

Comprehensive Monkeypox Dashboard

Software Requirements Specification
version 1.0

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Introduction - Vision and Scope

1.1 Purpose

This Software Requirements Specification document outlines the functional and nonfunctional requirements for the first version of our Comprehensive Monkeypox Dashboard. This dashboard builds on previous work from the Global.Health group, who put together and consistently update an in-depth spreadsheet containing every confirmed and unconfirmed case of Monkeypox in the world. While the CDC and Global.Health have put together their own dashboards, Global.Health's dashboard focuses on the entire world, without in-depth analysis of each country and the CDC's dashboard lacks the detail of the growth and spread of the disease. These are issues which we hope to address in our release. We will focus on building an in-depth dashboard of the Monkeypox outbreak in the US with charts and graphs displaying the growth of disease across the country and within each state which will be displayed on a website. This document is written by the members of our project team to develop the functions of the webpage. Unless otherwise noted, the requirements listed below are high priority and committed for version 1.0 of the Monkeypox Dashboard.

1.2 Document Conventions

The main body of this document is written in 12pt Calibri font and all titles and section headers are created using Google Docs' heading text formatting. These correspond to 26pt font for titles and 20pt font for section headers. Any other additional subheaders are sized relative to their specificity (more specific subtopics are in smaller font). While all features listed here are high priority, any bolding is done to draw the attention of the reader and provide additional emphasis.

1.3 Intended Audience and Reading Suggestions

This document has 6 sections: Introduction, Overall Description, External Interface Requirements, System Features, Other Non Functional Requirements, and an Appendix. The document is meant for use by several groups of people including the project team (one leader and two group members), Dr. Podgurski (the professor of the course), the TAs that oversee and help the group members, and the users of the dashboard.

For the leader of the project (who is also a group member), the document is intended to help take control of the project, including but not limited to delegating tasks/features to different members as well as overseeing which features are implemented and which still need to be

implemented. Additionally, the leader might find the document helpful in terms of the development of larger chunks of the dashboard including data analysis, backend development, and frontend development.

For the group members, the document contains a list of features and need to be implemented over the course of the entire project. It also seeks to remind the developers of high priority tasks that are necessary to implement.

For Dr. Podgurski and the TAs, this document is an outline of what we seek to accomplish through the Software Engineering project. Additionally, it is to be used as a check-in with the team members to discuss what the team hopes to accomplish and for the TAs and Dr. Podgurski to recommend changes to make the goal more achievable.

Lastly, but certainly not leastly, for the users of the dashboard, this document is intended to help them take control of the evolving Monkeypox situation. It describes all of the features so that users can easily learn about the different features included.

1.4 Product Scope

The havoc wrought by the COVID 19 pandemic showed how drastically unprepared we were for a pandemic of that scale. While the world heads towards normalcy, the growing influx of monkeypox cases is of real concern, especially because little emphasis has been placed on testing and contact tracing from national and local public health officials. Although this is partially due to the significantly low mortality rate caused by monkeypox, the disease still brings horrid conditions for the victim with little known about long term consequences of the disease. The ability to track and project growth in small areas and the country as a whole is a great tool to have in the fight against Monkeypox. While the CDC has small visualizations of the prevalence of monkeypox in each state, they lack the visualizations and charts to demonstrate the growth and spread of the disease at both the national and state level. Having the information easily accessible would mean that many hospitals and public health agencies have additional data tools to monitor the spread of the disease to base the allocation of resources and preserve medicine and treatment properly.

Based on the continuously updated dataset from the Global.Health team, we aim to bring a free web-based dashboard that contains the recent trends in the spread of the monkeypox disease, including charts demonstrating the trend of number of cases, and number of deaths as well as basic public health statistics such as incidence rate, prevalence rate, case-fatality ratio, etc. Additionally, we aim to include breakdowns of these same statistics at both a national and state

level to allow public policy officials and other users to make informed decisions related to travel, and personal contact.

We hope that the monkeypox virus does not spread, but if its spread continues, we hope that our dashboard will provide public health officials and users with the tools necessary to approach this potential pandemic with caution and confidence compared to COVID-19.

