

# The Potential of AI-Driven Facilitation of Collective Sensemaking for Complex Global Challenges

## 1. Introduction: The Imperative of Collective Sensemaking in Addressing Global Challenges

The world today faces a multitude of complex global challenges, ranging from the escalating crisis of climate change and persistent issues of economic inequality to the ever-present threat of public health emergencies. These challenges are characterized by their intricate nature, involving a web of interconnected factors, diverse stakeholders with varying perspectives, and a high degree of uncertainty <sup>1</sup>. Traditional approaches to understanding and resolving these issues, often relying on individual expertise or siloed organizational efforts, frequently fall short of producing effective and sustainable solutions. The sheer scale and interconnectedness of these problems necessitate a shift towards more collaborative and comprehensive methods of analysis and action.

In response to such complexity, the process of collective sensemaking has emerged as a crucial mechanism for generating shared understanding among a group of people <sup>1</sup>. This involves the active sharing of diverse perspectives, the collaborative construction of meaning, and the development of a common interpretation of the challenge at hand <sup>1</sup>. In an increasingly complex and ambiguous world, no single individual or leader can possess all the necessary knowledge to effectively address the multifaceted problems that confront humanity <sup>2</sup>. Therefore, the capacity to bring together varied cognitive abilities and experiences in a meaningful dialogue becomes paramount for making informed decisions and fostering innovation <sup>2</sup>.

Artificial Intelligence (AI), particularly the recent advancements in Large Language Models (LLMs), presents a potentially transformative toolset that can augment and facilitate these collective sensemaking processes. LLMs, with their ability to process and generate human language at scale, offer novel ways to synthesize diverse perspectives, identify emergent patterns within vast datasets, and ultimately contribute to a more profound understanding of complex global challenges. This report aims to explore the potential of AI-driven facilitation of collective sensemaking, with a specific focus on leveraging the capabilities of LLMs to address the pressing issues that face our global community.

## 2. Understanding Collective Sensemaking

Collective sensemaking is fundamentally a process through which a group of individuals collaboratively develops a shared understanding of a complex situation, often in response to a significant challenge <sup>1</sup>. This involves more than just the aggregation of individual opinions; it requires an active and iterative engagement where participants contribute their unique viewpoints, experiences, and interpretations to co-create meaning <sup>1</sup>. The essence of this

process lies in the dialogue and interaction among participants, where ideas are challenged, biases are questioned, and blind spots are collectively addressed, ultimately leading to a more comprehensive and nuanced understanding than any single individual could achieve alone <sup>2</sup>. Some definitions also highlight the ongoing and retrospective nature of sensemaking, where plausible narratives are continuously developed to rationalize collective actions <sup>3</sup>.

Several key aspects underpin the power of collective sensemaking. By bringing together a diverse group, it leverages the "wisdom of the crowd," tapping into a collective intelligence that can yield insights and solutions that might otherwise remain hidden <sup>1</sup>. The process inherently promotes collaboration and cooperation as participants actively listen to each other and work together to build a shared understanding, fostering trust and mutual respect among stakeholders <sup>1</sup>. Furthermore, the inclusion of a wide range of perspectives ensures that the resulting solutions are more inclusive and take into account the needs and interests of a broader spectrum of stakeholders <sup>1</sup>. Ultimately, collective sensemaking can help in building a shared vision for the future, grounded in a deep and common understanding of the challenges at hand, which can then serve as a guiding force for future action <sup>1</sup>. It also serves as a practice to bridge the gap between raw data and lived experience, organizing information and engaging those closest to the source to derive meaningful insights that can inform more effective decision-making <sup>4</sup>.

In the context of complex global challenges, collective sensemaking takes on a heightened relevance. These challenges often defy simple explanations and require breaking out of narrow or simplistic framings to truly grasp their multifaceted nature <sup>5</sup>. In dynamic and turbulent environments, where the need to create coherent understandings to sustain relationships and enable collective action is particularly critical, collective sensemaking becomes indispensable <sup>6</sup>. It provides a mechanism to navigate high complexity and uncertainty by convening diverse individuals in dialogue to challenge assumptions and collaboratively construct meaning <sup>2</sup>.

