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To cite this article: Bryan P. Weichelt, Matthew Pilz, Richard Burke, David Puthoff & Kang Namkoong (2024) The Potential of AI and ChatGPT in Improving Agricultural Injury and Illness Surveillance Programming and Dissemination, *Journal of Agromedicine*, 29:2, 150-154, DOI: [10.1080/1059924X.2023.2284959](https://doi.org/10.1080/1059924X.2023.2284959)

To link to this article: <https://doi.org/10.1080/1059924X.2023.2284959>



Published online: 05 Dec 2023.



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BRIEF REPORT



The Potential of AI and ChatGPT in Improving Agricultural Injury and Illness Surveillance Programming and Dissemination

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ABSTRACT

Generative Artificial Intelligence (AI) provides unprecedented opportunities to improve injury surveillance systems in many ways, including the curation and publication of information related to agricultural injuries and illnesses. This editorial explores the feasibility and implication of ChatGPT integration in an international sentinel agricultural injury surveillance system, AgInjuryNews, highlighting that AI integration may enhance workflows by reducing human and financial resources and increasing outputs. In the coming years, text intensive natural language reports in AgInjuryNews and similar systems could be a rich source for data for ChatGPT or other more customized and fine-tuned LLMs. By harnessing the capabilities of AI and NLP, teams could potentially streamline the process of data analysis, report generation, and public dissemination, ultimately contributing to improved agricultural injury prevention efforts, well beyond any manually driven efforts.

KEYWORDS

Agricultural injury; artificial intelligence; ChatGPT; surveillance

Aggregating agricultural injury data with AgInjuryNews

AgInjuryNews is a comprehensive platform that aggregates and distributes agricultural injuries and illnesses information from diverse sources, including news media, official reports, and obituaries.^{1,2} Serving as a centralized hub for agricultural incident data and news reports, AgInjuryNews provides a comprehensive overview of the current state of agricultural safety, a valuable resource for researchers, policymakers, agricultural workers, healthcare professionals, and other stakeholders involved in agricultural safety and injury prevention.

The value of AgInjuryNews lies in the way its surveillance aggregation can identify and influence the prevention of, and response to, agricultural injuries and illnesses. By collecting and analyzing data from multiple sources, AgInjuryNews enables the identification of patterns, trends, and emerging concerns. This information can inform targeted

prevention strategies, policy development, and interventions to mitigate risks and improve safety measures in the agricultural sector. Thus, AgInjuryNews promotes crucial evidence-based approaches for prevention. Its centralized and accessible platform facilitates knowledge dissemination and collaboration among global stakeholders, fostering a collective effort towards reducing agricultural injuries and improving the overall safety and well-being of agricultural workers.

As a collaborative hub, this dataset has yielded a number of reports, such as the latest Farm Fatality Reports in Wisconsin, Pennsylvania, Florida, and New York. Resulting work on agricultural injury coding also led to a major revision and expansion of the ASAE S575 Farm and Agricultural Injury Classification (FAIC) Code. The program contributed to the formation of a national Agriculture, Forestry, and Fishing surveillance workgroup and a 2024 special issue collection of papers in the Journal of Agromedicine.

The program's outputs list includes at least 24 peer-reviewed manuscripts since 2018, published in 10 different journals, with 31 co-authors from over 20 organizations. Papers and projects led by external researchers unaffiliated with the National Farm Medicine Center (NFMC) are also starting to emerge. Since its inception, the system has had over 24500 unique visitors and 290,500 page views from 150 countries, with more than 560 academic and government registrations – including the U.S. Bureau of Labor Statistics. In 2022, the system had 4,755 unique users. The system and its dataset are not without flaws; however, AgInjuryNews is well-poised for broader usage and is capable of improved and innovative data dissemination strategies.