1.5 References

CDC Monkeypox US Map and Other Statistics:

<https://www.cdc.gov/poxvirus/monkeypox/response/2022/us-map.html>

Global.Health Monkeypox Dashboard:

<https://map.monkeypox.global.health/country>

Global.Health Monkeypox Dataset:

<https://docs.google.com/spreadsheets/d/1CEBhao3rMe-qtCbAgJTn5ZKQMRFWeAeaiXFpBY3gbHE/edit#gid=0>

Overall Description

2.1 Product Perspective

The Comprehensive Monkeypox Dashboard is a website that consolidates and displays the latest and previous data on the Monkeypox outbreak—specifically in the U.S—and provides predictive statistical models for the progression of the outbreak statewide and nationwide. The website is expected to evolve over time to provide further functionality and features as needed if more information about the progression and complexity of the Monkeypox outbreak arises.

2.2 Product Functions

The dashboard will offer the following functions:

PF-1	Daily U.S. Map of Monkeypox Statistics	Users will be able to view confirmed cases of Monkeypox on a national and state level through an interactive map.
PF-2	Monkeypox Statistics and Trends Charts	Users will be able to access Monkeypox statistics and trends in chart and time series format on a national and state level.

PF-3	Monkeypox Predictive Modeling and Analytics	Users will be able to access predictions for the Monkeypox outbreak with regard to specific statistics (e.g. prevalence rate, incidence rate, case-fatality ratio, etc.) and progression of the disease over the next two weeks overlaid on trends charts.
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2.3 User Classes and Characteristics

Individual: an Individual refers to any person who wishes to view previous, current, or predictive statewide or nationwide data on the Monkeypox outbreak in the U.S. As the Comprehensive Monkeypox Dashboard is intended to run by itself and serve a general audience who are able to access the web, Individual is the only type of user class for the website.

2.4 Operating Environment

OE-1	The Comprehensive Monkeypox Dashboard should operate on desktop computers, tablets, and mobile devices that have access to the Internet.
OE-2	The Comprehensive Monkeypox Dashboard should operate on the latest versions of all common web browsers that support HTML5, including Google Chrome, Firefox, Safari, and Microsoft Edge.

2.5 Design and Implementation Constraints

CO-1	The design and code of the Comprehensive Monkeypox Dashboard will conform to a three-tier architectural style corresponding to a web server, an application server, and a database server.
CO-2	All HTML, CSS, and JavaScript frameworks and implementations constituting the front-end of the Comprehensive Monkeypox Dashboard will use the latest corresponding versions (HTML5, CSS3, ECMAScript 2022).
CO-3	All Python implementations and frameworks constituting the back-end and data analytics for the Comprehensive Monkeypox Dashboard will use the latest versions (Python 3).

2.6 User Documentation

UD-1	The Comprehensive Monkeypox Dashboard will provide a Help section to assist and instruct users on navigating through the website.
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2.7 Assumptions and Dependencies

AS-1	Users have access and a reliable connection to the Internet.
DE-1	The Global.health Monkeypox dataset that provides worldwide Monkeypox data and is available in spreadsheet form and through Global.health's APIs should be up-to-date and accessible during all hours of the day.

