APOPO Shiny App User Guide

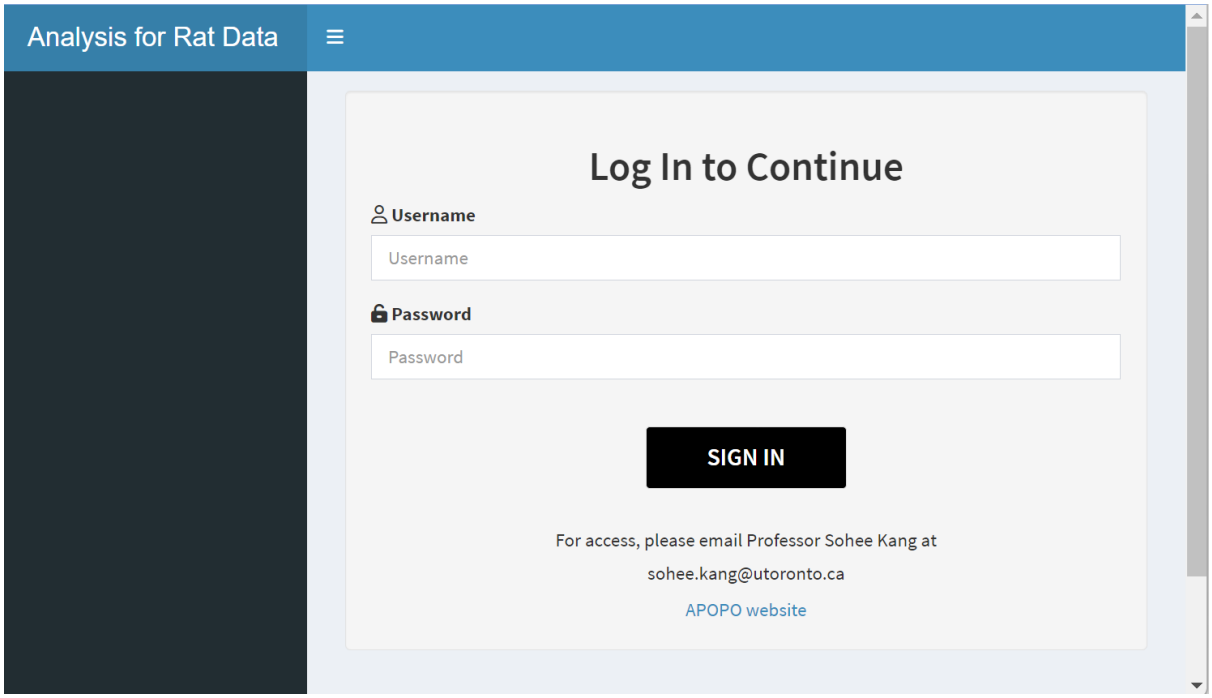
1. Introduction

This Shiny app has been developed to support APOPO lab's data analysis process. APOPO lab specializes in training rats to diagnose tuberculosis (referred to as TB in the following text).

2. Accessing the App

2.1. Log in system

In the initial user interface (UI) of this app, you will encounter the login page. Access to the app's functionalities is restricted and requires a specific Username and Password. We have not implemented a sign-up system to ensure that only authorized individuals can use the app. If you do not have access to the app and need it, please contact Professor Sohee Kang at sohee.kang@utoronto.ca for further assistance and information.



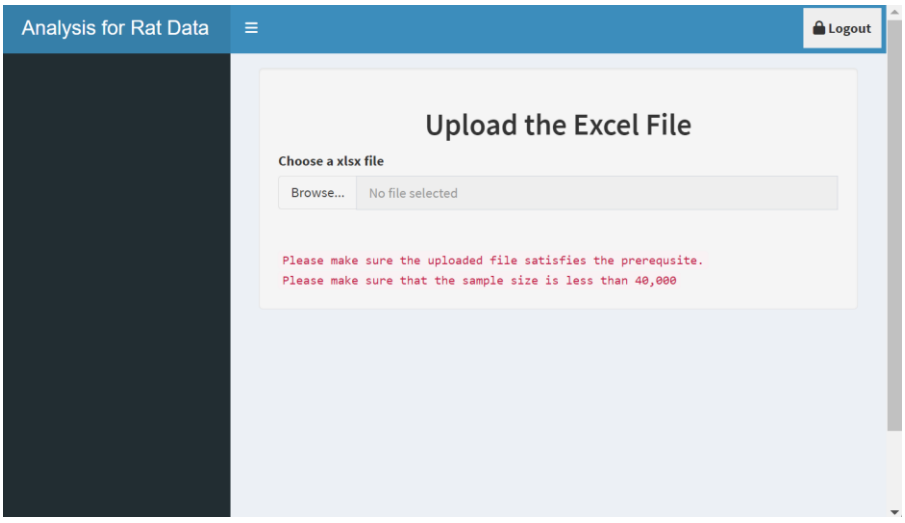
2.2. File Upload

Once you log in, it will be directed to the file upload section. It is crucial to know that for the tool to work correctly, the file format should match the one we have been previously using. This consistency ensures our app can accurately interpret and process the data. For reference, this is what the acceptable format looks like.