Generative artificial intelligence and agricultural injury surveillance systems

In recent years, the rapid advancement of technologies in the artificial intelligence (AI) field, especially OpenAI's chatbot ChatGPT (Generative Pretrained Transformer), has promised new solutions for generating and managing text.^{3–6} ChatGPT, a Large Language Model (LLM) using natural language processing (NLP), represents a watershed moment in AI-driven tools for developing human-like responses to written prompts, and can retain and retrieve writing parameters, allowing ease of management for at every stage of the writing process.^{7,8} Such promise has led a wide spectrum of industries to consider LLM applications, from healthcare and finance to transportation and entertainment.^{9–11} AI has permeated numerous sectors with the potential to revolutionize task performance, decision-making, and information processing. While concerns have arisen about authorship and accuracy of ChatGPT (e.g. hallucinations, invalid citations, misinformation, copyright concerns, monetization, etc.), its transformative power, like that of other AI technologies across industries, has opened up new possibilities for enhancing productivity, efficiency, and innovation, with a wave of interest as organizations seek to harness their potential.¹²

Thus, because the burden of agricultural injuries and illnesses continue to pose significant risks to farmers, agricultural workers, their families, and

surrounding communities, ChatGPT and similar LLMs may be useful in enhancing the efficiency of surveillance and, eventually may be effective tools in prevention strategies.^{13,14} While the need for this type of work remains stubbornly consistent, some gaps in national and regional surveillance programming exist due to factors such as a lack of staffing and resources.¹⁵ These gaps persist through downstream analyses, research, interventions, impactful dissemination, and policy. Success in this area of study hinges on effective collaborations.¹⁶ The need for more timely and accurate dissemination of surveillance data and injury prevention strategies to relevant stakeholders is vital for raising awareness, promoting safety measures, and preventing future incidents.

In our own experience testing the feasibility of ChatGPT for use with AgInjuryNews, we leveraged its technology (OpenAI's GPT-3.5 architecture) to enhance the identification of themes in recent agricultural injury reports. Then, we created customized and targeted media-ready report summaries that both highlight the events and also emphasize injury prevention strategies. In this case, we used the technology to create a set of tweets based on supplied press releases, and also drafted boilerplate press releases based on supplied ag-injury news articles (Figure 1). This process can save time and effort of staff members, while producing high-quality outputs; however, these products must still be reviewed to ensure competent content, phrasing, and delivery. By harnessing the capabilities of AI and NLP, teams could potentially streamline the process of data analysis, report generation, and public dissemination, ultimately contributing to improved agricultural injury prevention efforts, well beyond any manually driven efforts.

Ethical considerations

Privacy and data protection

Through our usage of and research about the emerging technology, we recognized that research and outreach teams should consider ethical implications, privacy concerns, and data security when working with ChatGPT. Integration of ChatGPT and AI technologies in agricultural injury and