### **3. Large Language Models: A Powerful Tool for Information Synthesis**

Large Language Models (LLMs) represent a significant advancement in the field of Natural Language Processing (NLP), designed to understand and generate human language with remarkable proficiency <sup>7</sup>. These advanced AI models are trained on vast amounts of text data, enabling them to recognize intricate linguistic patterns, comprehend context, and produce coherent and contextually relevant responses <sup>7</sup>. LLMs can be viewed as a specialized form of generative AI, primarily focused on creating natural language text <sup>8</sup>.

The capabilities of LLMs hold significant promise for facilitating collective sensemaking. Their advanced natural language understanding allows them to grasp the nuances and context within diverse textual inputs <sup>7</sup>. LLMs exhibit versatility in performing various tasks, including text generation, summarization, translation, and question answering, without requiring task-specific retraining <sup>7</sup>. Notably, summarization and information extraction from documents are prominent use cases, allowing for the efficient processing of large volumes of textual data <sup>9</sup>. Furthermore, LLMs can understand and process diverse forms of information, extending beyond text to include images and video <sup>10</sup>. A crucial capability for sensemaking is their ability to recognize linguistic patterns and, more broadly, to identify trends, correlations, and outliers within datasets <sup>7</sup>.

Recent research also highlights the potential of LLMs in processing multiple perspectives. Frameworks like the Multi-Perspective Self-Consistency (MPSC) treat different outputs generated by an LLM (e.g., a proposed solution, its specification, and corresponding test cases) as distinct perspectives on a reasoning process<sup>13</sup>. By analyzing the consistency both within and between these perspectives, a more robust understanding can be achieved<sup>13</sup>. Additionally, there are explorations into using LLMs to simulate the evaluations of diverse individuals by constructing comprehensive user models, aiming for a more inclusive evaluation framework<sup>15</sup>.

Despite their powerful capabilities, LLMs also come with operational challenges and limitations. One significant concern is "hallucination," where LLMs produce outputs that are factually incorrect or nonsensical, sometimes giving the impression of sentience<sup>7</sup>. Bias is another critical issue, as LLMs trained on biased data can generate discriminatory or unfair outputs<sup>7</sup>. The lack of explainability in how LLMs arrive at certain decisions or outputs can make it difficult to troubleshoot or refine them<sup>7</sup>. Finally, there is a risk of over-reliance on LLMs, potentially sidelining human expertise and critical thinking<sup>7</sup>.

#### **4. Theoretical Underpinnings: Collective Intelligence and AI**

The application of AI, particularly LLMs, to facilitate collective sensemaking draws upon several key theoretical frameworks, most notably the theory of collective intelligence. Collective intelligence refers to the enhanced capabilities that emerge when a group of individuals, often with diverse skills and knowledge, collaborate to achieve a common goal<sup>17</sup>. This concept posits that the collective outcome can surpass the sum of individual contributions, leading to improved accuracy and novel solutions<sup>17</sup>. LLMs are increasingly recognized as tools that can reshape collective intelligence by enabling the synthesis of diverse insights and facilitating communication within groups<sup>20</sup>. Leveraging the collective power of multiple LLMs, each potentially possessing different strengths, to achieve consensus on complex problems aligns directly with the principles of collective intelligence<sup>20</sup>. The success of LLMs in these endeavors is inherently linked to the availability of vast, diverse, and high-quality data for training, which allows for robust generalization across various tasks and domains<sup>23</sup>.

The framework of distributed cognition also provides a valuable lens through which to understand AI-driven sensemaking. Distributed cognition suggests that cognitive processes are not confined to individual minds but are instead distributed across individuals and the tools they use<sup>20</sup>. In the context of AI, this implies that the cognitive work of sensemaking can be shared between humans and AI agents. LLMs can act as external cognitive aids, handling the processing and synthesis of large amounts of information, while humans focus on higher-level interpretation, contextualization, and decision-making<sup>24</sup>.