SESSION_DATE	PROGRAM	ID_EVALUATION_SESSION	ID_SAMPLE	RUN	HOLE	TotalRat	RatHit	STATUS_BLINDPOS	ID_PATIENT	POT_NUMBER	DOTS_NAME	DATE_INCOMING	ID_BL_DOTS	ID_GXP_DOTS	ID_BL_APOPO	ID_GXP_APOPO	ID_STORAGE	REUSED
2022/9/15	DAR	14343	826994	H	10	5	0	FALSE	412869	2	Crugambwa	2022/9/15	1				62	1
2022/9/15	DAR	14344	827022	A	1	5	2	FALSE	412886	1	Mnazi mmoja	2022/9/15	1		1		9	1
2022/9/15	DAR	14344	827023	A	2	5	0	FALSE	412886	2	Mnazi mmoja	2022/9/15	1				9	1
2022/9/15	DAR	14344	827013	A	3	5	0	FALSE	412880	1	Mnazi mmoja	2022/9/15	1				9	1
2022/9/15	DAR	14344	827018	A	4	5	3	FALSE	412883	1	Mnazi mmoja	2022/9/15	1		6		9	1
2022/9/15	DAR	14344	826772	A	5	5	2	FALSE	412704	1	Ilala IDC	2022/9/14	1		1		8	2
2022/9/15	DAR	14344	827015	A	6	5	2	TRUE	412881	2	Mnazi mmoja	2022/9/15	12		12		9	1
2022/9/15	DAR	14344	827027	A	7	5	0	FALSE	412888	2	Mnazi mmoja	2022/9/15	1				9	1
2022/9/15	DAR	14344	827001	A	8	5	1	FALSE	412874	1	Kiwalani	2022/9/15	1		1		28	1
2022/9/15	DAR	14344	827026	A	9	5	0	FALSE	412888	1	Mnazi mmoja	2022/9/15	1				9	1
2022/9/15	DAR	14344	827012	A	10	5	1	FALSE	412879	2	Mnazi mmoja	2022/9/15	1		1		9	1
2022/9/15	DAR	14344	827003	B	1	5	2	FALSE	412875	1	Kiwalani	2022/9/15	1		1		28	1
2022/9/15	DAR	14344	827024	B	2	5	0	FALSE	412887	1	Mnazi mmoja	2022/9/15	1				9	1
2022/9/15	DAR	14344	827019	B	3	5	1	FALSE	412884	1	Mnazi mmoja	2022/9/15	1		1		9	1
2022/9/15	DAR	14344	826912	B	4	5	4	FALSE	412804	1	Mwananyamala	2022/9/15	1	1	1		1	1
2022/9/15	DAR	14344	827004	B	5	5	0	FALSE	412875	2	Kiwalani	2022/9/15	1				28	1
2022/9/15	DAR	14344	827002	B	6	5	0	FALSE	412874	2	Kiwalani	2022/9/15	1				28	1
2022/9/15	DAR	14344	827014	B	7	5	0	FALSE	412881	1	Mnazi mmoja	2022/9/15	15		12		9	1
2022/9/15	DAR	14344	826884	B	8	5	0	FALSE	412781	1	Buguruni	2022/9/15	1	1			10	1
2022/9/15	DAR	14344	827025	B	9	5	1	FALSE	412887	2	Mnazi mmoja	2022/9/15	1		1		9	1
2022/9/15	DAR	14344	827011	B	10	5	0	FALSE	412879	1	Mnazi mmoja	2022/9/15	1				9	1
2022/9/15	MORO	21599	651652	A	1	9	4	FALSE	300341	1	Sabasaba 2	2022/9/14	1		1		16	1
2022/9/15	MORO	21599	651436	A	2	9	1	FALSE	300158	1	Mwananyamala	2022/9/8	1		8		1	1
2022/9/15	MORO	21599	651322	A	3	9	4	FALSE	300063	1	Kigamboni	2022/9/8	1		9		1067	1
2022/9/15	MORO	21599	651622	A	4	9	5	FALSE	300321	1	Morogoro	2022/9/14	1	1	1		6	1
2022/9/15	MORO	21599	651632	A	5	9	1	FALSE	300330	1	Mzinga	2022/9/14	13		13		23	1
2022/9/15	MORO	21599	651616	A	6	9	1	FALSE	300315	1	Morogoro	2022/9/14	1	1	11		6	1
2022/9/15	MORO	21599	651320	A	7	9	2	FALSE	300061	1	Kigamboni	2022/9/8	1		1		1067	1
2022/9/15	MORO	21599	651623	A	8	9	0	FALSE	300322	1	Morogoro	2022/9/14	1	1			6	1
2022/9/15	MORO	21599	651324	A	9	9	3	FALSE	300065	1	Kimara	2022/9/8	1		1		1066	1
2022/9/15	MORO	21599	651316	A	10	9	3	FALSE	300057	1	Kigamboni	2022/9/8	1		1		1067	1
2022/9/15	MORO	21599	651615	B	1	9	0	FALSE	300314	1	Morogoro	2022/9/14	1	1			6	1

