Use Case 2: Public Health Monitoring Platform

Overview: Build a platform to track public health trends and predict disease outbreaks using synthetic health data, leveraging advanced AI and continuous data flows.

Requirements:

- **Data Engineering**:
  - Develop a real-time data pipeline to ingest synthetic health data (e.g., symptoms, timestamps, locations), ensuring privacy and scalability.
  - Implement mechanisms to handle schema changes and data drift over time.
- **AI/ML Engineering**:
  - **Fine-tune an LLM** to analyze symptom descriptions and predict potential disease outbreaks, using RAG to incorporate medical knowledge bases.
  - Create an **AI Agent** to simulate disease spread and evaluate intervention strategies (e.g., lockdowns, vaccinations).
- **Data Analysis**:
  - Analyze trends (e.g., symptom prevalence, high-risk areas) to provide actionable insights for health officials.
  - Generate automated reports highlighting emerging health risks and mitigation strategies.
- **UI/UX Development**:
  - Design a real-time dashboard for health officials to monitor outbreaks, AI predictions, and intervention simulations.

Important Instructions:

- **Purpose**: Each use case integrates all four roles—Data Engineering, AI/ML Engineering, Data Analysis, and UI/UX Development—into a single project. Your performance across these areas will help determine your strengths and role fit.
- **Data**: Use synthetic/open data to simulate real-world scenarios. Document how you generated or sourced it.
- **Tools**: Use only free or open-source tools. No paid services are allowed.
- **Deliverables**:
  - A presentation detailing your approach, challenges, and solutions for each role.
  - A working prototype or detailed UI/UX mockups.
  - Documentation of your data pipeline, AI/ML models, analysis, and design process.
- **Evaluation**: Focus on quality, innovation, and clarity. We'll assess your skills in all four areas to identify your strongest domain.

Timeframe: Complete the use case in 3 weeks, balancing depth and practicality.