External Interface Requirements

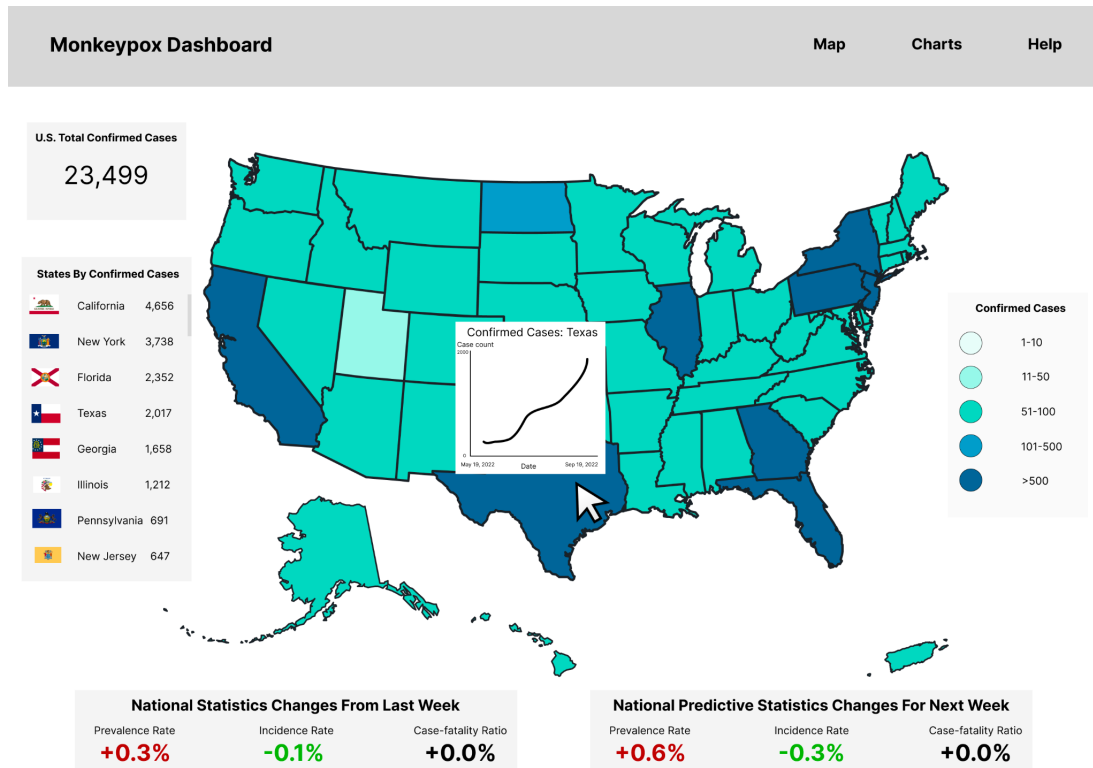
3.1 User Interfaces

3.1.1 User Interface Descriptions

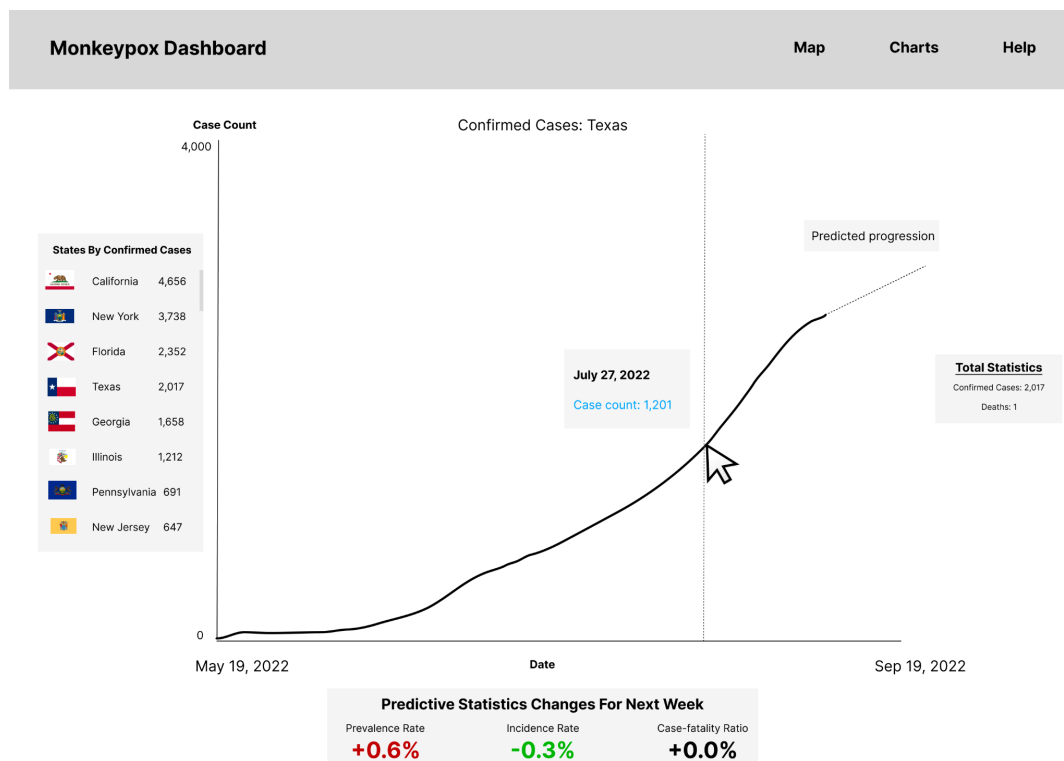
UI-1	The Map interface will display an interactive U.S. map that accomplishes the functional requirements specified in section 4.1.3. The map will also contain a legend for confirmed case counts with ranges 1 to 10, 11 to 50, 51 to 100, 101 to 500, and >500. It will display chart statewide data as a small window for an individual state, as per upon hovering over it.
UI-2	The Charts Interface will display a section for interactive charts demonstrating the trend of number of cases over time since the first confirmed case as well as basic public health statistics such as incidence rate, prevalence rate, and case-fatality ratio. The charts will accomplish the functional requirements specified in section 4.2.3.
UI-3	The Predictive Analytics Interface will display projections for the progression of the Monkeypox outbreak for a specific statistic.