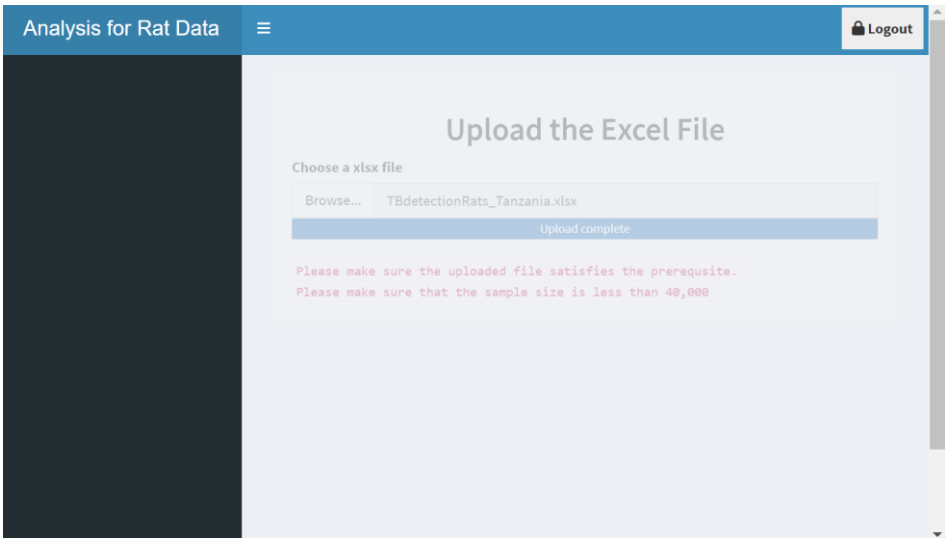
(excel format)

By following this format, we ensure that the app can effectively read and analyze data. Our approach is straightforward: we acknowledge that data may expand, and new data may be added. By using the same format, we ensure that as long as the format remains consistent, you can analyze data for similarities without any additional setup.



(Upload UI interface)

With the correct format for the uploaded file, the app will initiate the data analysis process. It may temporarily appear as grey for a brief period, primarily because of our extensive dataset.



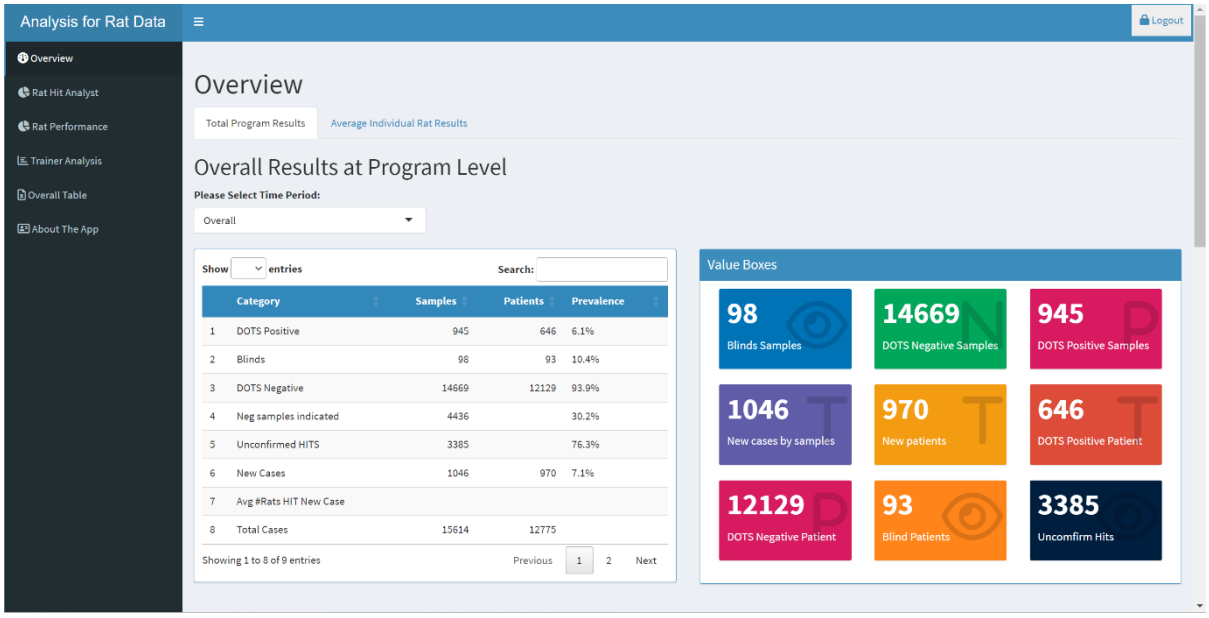
3. Main Features

We summarize our findings on given Apopo datasets into different features for demonstration. Users can easily track their interest aspects through titles and we will go through their functionalities on this guide.

