



Case Competition Title

Simulating Vaccine Hesitancy: Understanding the Behavioral Impact of Public Healthcare Information Using LLM-Based Agents

Overview

This healthcare data analytics case competition invites participants to explore the complex relationship between public healthcare information and individual decision-making regarding vaccines. Specifically, teams will simulate human behavior using Large Language Model (LLM)-based agents and examine how exposure to various types of COVID-19-related news (real or fake) influences vaccine hesitancy.

Participants will design realistic agent profiles, curate or generate healthcare-related datasets, and run experiments to evaluate behavioral responses. This competition fosters creativity in simulation, encourages a multidisciplinary approach, and provides insights into the influence of public information on health behavior.

Competition Structure & Requirements

The competition is divided into three main phases:

Step 1: News Dataset Generation

- Teams must crawl or simulate a dataset of news articles or social media posts related to **COVID-19** or the **COVID-19 vaccine**.
- The dataset can include:
 - Real news articles from trusted media outlets (e.g., CBC, CNN)
 - Posts from social media platforms (real or simulated, e.g., tweets advocating for/against vaccination)
 - Verified facts from fact-checking websites (e.g., Snopes, Reuters Fact Check, PolitiFact).
 - Simulated or fabricated fake news content



- There are **no restrictions** on data sources or formats, but all content must be related to COVID-19 or COVID-19 vaccine, and clearly categorized (e.g., real vs. fake, fact vs. opinion).

Step 2: LLM-Based Agent Construction

- Teams must design one or more LLM-based agents to simulate human responses to healthcare information.
- Agents may be built using any method or framework, including **AutoGen**, **CrewAI**, or custom pipelines.
- There are **no constraints** on agent characteristics; teams are encouraged to create diverse agent profiles that may include:
 - Educational background
 - Personality traits
 - Socioeconomic status
 - Marital status
 - Prior beliefs or experiences with vaccines or healthcare
- Agents should be able to process input text and produce behavioral outputs in response to the news they consume.

Step 3: Behavioral Evaluation

- Each agent will be exposed to the curated news dataset and asked to respond to questions related to vaccine behavior.
- Example prompts may include:
 - *"Would you take the COVID-19 vaccine after reading this?"*
 - *"How likely are you to recommend the vaccine to others?"*
- Teams may represent responses as:
 - Binary decisions (Yes/No)
 - Likert scale ratings (e.g., 1–5)
 - Ranked or probabilistic attitudes



Expected Outcomes in the Presentations

During the final presentation, each team is expected to deliver a comprehensive overview of their project, including but not limited to:

1. Dataset Design & Description

- Overview of the sources and types of data used
- Proportion of real vs. fake news
- Preprocessing and labeling methodology

2. Agent Development

- LLM-based Agent architecture and simulation methodology
- Characteristics and diversity of agent profiles
- Tools, frameworks, and models used

3. Experimental Findings

- How agents responded to different types of information
- Impact of misinformation vs. factual content on vaccine willingness
- Comparison across different agent profiles
- Ability of agents to **identify or be influenced by fake news**

4. Insights and Reflections

- Key findings regarding the influence of public healthcare messaging
- Behavioral trends or unexpected patterns
- Ethical considerations in simulating human behavior
- Limitations and suggestions for real-world applications

5. Enrichment

- Recommendations for public health communication strategies
- Use of explainable AI (XAI) to interpret agent decisions
- Visualizations or interactive dashboards



Judging Criteria

- **Innovation & Creativity** in simulation and design
- **Technical Rigor** in data handling and agent modeling
- **Behavioral Insight** from analysis and interpretation
- **Presentation Quality** and storytelling
- **Relevance to Real-World Challenges** in healthcare communication