3.1.2 User Interface Mockups

UI-1 Mockup



UI-2 Mockup



3.2 Hardware Interfaces

No hardware interfaces have been identified.

3.3 Software Interfaces

SI-1	Global.health Monkeypox Dataset API
SI-1.1	The Global.health Monkeypox Dataset API will be used to get and display relevant Monkeypox statistics. Relevant data that will be fetched includes the “Status,” “Location,” “City,” and “Date confirmation” fields for each confirmed case of Monkeypox, which are included in the API response.
SI-2	OpenStreetMap
SI-2.1	Used for the basis of the interactive map: color-coding of states, dragging actions, zooming actions, hover actions, and click actions.

3.4 Communications Interfaces

No communication interfaces have been identified.

System Features

4.1 Daily Map of MonkeyPox Statistics

4.1.1 Description and Priority

The users of our site will be able to access a chart that is full of the latest Monkeypox data from the United States. The chart will update daily as new statistics are updated in the monkeypox database we are using. Additionally there will be data on a state by state basis for the US i which will allow users to see which states are having the greatest number of cases

4.1.2 Stimulus Response/Sequences

Stimulus	Response
The users enter the site and are presented with the option for the map.	The site queries the options to select the United States monkeypox map

The user selects the United States map	The site loads the correct map and displays it for the user to see and also presents a further option for the state view
The user selects the state view and hovers over whichever state they wish to see statistics of	The site displays a small window of state monkeypox statistics and a graph showing the progress in that state

4.1.3 Functional Requirements

Feature ID	Feature Name	Description
INT-1	Interact.Hover	System allows hovering over states and countries which will cause
INT-2	Interact.Move	System will allow movement around the map by putting cursor at the edge of the screen
INT-3	Interact.Zoom.In	System will zoom into the map
INT-4	Interact.Zoom.Out	System will zoom out of the map
INT-5	Interact.Search	System will search for statistics on specific countries and states

4.2 Monkeypox Statistics and Trends

4.2.1 Description and Priority

The other main aspect of our website will be the section where we aggregate different sources of data into one area that the users can look at. This section will contain various public health statistics such as the prevalence rate, incidence rate, case mortality ratio, etc.

4.2.2 Stimulus Response/Sequences

Stimulus	Response
User enters the site and is presented with the option to view monkeypox trends and statistics in the form of a separate nav bar	Loads that part of the website and presents the user with several different charts of different statistics that the user may select

which lists out all the charts and graphs that the user can view	
User selects the chart that they wish to see	Site loads the selected chart

4.2.3 Functional Requirements

Feature ID	Feature Name	Description
STAT-1	Stat.Select	The system lets the user select which chart they wish to view
STAT-2	Stat.Hover	The system lets user find out the exact values on graphs and charts by hovering over them
STAT-3	Stat.View	Allows one to expand a graph or chart to the full screen on its own

4.3 Monkeypox Predictions

4.3.1 Description and Priority

This feature will be a predictive modeling feature of our platform where the user will be able to see the predicted growth rate for several different monkeypox statistics that we are tracking. It will contain a predictive algorithm and line of best fit to ensure as best of a result as possible. This feature is very important to the point of this site as a primary goal is to make it as useful to public health officials as possible