3.1. Overview

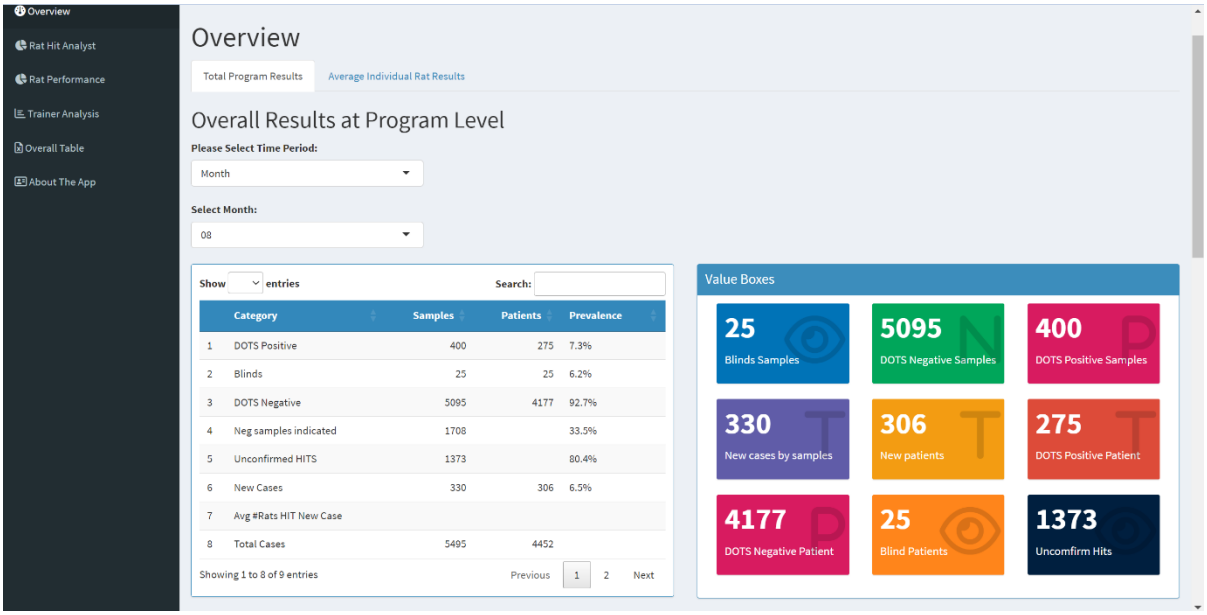
3.1.1. Tab: Total Program Results

Once the data is loaded and the analysis is complete, you will be directed to the Overview page. This interface offers straightforward functionality and provides detailed insights into essential initial data for our



study. Additionally, we've incorporated brightly colored squares to draw the your attention and highlight the specific data we want to emphasize.

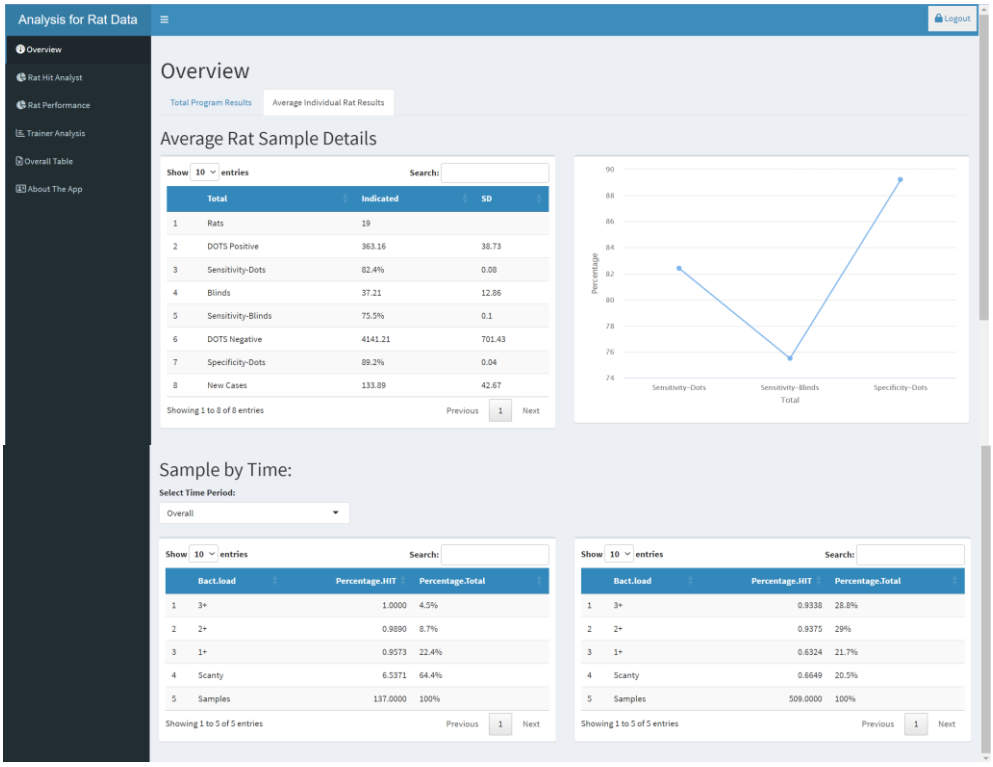
What's more, for further specification of the study, we separate our dataset into different time periods. We cut them into days, weeks and months and you can choose the specific time periods for comparison.



