

ABSTRACT

This research aims to bridge gaps in public understanding and behavior regarding climate change mitigation by leveraging large language models (LLMs) like GPT-4. Many individuals hold misconceptions about the causal links connecting the many factors in climate change, and this leads to confusion about the effectiveness of mitigation strategies. Our project addresses these issues by employing LLMs for causal belief modeling and personalized messaging within an active learning feedback loop that is transparent and engages users directly. By identifying and targeting misinformation, misunderstandings, and anxieties – including the Not-In-My-Backyard (NIMBY) phenomenon, economic concerns, and distrust in institutions – our system aims to foster more climate-friendly behaviors.

This collaborative effort brings together researchers from computer science, social and political science, journalism, science communication, and climate science. Building on existing research, we will expand a crowdsourced causal belief extraction methodology called Belief Miner, published by the PI, from human surveys to LLMs, with the goal of uncovering causal illusions across diverse demographic and psychographic profiles. We will implement an active learning feedback loop to continuously refine personalized messaging strategies until they align with desired outcomes, promoting more accurate causal beliefs. Additionally, we propose developing an interactive dashboard that visualizes system states, causal beliefs, and messaging impacts, allowing stakeholders to explore, identify misconceptions, and contribute to the message formation process.

By conducting studies with both LLMs and human participants, we will validate the messaging's impact on real human populations and ensure its scientific accuracy. This project is novel in its integration of causal belief modeling and personalized messaging for diverse population subgroups using LLMs, all within an active learning feedback loop, paired with a visual dashboard for monitoring and refinement. Apart from being high-impact research it also lays the groundwork for securing large-scale funding, such as NSF's Growing Convergence Research (GCR) program and others.