Data-Driven Real-Time Infectious Disease Surveillance App and Dashboard

Daniel A. Quezada
Department of Computer Science
California State University Fullerton

SCAN ME

INTRODUCTION

Effective public health surveillance is a *fundamental* requirement to monitor the progression of outbreaks. Web-based digital dashboards are one such surveillance system that proved to be a *highly efficient* tool for policymakers to develop intervention strategies during the COVID-19 pandemic. Given the global ongoing outbreak of human monkeypox (mpox), this study sought to:

1. Build a **mobile friendly web-based** surveillance system dashboard
2. Monitor the progression of mpox cases in the United States

METHODS

This dashboard application was created using Streamlit, an open-source web application framework. An ETL process modeled in Fig.1 was used to extract weekly epidemiological data from the CDC's website.

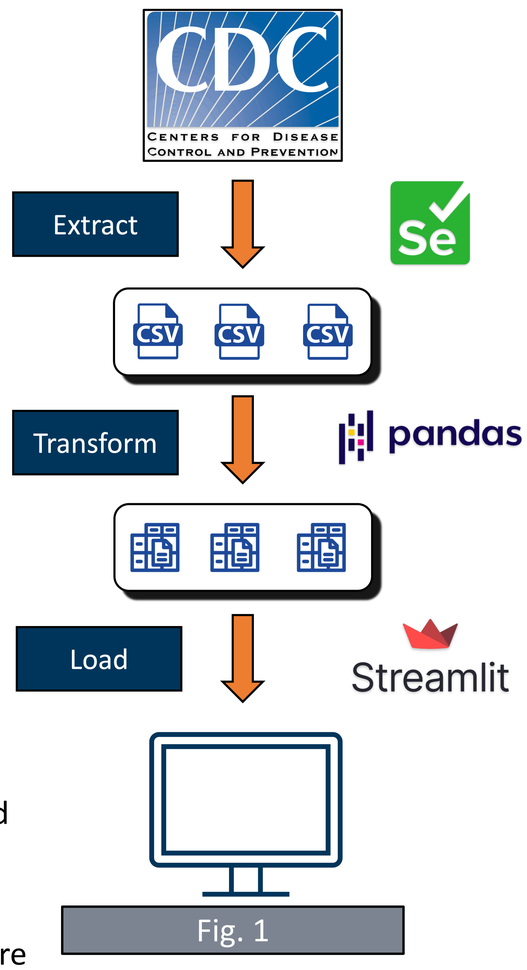


Fig. 1

- Web scrape CSV data from CDC using **Selenium**
- Reformat data into **Pandas** DataFrame objects
- Load data visualizations and graphs with **Streamlit**

Tile-map choropleth maps were created with **Plotly** visualizations and public GeoJson data in order to build out the geographic information systems (GIS) aspect.

RESULTS

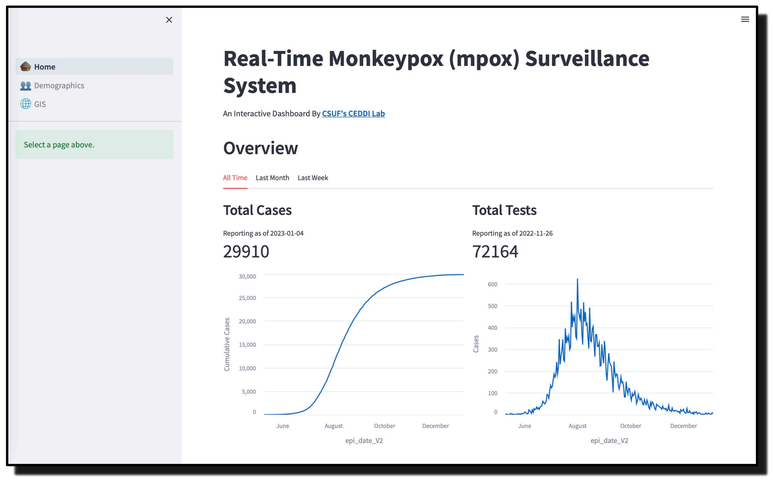
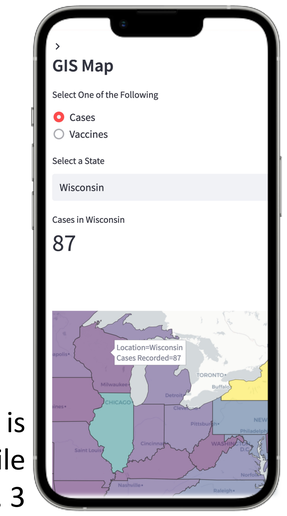


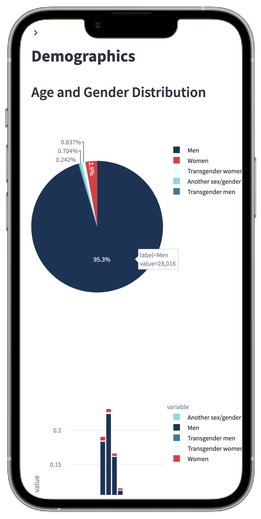
Fig. 2

Fig. 2 represents the landing page that users see. Users can switch between pages via the side menu bar.



The GIS feature is depicted in mobile view in Fig. 3

Fig. 3



Mobile view of the demographics page in Fig. 5

Fig. 5

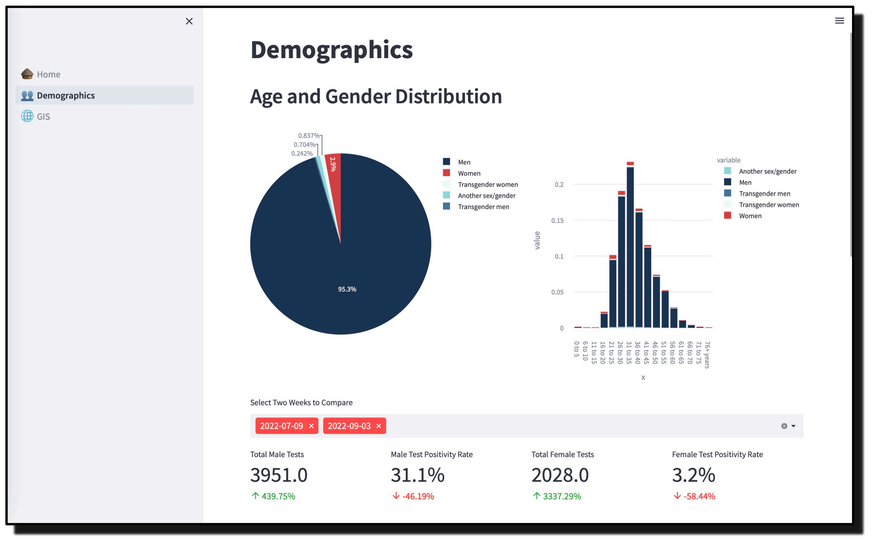


Fig. 4 is a desktop view of demographics page of the dashboard.

Fig. 4

DISCUSSION

• Our web-based dashboard provides a user-friendly format to disseminate public health data to various stakeholders. • This dashboard analyzes the 2022 mpox outbreak using **Plotly** visualizations to present relevant trend data • Key considerations for optimizing the dashboard for another target disease are: data quality & accuracy, data visualization, and real-time data streams • Mobile-friendly dashboard surveillance systems can be implemented with minimal resources using free and open-source software