As you scroll down the page, you will come across two tables and a corresponding bar chart, each related to the accounting of DOTS and New Cases. These factors are of utmost importance in influencing our research and require further in-depth analysis. Therefore, we have singled out these two factors for detailed examination. Additionally, we have incorporated a time period selection functionality to enhance your analytical capabilities.

3.1.2. Tab: Average Individual Rat Results

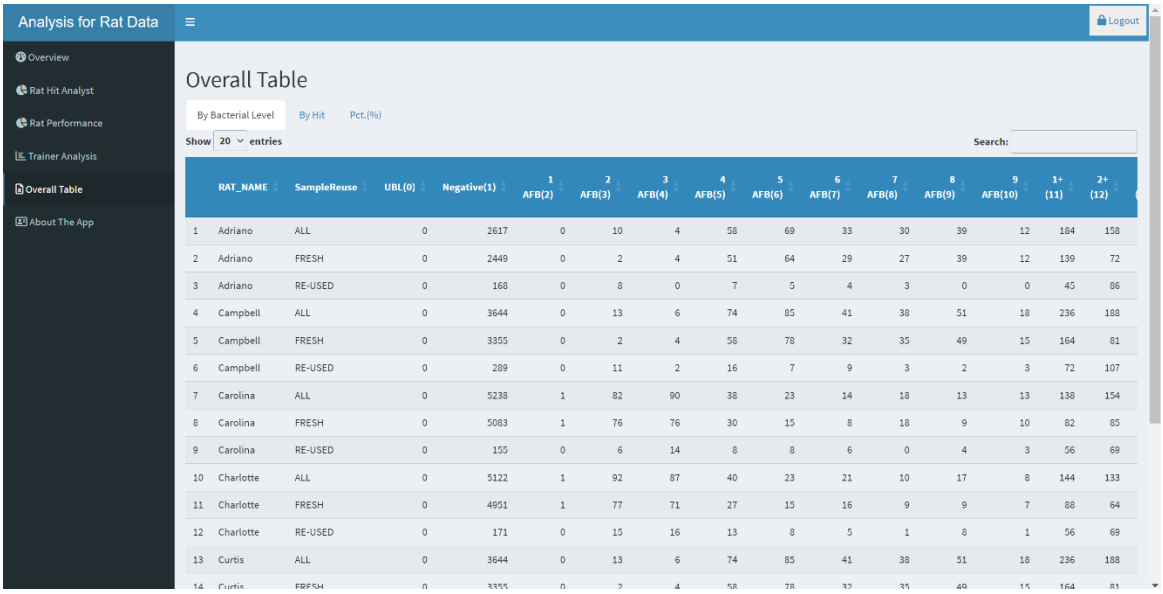
If you are looking for an average data, then please click the tab “Average Individual Rat Results” and check the data. Please note that we also provide a line chart for data visualization and search function for rapid targeting wanted data.



