

Neal Jaison

PandemicGuard : An AI-Powered Framework For Early Detection , Prediction And Prevention Of Future Global Pandemics Via Multimodal Surveillance

Talent Public School, Cochin , Kerala , India

✉ nealjaison@gmail.com

🌐 nealjaison

📞 +91-7025729179

Project Overview

PandemicGuard is an innovative AI-driven platform designed to detect early signals of emerging pandemics by integrating global health data, social media trends, and biomedical literature analysis. Leveraging state-of-the-art NLP (BioBERT) and LSTM-based time-series forecasting, PandemicGuard aims to reduce detection lag by providing actionable alerts weeks before conventional public health systems.

Key Contributions

- **Novel Integration:** Combined BioBERT NLP models with LSTM forecasting to analyze heterogeneous data streams in real-time.
- **High Accuracy:** Achieved over 90% prediction accuracy on simulated outbreak data, outperforming baseline models.
- **Interactive Visualization:** Developed a Streamlit dashboard enabling intuitive exploration of outbreak trends and alerts by health professionals.
- **Ethical AI:** Incorporated bias mitigation, privacy safeguards, and misinformation filtering to ensure socially responsible deployment.
- **Impact Potential:** Simulated results suggest up to 3-week earlier detection, enabling proactive interventions and potentially saving thousands of lives.

Technical Proficiencies

- **Programming:** Python (TensorFlow, PyTorch, pandas, numpy, matplotlib, seaborn)
- **Machine Learning:** NLP, Deep Learning (BioBERT, LSTM), Time-series Forecasting
- **Data Sources:** WHO datasets, Twitter API, biomedical research publications
- **Tools:** Streamlit, Git, LaTeX (Overleaf), Docker (planned)

Impact and Future Work

- Strengthens pandemic preparedness and response with scalable, real-time analytics.
- Potential expansion to other public health threats such as antibiotic resistance and bioterrorism detection.
- Future enhancements include integration of mobility and environmental data, improved explainability, and multi-lingual NLP support.

Personal Growth & Recognition

- Demonstrated leadership in interdisciplinary research blending AI, biology, and public health.
- Cultivated resilience and innovative problem-solving through iterative model development and ethical challenges.
- Developed advanced technical writing, presentation, and data visualization skills critical for top-tier academic and professional success.