Consensus formation models offer another crucial theoretical perspective. These models explain how agreement emerges among multiple decision-making agents<sup>20</sup>. In the realm of AI-driven collective sensemaking, understanding these models can inform the design of collaborative AI systems that aim to facilitate agreement and shared understanding among diverse stakeholders or even among multiple LLMs<sup>20</sup>. By combining the strengths of different models, a more reliable and accurate understanding can be approximated, even in the absence of definitive correct answers<sup>22</sup>.

Furthermore, the cognitive science paradigm of enaction provides a theoretical framework for

understanding how meaning emerges through the interaction of an agent with its environment in a process of sense-making <sup>25</sup>. This perspective emphasizes that cognition is not solely an internal process but arises from the dynamic interplay between an agent and its surroundings. In the context of co-creative AI systems, including those facilitating collective sensemaking, enaction offers a way to design and evaluate systems that emphasize interaction, situated meaning construction, and the emergence of shared understanding through collaborative engagement.

## **5. Benefits of AI-Driven Facilitation of Collective Sensemaking**

The integration of AI, particularly LLMs, into collective sensemaking processes offers a multitude of potential benefits. One of the most significant advantages is the potential for increased efficiency and speed in analyzing large volumes of data. AI and LLMs can gather, structure, analyze, and synthesize information at dramatically higher speeds and lower costs compared to traditional data analysis practices <sup>26</sup>. Platforms leveraging AI for sensemaking report the ability to organize and summarize community input in seconds and analyze data up to 50% faster <sup>27</sup>. This acceleration in processing time allows for quicker identification of key themes and trends within complex datasets.

LLMs also possess the capability to identify hidden insights and emergent patterns that might be missed by human analysis alone <sup>11</sup>. By processing vast amounts of textual data from diverse sources, LLMs can uncover subtle correlations, relationships, and outliers that may not be apparent to human analysts due to cognitive limitations or the sheer volume of information. This ability to detect non-obvious patterns can lead to a more profound and nuanced understanding of complex global challenges.

Furthermore, AI-driven tools can contribute to more inclusive sensemaking processes by facilitating the inclusion of diverse perspectives. Collective sensemaking, by its very nature, aims for inclusivity <sup>1</sup>. LLMs can increase accessibility by breaking down language barriers through translation services <sup>30</sup>. AI can also give voice to previously unheard stakeholders, ensuring that a wider range of viewpoints are considered in the process <sup>32</sup>.

The ability of LLMs to synthesize information from diverse sources and provide coherent summaries is another key benefit <sup>10</sup>. In addressing global challenges, information often resides in disparate locations and formats. LLMs can process this fragmented information and generate cohesive narratives, making it easier for stakeholders to grasp the big picture and identify areas of convergence and divergence. This synthesis can also facilitate the creation of shared narratives and understanding, which is a crucial outcome of effective sensemaking <sup>4</sup>.

## **6. Challenges, Limitations, and Ethical Considerations**

Despite the promising benefits, the application of AI and LLMs in collective sensemaking is fraught with challenges, limitations, and ethical considerations that must be carefully addressed. One of the most significant concerns is the issue of bias. LLMs are trained on massive datasets that often reflect existing societal biases related to gender, race, socioeconomic status, and other factors <sup>7</sup>. If these biases are not carefully identified and mitigated, the LLMs may inadvertently perpetuate and even amplify these inequalities when synthesizing information or identifying patterns, leading to skewed understandings and unfair outcomes in the context of

global challenges.

Another critical limitation is the problem of "hallucinations," where LLMs generate outputs that are factually incorrect or nonsensical <sup>7</sup>. In the context of collective sensemaking, the dissemination of such misinformation could lead to flawed understandings of critical issues and potentially harmful decisions.

The lack of explainability in LLM decision-making processes also poses a significant challenge <sup>7</sup>. Often operating as "black boxes," it can be difficult to understand how LLMs arrive at their conclusions. This lack of transparency can erode trust in AI-driven sensemaking, making it difficult to identify and correct errors or biases and hindering accountability for the outcomes of the process.