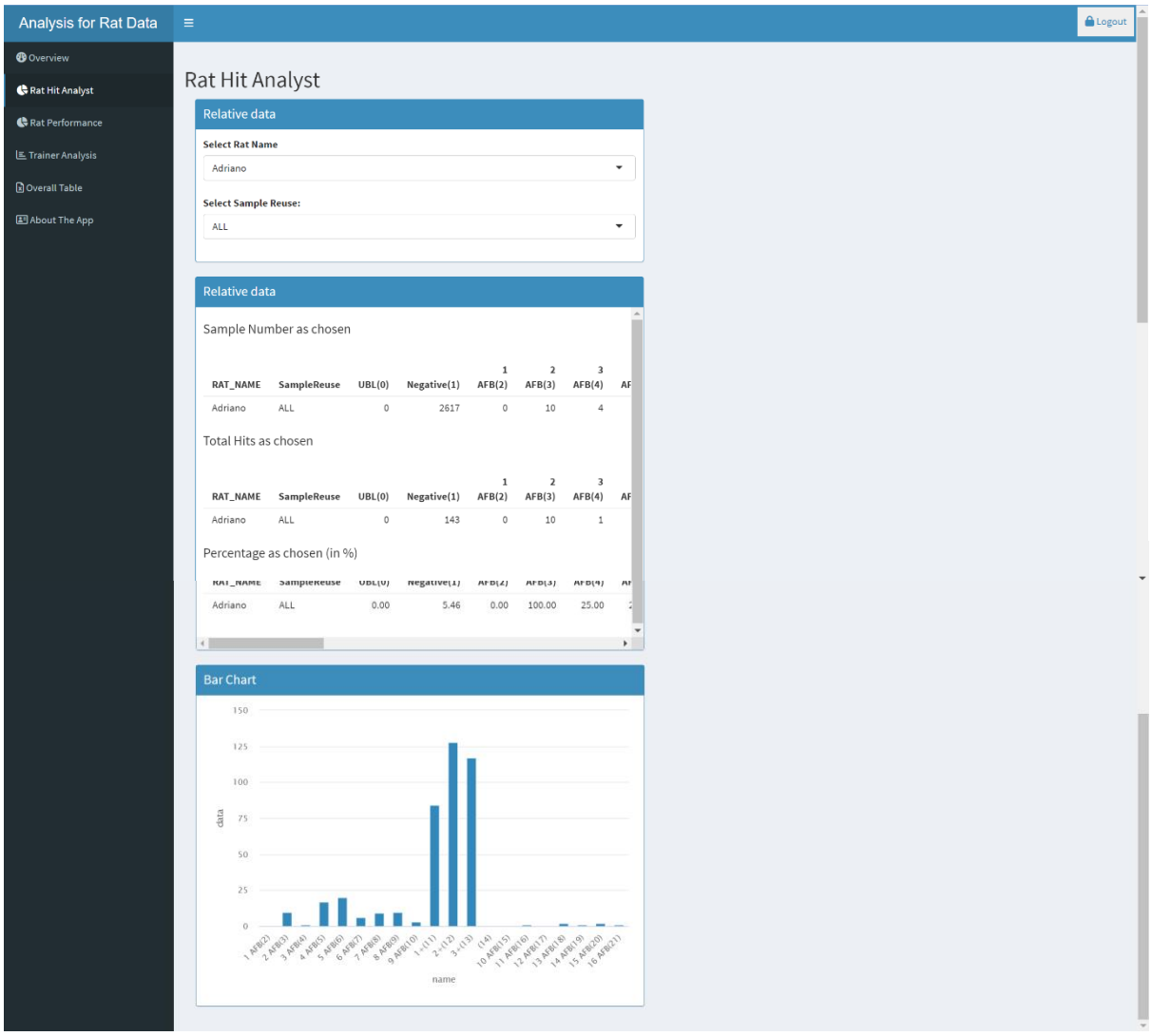
3.2. Rat Hit Analyst & Overall Table

If you are interested in if rats hit(identify) the TB samples or not, you can check Rat Hit Analyst & Overall Table where Overall Table contains quantities of all samples of different bacterial loads encountered by each rat. Moreover, Sample Reuse refers to if this sample is the first time use or not, it will affect rat to cheat on this sample so we need to list clarify them out.

Then, “By Hit” tab is amount of times rat hit the sample, and “Pct.(%)” refers to the percentage hit amount divided by total amount.



