Climate Change Rooted in Language: Large Language Models Uncover and Amplify Narratives

by

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Abstract:

Large language models (LLMs) have transformed how humanity accesses knowledge, but their multilingual capabilities beyond English are underexplored. We query GPT-4o on how it frames climate discourse in German, Hindi, and Spanish, applying a frame analysis approach to assess how the model communicates causes, issues, and proposed solutions to climate change. We apply an abductive qualitative analysis of chat-based responses, focusing on phrasing, topics, and depth across languages. We find that German responses are typically concise and prioritize technological solutions and economic factors over social concerns. Hindi responses emphasize region-specific challenges such as air pollution and water quality, while offering fewer quantitative details. Spanish responses are generally less detailed and conceptually rich, instead emphasizing personal awareness. Our findings show that (1) Responses vary in tonal phrasing, showing that LLMs are not merely passive translation tools but act as active cultural intermediaries. As such, we argue that they should be recognized as non-human actors shaping the climate discourse. (2) Responses vary in topical foci across languages, in which LLM acts as an amplifier of these narratives. We therefore urge users to become aware of how linguistic operational choices of LLMs shape the framing of information. (3) Responses vary in depth and completeness across languages. This raises concerns about equitable access to climate information. We advocate for the alignment of response quality across languages while upholding cultural nuance. This study highlights the need for a broader research agenda on the socio-environmental impact of LLMs beyond the English language.