4.3.2 Stimulus Response/Sequences

Stimulus	Response
User presented with option to view site projections for the monkeypox virus and selects one	Shows the options for the charts the user may wish to see
User presented with several different statistics that they can see the projections for and can select one	Shows relevant predictions for that specified statistic

4.3.3 Functional Requirements

Feature ID	Feature Name	Description
PRDT-1	Prdct.Select	The system lets the user select which chart they wish to view
PRDT-2	Prdct.Hover	The system lets user see where the values on the graphs and chart are exactly
PRDT-3	Prdct.Zoom.In	The System allows user to zoom in the charts
PRDT-4	Prdct.Zoom.Out	The System allows user to zoom out of the charts

Other Non Functional Requirements

5.1 Performance Requirements

This section details specifications regarding the performance of the webpage, how many requests it will be able to attend to, website speed, etc.

PR-1	Website Capacity	The website will be able to handle at most 5000 individuals when individuals are most likely to check the public health status between the hours of 7-10am, when people are getting ready for the rest of the day
PR-2	Website Speed	The web page should display new charts and graphs to user within 10 seconds the users request
PR-3	State Load Speed	Within 3 seconds, pop-ups should reveal the relevant state data when hovering over the state of interest

Importantly, because our website is meant to be a dashboard, there will be no sign in (ie username and password), removing many nonfunctional requirements regarding signing in.

5.2 Safety Requirements

This section details specifications regarding the safety of the webpage, any safety requirements that need to be met, and safety requirements in terms of liability.

SR-1	Liability	Because the data that we get is directly from that of global.health, any incorrect data identified should be
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		directed to their website. Additionally, any data that is identified to be incorrect will be taken down or corrected as early as possible.
SR-2	User Safety	The website's purpose is to provide users with in-depth, yet simple charts so that they may make qualified decisions. The data provided should be used with the best intent.

Because our website is meant to provide additional safety, we have deliberately tried to eliminate any hazards present.

5.3 Security Requirements

Since there are no accounts to be made (i.e. no personal data collected), and the data being used to create the dashboard is open-source, there are minimal security risks and therefore no security requirements.

5.4 Software Quality Attributes

There are several software quality attributes that are noted below.

SQA-1	Availability	The website shall be available for all users 99.9% of the time between the hours of 5am and 11pm and 90% of the time between 11pm and 5am for scheduled and unscheduled maintenance
SQA-2	Robustness	In order to retain web page functionality, each day that the website is updated, the previous day's data will be saved. If the next day, data is not updated on global.health, the site will continue to show the same statistics as that of the previous day.
SQA-3	Correctness	To ensure accurate data is displayed, each time global.health updates their dataset, displays will be updated to contain the proper data displays. In between data updates, data may be manually updated if discrepancies are found.
SQA-4	Portability	The dashboard will be available to view from macOS, Windows, and mobile smartphone systems using web browsers.

SQA-5	Maintainability	There will be a log kept and if a system feature goes down, the log will be checked and a group member will work diligently to address the issue.
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5.5 Business Rules

1. Because raw data is not generated by the project team members, there will be consistent checks to ensure data quality and accuracy.
2. Periodically, team members will update the analysis pipeline when new data features are available or developed to provide users with the most valuable information.
3. If new statistics or features are found/calculated and they are deemed more informative than a previous feature, they will be switched out.
4. Additionally, data displays will be updated if the project team can find new, simpler, and innovative ways to bring data to users.