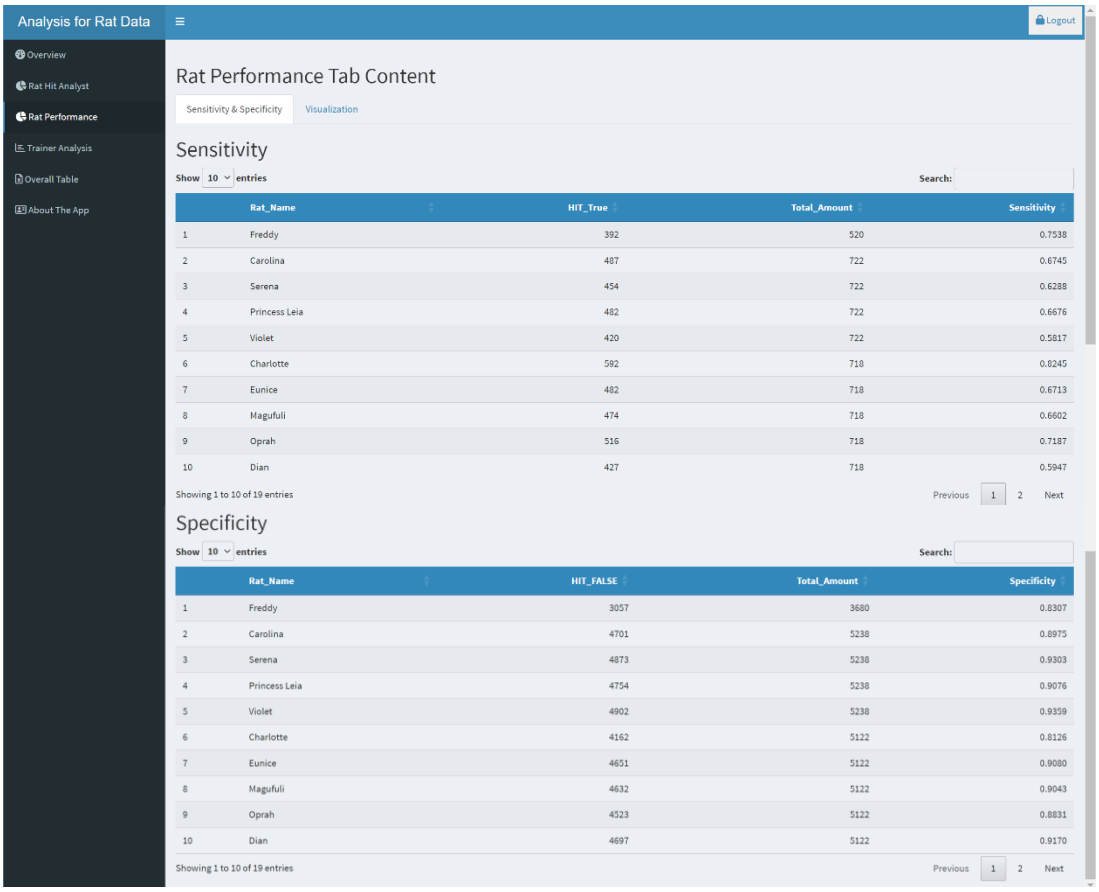
Then for “Rat Hit Analyst”, it provided select box that you can choose the specific rat and sample reuse condition. After selection, the Relative Data box will list the chosen rat’s data and visualized the data as bar chart for clear understanding.



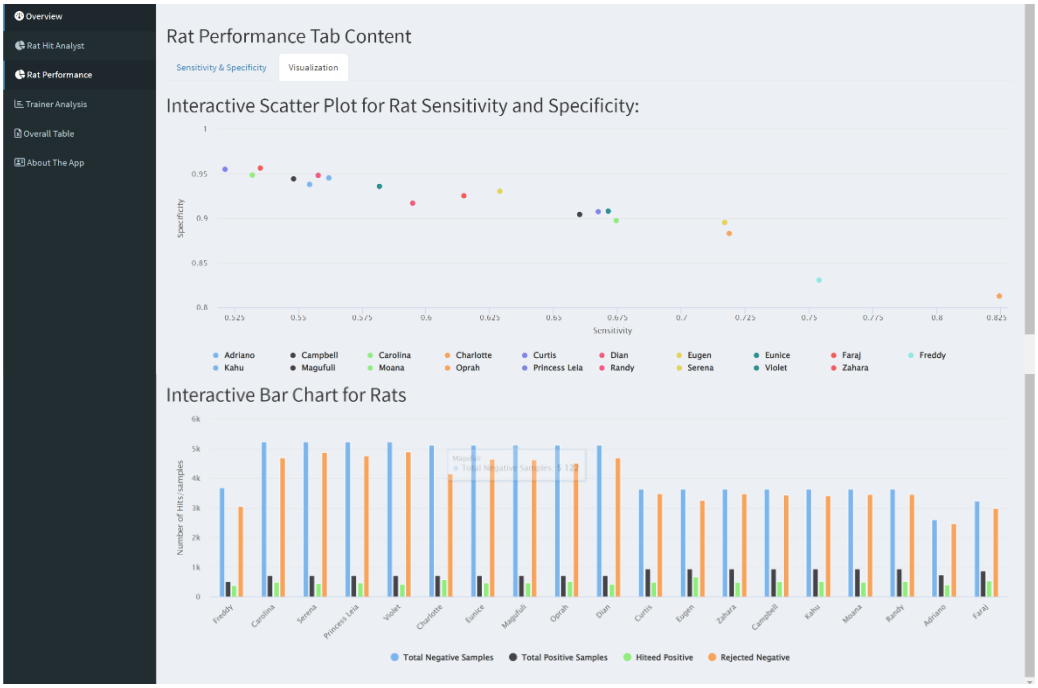
3.3. Rat Performance

If you want to figure out how each rat performance as sensitivity and specificity, you can directly go to tab “Rat Performance”.

In this tab, it contains each rat’s sensitivity and specificity for research purpose.