Ethical concerns related to data privacy, security, and potential misuse are paramount <sup>33</sup>. Collective sensemaking often involves the sharing of sensitive information. Ensuring the security and privacy of this data when processed by AI systems is crucial. Furthermore, the potential for misuse of LLMs, such as the generation of deepfakes or the spread of disinformation, raises serious ethical questions that need careful consideration.

There is also a risk of over-reliance on AI and the sidelining of human expertise and critical thinking <sup>7</sup>. While LLMs can automate certain aspects of information processing, human judgment, contextual understanding, and the ability to engage in nuanced interpretation remain essential for effective sensemaking, particularly when addressing complex global challenges.

Finally, evaluating the performance and reliability of LLMs in complex sensemaking tasks presents its own set of challenges <sup>15</sup>. Traditional evaluation metrics may not fully capture the nuanced performance of LLMs, and concerns about data contamination in benchmarks further complicate the assessment of their true capabilities.

## 7. Case Studies: Applications of AI and LLMs in Collective Sensemaking

The potential of AI and LLMs to facilitate collective sensemaking is being explored across various domains related to complex global challenges.

In the realm of **climate change**, AI is being leveraged to organize vast amounts of unstructured Earth data and downscale global climate models to local levels, turning raw information into actionable insights <sup>40</sup>. LLMs, particularly through techniques like Retrieval Augmented Generation (RAG), are being used to analyze companies' sustainability reports, enabling faster and more efficient assessment of their transition plans towards net zero <sup>41</sup>.

In **public health**, AI plays a crucial role in early outbreak detection, risk modeling, and prediction, often analyzing vast datasets to identify potential health crises even before traditional surveillance methods <sup>43</sup>. LLMs are being explored for their potential in clinical decision support, diagnosis, and medical research, assisting healthcare professionals in processing and interpreting large volumes of medical data <sup>44</sup>. The concept of collective sensemaking is also vital in understanding responses to public health crises, particularly in navigating misinformation and promoting effective public health measures <sup>45</sup>. Collaborative efforts between researchers and public health decision-makers, facilitated by principles of collective sensemaking, have been



shown to strengthen health systems <sup>46</sup>.

Addressing **economic inequality** is another area where AI and LLMs are being applied. The collective power of multiple LLMs is being explored to approximate correctness and identify consensus on complex reasoning tasks related to economic issues <sup>22</sup>. However, it is also recognized that LLMs could potentially perpetuate or exacerbate existing sociopolitical tensions if biases in their training data are not carefully addressed <sup>35</sup>. Initiatives aimed at building AI datasets in vernacular languages by employing rural communities demonstrate an effort to use AI in a way that promotes inclusivity and potentially reduces economic disparities <sup>48</sup>.

Beyond these specific domains, collective sensemaking, sometimes facilitated by technology, has been studied in the context of general social issues such as responding to refugee crises, where the narratives of diverse actors contribute to the emergence of collective solutions <sup>6</sup>.

## 8. Platforms and Tools for AI-Enhanced Collective Sensemaking

Several platforms and tools are emerging that specifically aim to leverage AI to enhance collective sensemaking processes. **Go Vocal** (formerly CitizenLab) is a community engagement platform that incorporates AI-powered Sensemaking for input analysis and summarization <sup>27</sup>. This tool helps organize and summarize large amounts of community feedback, analyze data faster, and generate impactful reports using AI-generated summaries, while maintaining transparency of the data sources <sup>27</sup>.

**Cortico's Fora** platform also integrates AI-assisted sensemaking features to analyze recorded conversations and elevate underheard voices <sup>51</sup>. Cortico emphasizes a human-led approach, with AI acting as a co-pilot to assist in tasks like thematic tagging, codebook creation, and summarization, while ensuring learnability, steerability, and transparency <sup>52</sup>.