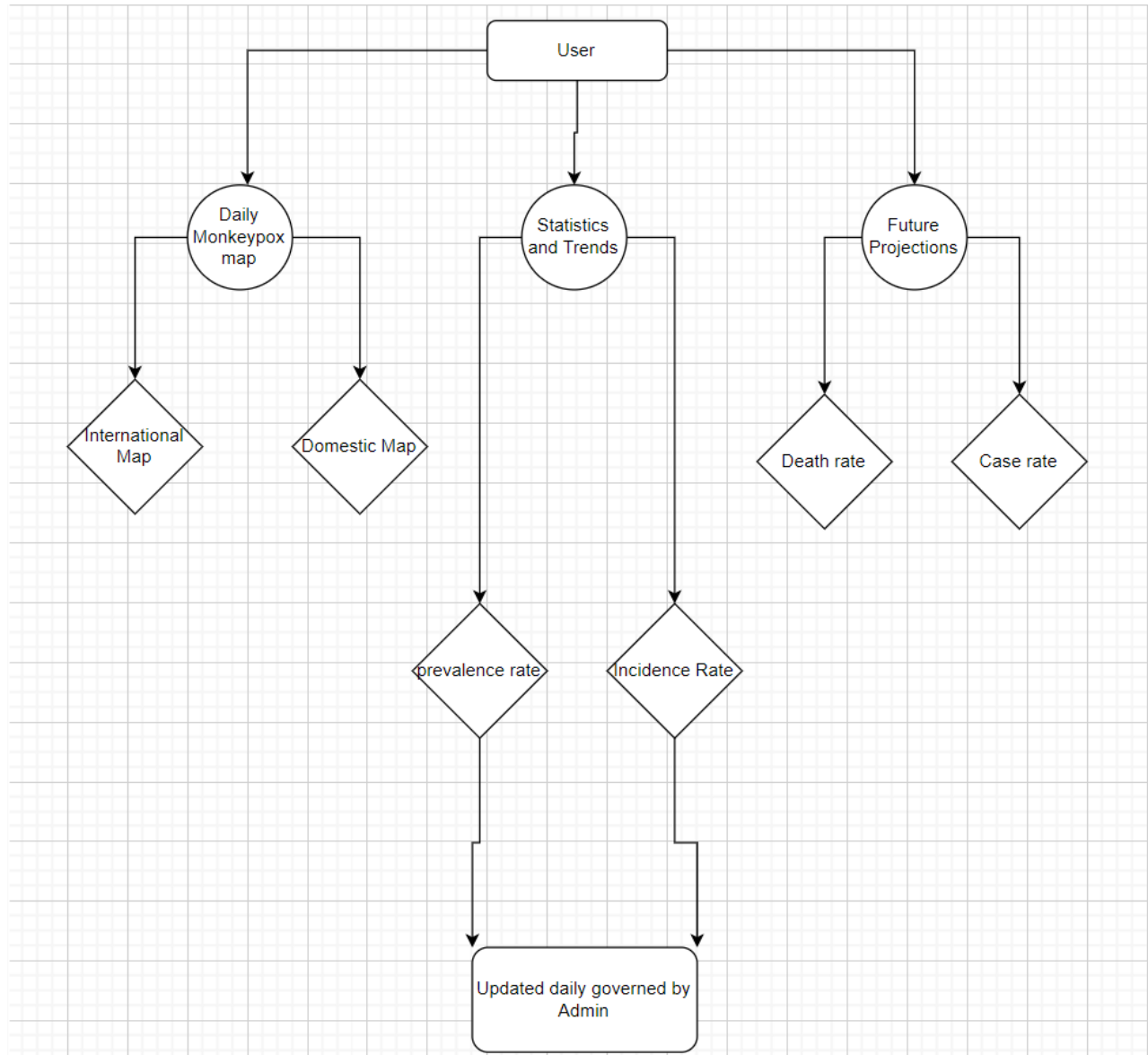
Appendix

6.1 Glossary

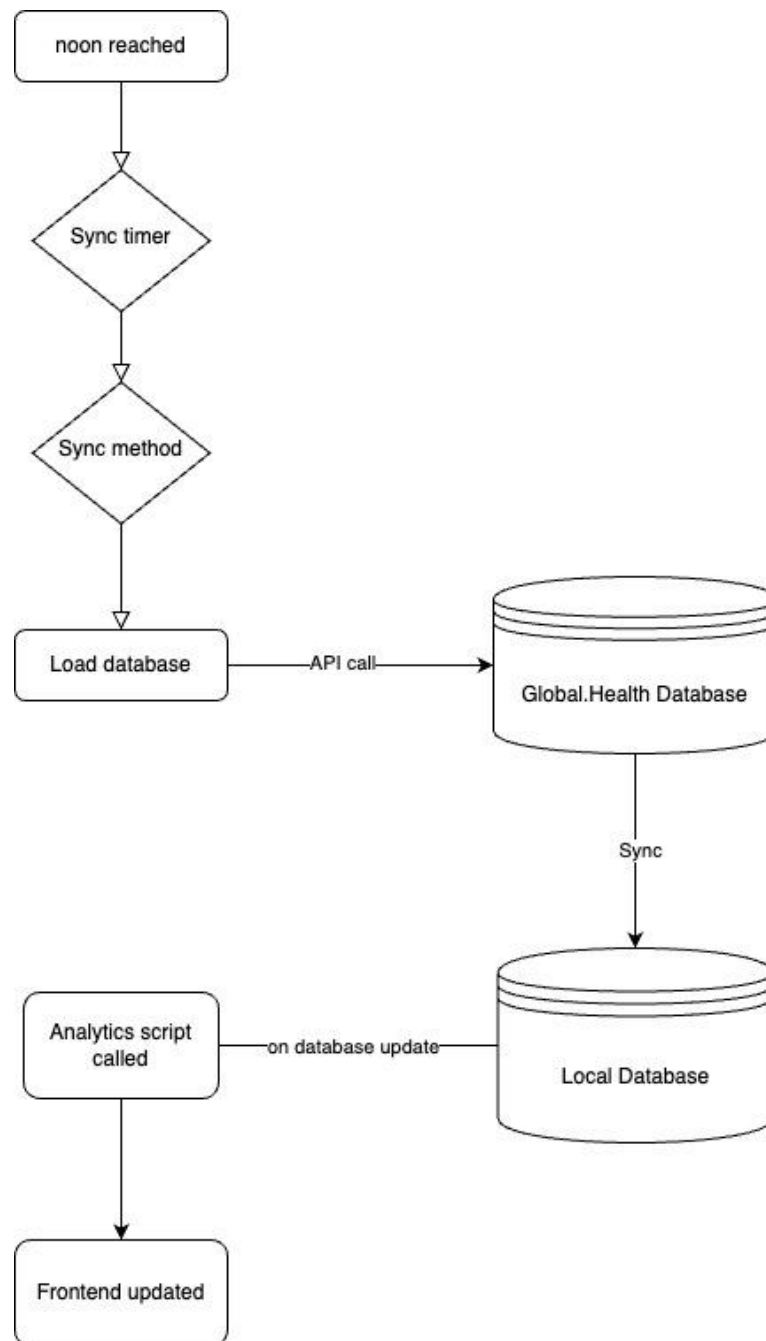
Database: used the global.health dataset for state level covid cases and the United States as a whole

6.2 Analysis Models

6.2.1 Frontend Design



6.2.2 Backend Design



6.3 Issues Raised

1. The Global.Health dataset is not cleanly formatted, making it difficult to take data directly from the source. A custom analytics script will be built to address this.

2. In the event that Global.Health stops updating their database because Monkeypox is not deemed enough of a concern, a local copy of the data will be stored to ensure website functionality.
3. Because of the significantly lower death rate of Monkeypox compared to COVID-19, there is significantly less time being spent on documenting statistics related to the disease. Therefore, there are fewer features to address it.

6.4 Inspection Report

6.4.1 Inspection Log

FH = Felix Huang, SD = Saketh Dendi, SK = Sakin Kirti

Date	Person	Item
09/17/2022	SK	Wrote vision and scope
09/18/2022	FH, SD	Inspected vision and scope and added comments where necessary
	SK	Wrote other nonfunctional requirements section
	SD	Wrote system features and started appendix (glossary and analysis models)
	FH	Wrote overall description and external interface requirements
09/19/2022	SK, FH, SD	Inspected the entire report for cohesiveness and flow and made comments for the respective author to fix
	SK, FH, SD	Inspected the report for correctness, loopholes, and issues for the author to fix
	FH	Built UI mockups for section 3.1 to create a visual image for reader
09/20/2022	SK, FH, SD	The group met in person to discuss final thoughts, write the "Issues Raised" section and create backend chart
	SK	Wrote inspection log
	FH, SD	Reviewed inspection log to ensure accuracy

6.4.2 Work Breakdown

Each member contributed to the software requirements specifications fairly equally with Felix doing 35% of the work, Saketh doing 35% of the work, and Sakin performing the remaining 30% of the work. Please refer to the Inspection Log for a detailed breakdown of work.