token
- Calculate pairwise cosine similarities
- Generate similarity matrix as a semantic graph

Step 2: Modelling with AME

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Image level:

$$y_{pq} = \mu + z_p^\top z_q + \epsilon_{pq}, \quad \epsilon_{pq} \sim \mathcal{N}(0, \sigma^2) \quad (2)$$

Case Study: Visual Reporting on the Gaza War

Visual Reporting on the Gaza War

Dataset:

- >17'000 images
- Between October 2023 and October 2024
- 10 cross-national news outlets

Visual Reporting on the Gaza War

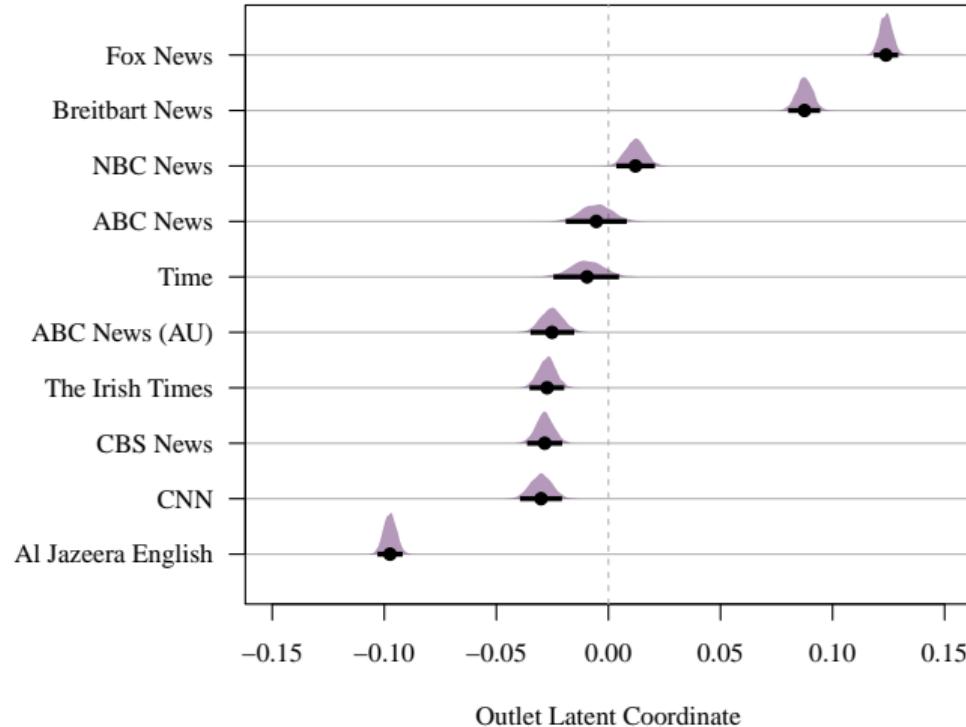
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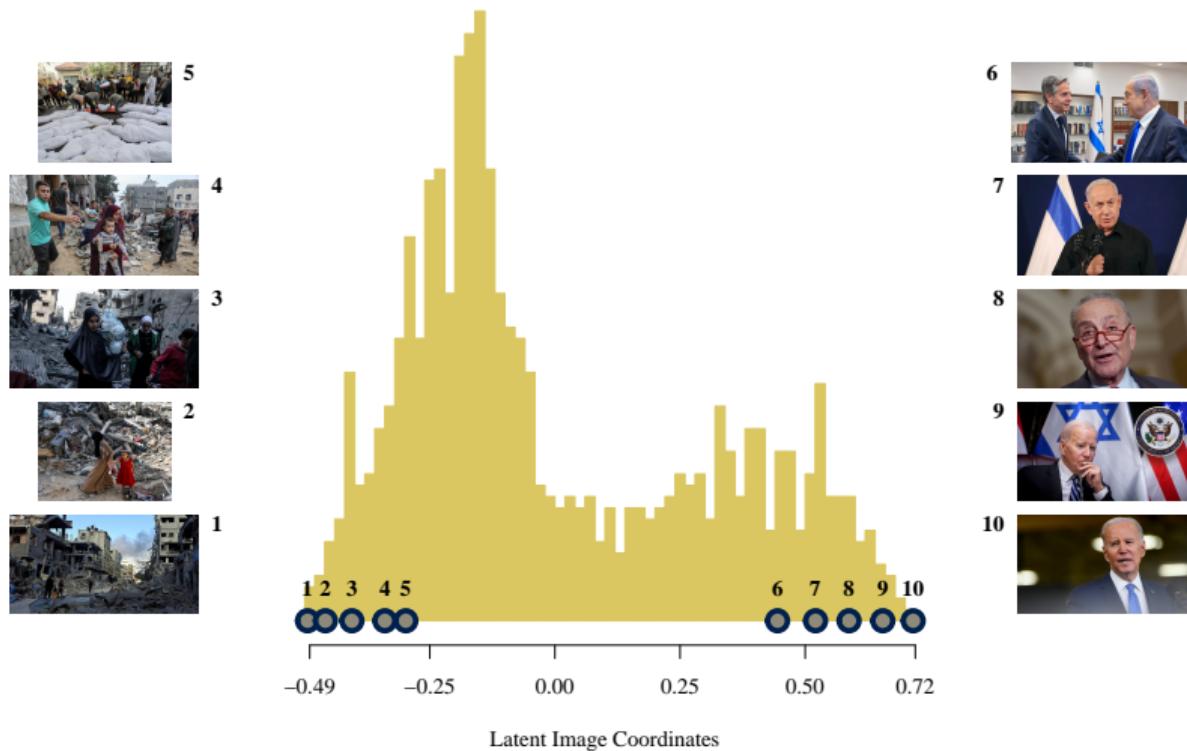
Preprocessing:

- Image embeddings from Google's ViT model vit-base-patch16-224-in21k (pre-trained on ImageNet-21k)
- Cosine similarities between all image dyads (complete weighted graph)

Scaling Results: Outlet Level



Scaling Results: Image Level



Conclusion and Future Directions

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- Our framework extends the current toolkit to other modalities:
 - (1) Complete weighted graph from pairwise cosine similarities between embeddings
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- Unsupervised, scalable, and extendable (hierarchical, dynamic, and multidimensional contexts)

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- Our framework extends the current toolkit to other modalities:
 - (1) Complete weighted graph from pairwise cosine similarities between embeddings
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- Unsupervised, scalable, and extendable (hierarchical, dynamic, and multidimensional contexts)
- Application on the Gaza War:
 - Far right outlets utilize similar images—different from visuals used by, e.g., Al Jazeera English and CNN
 - Al Jazeera English uses on-the-ground photos much more frequently compared to far-right outlets

Future Directions

- Scaling multidimensional issue spaces (e.g., separate axes for left-right vs. populist-nonpopulist framing of a social media corpus)
- Multimodal scaling with shared embedding spaces (e.g., systematic patterns of coherence or discrepancy between text and image)

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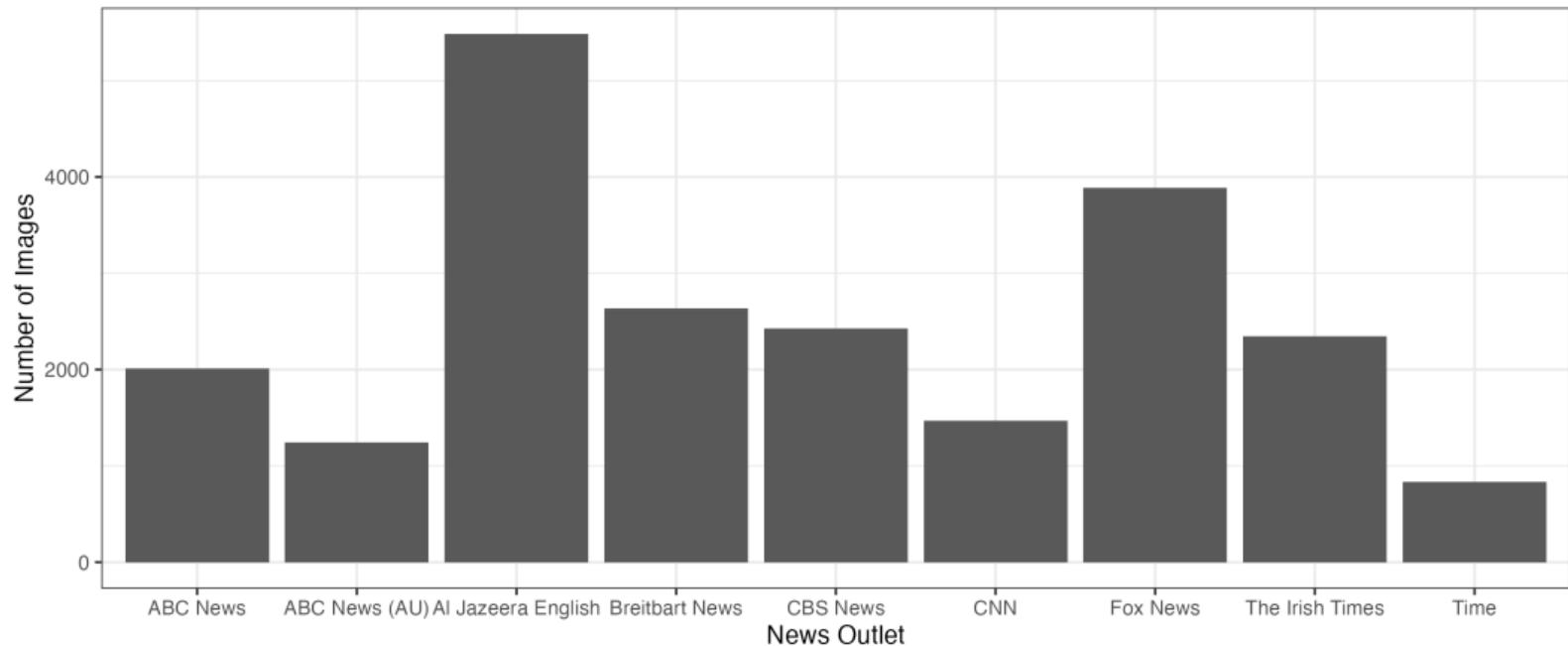
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Descriptive Figures (1)



Descriptive Figures (2)