Other platforms incorporate AI to facilitate collaboration and knowledge sharing, which can indirectly support collective sensemaking. **Guru** functions as an enterprise AI, wiki, and intranet, using AI to push relevant information to employees <sup>56</sup>. **Microsoft Copilot** and **Notion AI** offer AI-powered features for team coordination, such as intelligent scheduling and discussion summarization <sup>57</sup>. **ThoughtExchange** is a collective intelligence platform that utilizes patented anti-bias technology to gather and analyze diverse opinions for problem-solving <sup>58</sup>. **Hunome** aims to combine human insight with AI to transform data into actionable strategic understanding <sup>59</sup>. **GigSense** is an LLM-infused tool specifically designed to foster collective intelligence among gig workers by enabling collaborative problem-solving <sup>60</sup>. Furthermore, various AI tools are being developed for public participation, offering benefits like automated analysis of responses, support for deliberation, cost and time savings, and enhanced accessibility through features like translation and text-to-speech <sup>31</sup>.

## 9. Expert Perspectives and the Future of AI in Collective Sensemaking

Expert perspectives on the future of AI in collective sensemaking reveal a mix of optimism and caution. Many recognize the transformative potential of AI, especially LLMs, to enhance group collaboration and decision-making by synthesizing diverse insights and breaking down communication barriers <sup>21</sup>. The ability of AI to process vast amounts of data quickly and identify non-obvious patterns is seen as a significant advantage in tackling complex global challenges

<sup>65</sup>. Some experts even envision AI playing a role in representing the interests of future generations in present-day decision-making processes <sup>66</sup>.

However, there are also significant concerns regarding the ethical implications and potential harms associated with AI. The risk of bias in LLMs, leading to discriminatory outcomes, is a major worry <sup>61</sup>. Experts emphasize the need for careful consideration to maintain diversity of thought and avoid the amplification of existing societal inequalities <sup>62</sup>. The lack of transparency in AI decision-making and the potential for misinformation through hallucinations also raise concerns about trust and accountability <sup>61</sup>.

Looking ahead, several trends and opportunities are emerging. There is a move towards more specialized, domain-specific LLMs tailored for specific industries and applications <sup>67</sup>. The concept of "responsible AI" is gaining prominence, prioritizing human-centered design, transparency, and accountability in the development and deployment of AI technologies <sup>68</sup>. Future research will likely focus on addressing the limitations of current LLMs, such as improving their explainability, mitigating biases, and developing robust evaluation frameworks <sup>39</sup>. Experts also call for greater transparency in the creation of LLMs, including disclosure of training data sources, and suggest the implementation of monitoring mechanisms to mitigate adverse developments <sup>30</sup>. Ultimately, fostering a culture of ethical and societally responsible AI research is seen as a collective pursuit, requiring buy-in and participation from a wide range of stakeholders <sup>38</sup>.

## **10. Conclusion: Towards a Future of Enhanced Collective Understanding**

This report has explored the significant potential of AI-driven facilitation of collective sensemaking, particularly through the application of Large Language Models, in addressing the complex global challenges that confront humanity. The analysis indicates that LLMs offer substantial benefits in terms of efficiency, the identification of hidden insights, and the potential for more inclusive sensemaking processes by synthesizing diverse perspectives and breaking down communication barriers. Platforms and tools are already emerging that leverage these capabilities to enhance community engagement and qualitative data analysis.

However, it is crucial to acknowledge and address the inherent challenges and ethical considerations associated with this technology. Biases embedded in training data, the risk of generating incorrect information, the lack of explainability in AI decision-making, and the potential for over-reliance all pose significant hurdles that must be overcome to ensure the responsible and effective use of LLMs in collective sensemaking. Expert perspectives underscore the need for a balanced approach, one that harnesses the power of AI while upholding ethical principles and maintaining human oversight.

The future of AI in collective sensemaking likely lies in continued research and development focused on mitigating the current limitations of LLMs. Improving the transparency of these models, developing robust methods for bias detection and reduction, and establishing comprehensive evaluation frameworks are critical areas for future work. Furthermore, fostering a global dialogue around the ethical implications of AI and promoting the principles of responsible AI development will be essential to ensure that these powerful tools are used in a way that benefits society and contributes to a more profound and shared understanding of the

complex global challenges we face.