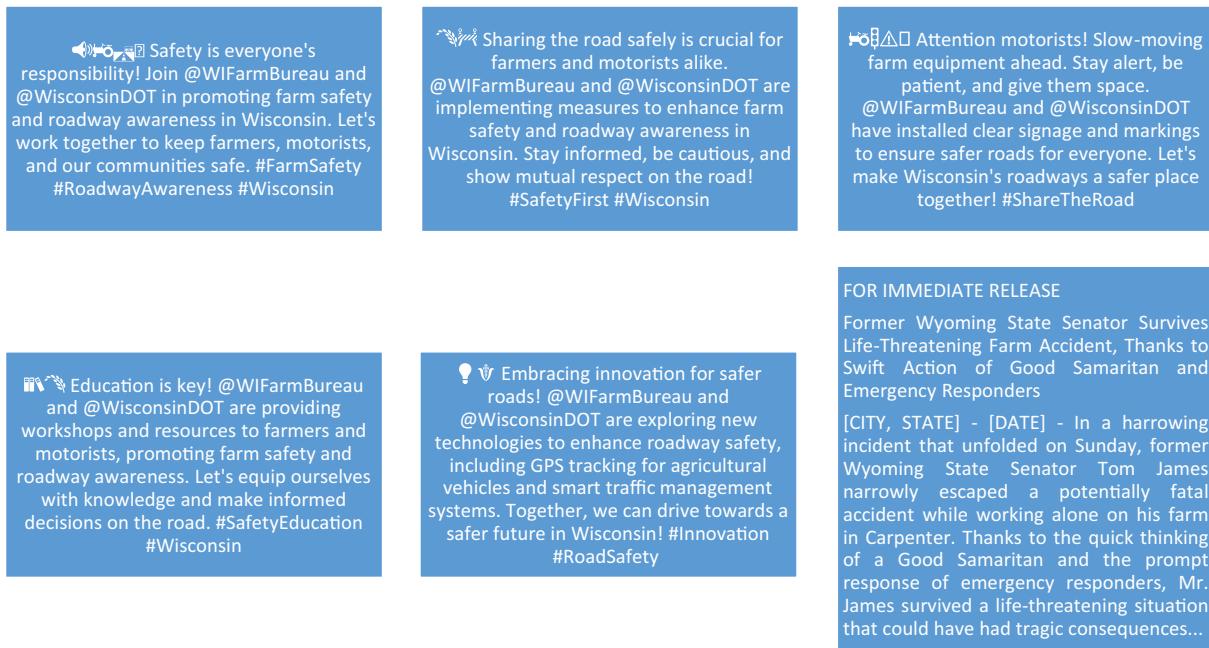


Figure 1. ChatGPT responses to prompt: “draft 5 tweets based on this press release.” as well as “generate a draft press release based on a supplied ag-injury related news article.”

illness surveillance programming raises important privacy and data protection concerns. As we collect and analyze data from various sources, including news media and obituaries, we must ensure privacy and ethical guideline compliance.¹⁷ Though we utilized publicly published information, safeguarding personally identifiable information and maintaining data anonymity should be prioritized to protect the rights of individuals involved in the reported incidents. The individual data collection policies of LLM platforms must also be considered – when using ChatGPT 3.5, for example, by default all transmitted data may be used to improve their models; this can be disabled by submitting an opt-out form.¹⁸

Bias and discrimination

AI systems are susceptible to biases and discrimination, which can perpetuate inequalities and exacerbate social disparities.^{19,20} Researchers must ensure that AI algorithms are trained on diverse and representative datasets, avoiding bias towards certain demographics or geographic regions and conducting regular monitoring and evaluation for

such biases.²¹ Teams and peer-reviewers should acknowledge potential limitations and challenges such as data availability, quality, and bias. The technical challenges of AI model performance and proper validation must continue to be addressed. At times, the generative output from AI systems can result in hallucinations and erroneous data, requiring manual human review.²²

Limitations and challenges

An important difficulty to consider with internet-based research is its inherent decentralization and volatility. Researchers have had past difficulties extracting data from platforms such as Facebook and Instagram, even with private and for-profit tools developed for these purposes.²¹⁻²⁴ Furthermore, traditionally free or low-cost data scraping from platforms like X (formerly known as Twitter) and Reddit have recently been disrupted after introducing major price increases or capping Application Programming Interfaces (API) calls for non-premium accounts.²⁵⁻²⁹ This uncertainty should be considered whenever working with internet-based, decentralized data sources with robust countermeasures in place.

Furthermore, when using LLM software to generate text, extra precautions may be warranted. Because ChatGPT's vast database has allowed it to bypass plagiarism checkers, researchers who use it to generate public-facing text may find it ethical to add some manner of "Generated with the help of ChatGPT" disclaimer to AI-influenced updates. As any field leans more heavily on the use of the chatbot, a risk also arises of a general homogenization of style, which could lead to a falling-off of public interest after novelty wears off and saturation settles in. To address this latter challenge, we advocate using the chatbot's parameter-retention features to develop, maintain, and update a "house style," helping to ensure data integrity, and blend this with human input to create a singular tone.

Conclusions

The agricultural injury database, AgInjuryNews, curates and publishes information related to agricultural injuries and illnesses. Like many other databases across numerous fields, this data collection and communication platform stands to benefit from the introduction of the LLM program ChatGPT developed in the AI field. To leverage this opportunity, we propose that researchers examine how ChatGPT and other LLMs can be programmed with public incident reports from AgInjuryNews to develop AI agents to interpret, retrieve, and integrate external API, like News API, enhancing platform outputs. Such steps generate automated reports summarizing key surveillance findings and create media-ready release-formatted report summaries with injury details, historical context, and prevention strategies. Exploring the feasibility of LLM integration in injury and illness surveillance applications can deeply impact the field of agricultural health and safety, extending the reach of dissemination and publication efforts well beyond the limits of traditional manual methods, with implications for many other industries as well.

Disclosure statement

The authors have no personal or financial conflicts of interest to disclose.

Funding

Funding support was provided through the National Farm Medicine Center, Marshfield Clinic Research Institute, and National Children's Center for Rural and Agricultural Health and Safety through the National Institute for Occupational Safety and Health Cooperative Agreement U54 OH009568.

Contributions

All authors contributed to the conception or design of the work and writing of the manuscript.

Institution and ethics approval and informed consent

No human subjects were involved in this project.

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