

You will build an end-to-end MLOps system that collects data from many sources, like wearable health devices, air-quality sensors, and weather data, and uses AI models to predict health risks (e.g., pollution-related illness or outbreak alerts) in real time.

But:

The data stays in different locations (hospitals, cities, or devices), and you'll train your model using Federated Learning.

You'll also deploy your model using MLOps tools to automate the full cycle: data → training → deployment → monitoring → updating.

### **Required Flow:**

#### **Data Ingestion System**

- Simulate or use open datasets (wearables, IoT sensors, weather).
- Send data from different “nodes” (like hospitals or cities).

#### **AI Model**

- Combine multiple data types (time series, images, text).
- Train it using Federated Learning.
- Detect data drift.

#### **MLOps Pipeline**

- Automate everything with CI/CD for ML.
- Use Docker/Kubernetes for deployment.
- Track experiments, monitor performance, and handle re-training.

#### **Dashboard**

- Create dashboards for:
  - Health authorities (public-health risk maps, alerts).
  - Citizens (personal alerts and trends).

### **Deliverables:**

- **Project Paper:** Research paper explaining the proposed methodology adopted.
- **Code Notebook(s):** EDA, experiments, and modeling.
- **Trained Model(s)** along with serialization (e.g., pickled model) or at least a detailed description of the final model.
- **Evaluation Report:** Comparing models, discussing trade-offs, and error analysis.
- **Presentation/Dashboard:** Summarizing findings, visualizations, recommendations.