Key Tables:

Table 1: Key Capabilities and Limitations of Large Language Models for Collective Sensemaking

Category	Specific Feature/Challenge	Relevance to Collective Sensemaking	Supporting Snippets
Capabilities	Advanced Natural Language Understanding	Enables processing and comprehension of diverse textual inputs from various stakeholders.	7
	Versatility (Summarization & Information Extraction)	Allows for efficient analysis of large volumes of data and identification of key information.	7
	Processing Diverse Information	Facilitates the integration of insights from various formats, including text, images, and video.	10
	Identifying Patterns and Trends	Helps uncover non-obvious connections and emergent themes within complex datasets.	7
	Processing Multiple Perspectives	Offers potential mechanisms for synthesizing and reconciling different viewpoints.	13



<b>Limitations</b>	Bias	Risk of perpetuating and amplifying societal inequalities in synthesized information.	7
	Hallucinations	Potential for generating and disseminating incorrect or misleading information.	7
	Lack of Explainability	Difficulty in understanding the reasoning behind LLM outputs, hindering trust and accountability.	7
	Over-Reliance	Risk of diminishing human critical thinking and nuanced interpretation.	7

**Table 2: Comparison of AI-Enhanced Collective Sensemaking Platforms**

<b>Platform Name</b>	<b>Primary Focus</b>	<b>Key Features AI</b>	<b>Target Audience</b>	<b>Link to Website</b>
Go Vocal (formerly CitizenLab)	Community Engagement	Automated Tagging, Summarization	Local Governments, Organizations	<a href="https://www.go-vocal.com/">https://www.go-vocal.com/</a>
Cortico Fora	Qualitative Analysis, Amplifying Underheard	AI-assisted Thematic Tagging, AI-generated	Researchers, Community Organizations	<a href="https://cortico.ai/">https://cortico.ai/</a>

	Voices	Codebooks, AI-assisted Summarization		
ThoughtExchange	Collective Intelligence	Anti-Bias Technology, Real-time Analytics, Idea Prioritization	Businesses, Leaders	<a href="https://thoughtexchange.com/">https://thoughtexchange.com/</a>
Guru	Enterprise Knowledge Management	AI-powered Content Suggestions	Businesses	<a href="https://www.getguru.com/">https://www.getguru.com/</a>
Microsoft Copilot	Team Collaboration	Intelligent Scheduling, Sentiment Analysis, Discussion Summarization	Businesses, Teams	<a href="https://copilot.microsoft.com/">https://copilot.microsoft.com/</a>
Notion AI	Productivity, Collaboration	Content Generation, Summarization , Action Item Extraction	Individuals, Teams	<a href="https://www.notion.com/product/ai">https://www.notion.com/product/ai</a>
Hunome	Strategic Understanding	Contextual Enrichment, Insight Generation	Enterprises	<a href="https://www.about.hunome.com/">https://www.about.hunome.com/</a>
GigSense	Collective Intelligence for Gig Workers	LLM-enhanced Interface, Summarization of Issues, Solution Brainstorming	Gig Workers	<a href="https://arxiv.org/html/2405.02528v1">https://arxiv.org/html/2405.02528v1</a>

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This also highlights the importance of cultivating a culture of intellectual humility—recognizing the limits of our own understanding and actively seeking out diverse perspectives. Acknowledging our inherent biases is essential for navigating complex ethical dilemmas and fostering genuine collaboration.

. Consciously mitigating the backfire effect—bypassing defensive cognitive mechanisms—is a powerful strategy for fostering genuine understanding and promoting constructive dialogue. It's a meta-skill with profound implications.

This suggests a potential framework for evaluating information sources: prioritizing those that actively acknowledge their limitations and demonstrate a willingness to engage with opposing viewpoints. It's a heuristic for discerning genuine inquiry from ideological entrenchment.