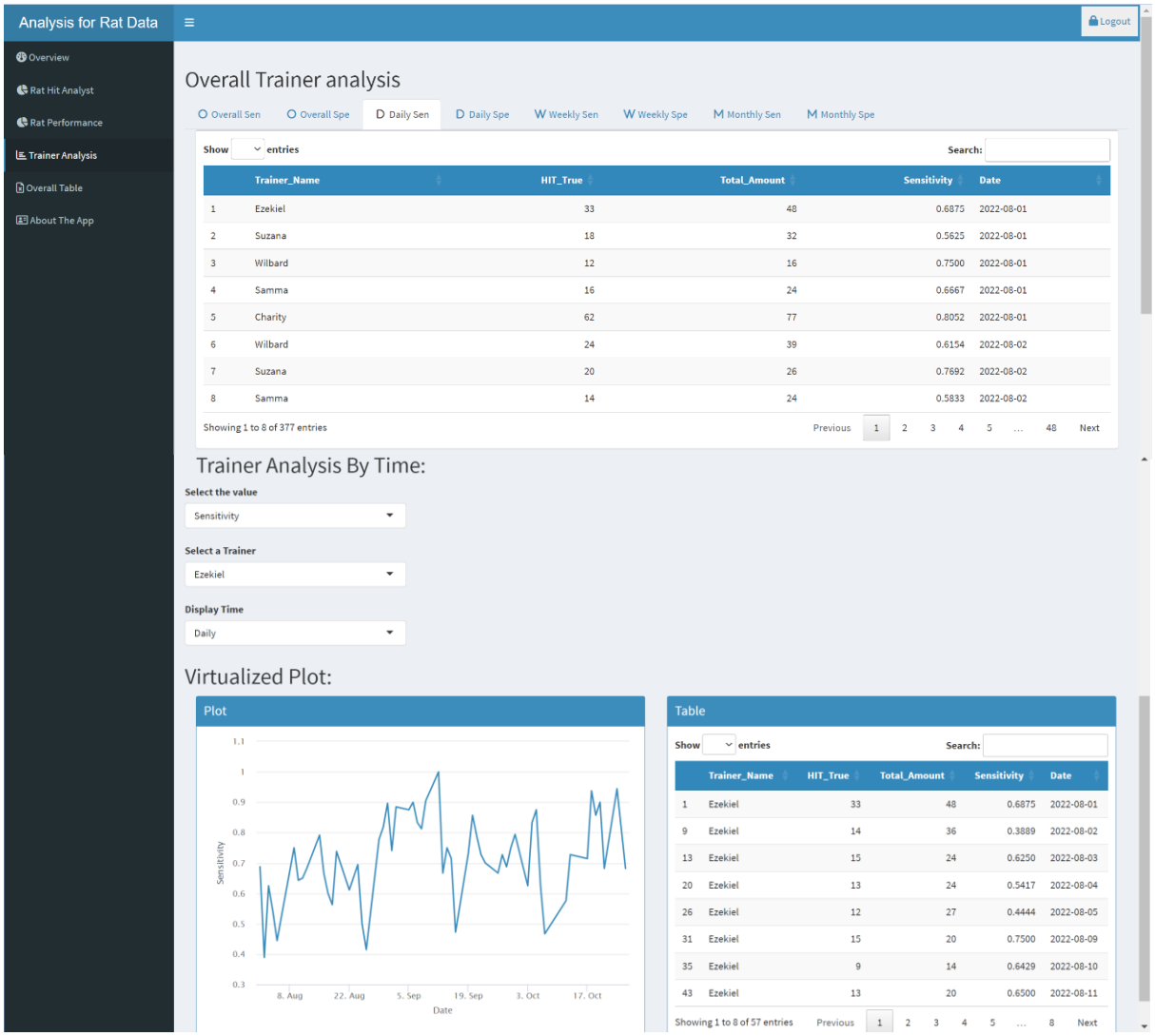
In “Visualization”, we provided visualized data. What’s important, they are interactive graph that if you don’t like any of the variables (e.g., Adriano, Cambell, etc.) in two graphs, you can delete them from graph by simply click on the variable’s name, and add them back by one more click.



3.4. Trainer Analysis

“Trainer Analysis” refers to the analysis for rat’s data that controlling Trainer as an independent variable. For data display, we provided another category other than choose Time UI and Trainer UI. Users can have more direct feeling when looking at table data.

Also, for easier reading the data, we created line plots after choose Trainer’s name and Time slots.



3.5. About the App

The final part it about the development of the R shiny App. We have documented websites that were helpful to us on this platform, and we'd like to express our gratitude to them for their assistance. Users interested in this can visit these websites to access specific information.

Login Page (https://www.listendata.com/2019/06/how-to-add-login-page-in-shiny-r.html#comment-form)

Dashboard structure(https://rstudio.github.io/shinydashboard/)

Highchart Output (https://www.highcharts.com/blog/tutorials/highcharts-for-r-users/)

Datatable Output(https://rstudio.github.io/DT/shiny.html)

Value Box(https://rstudio.github.io/shinydashboard/structure.html)

Additionally, we have provided our email addresses and the supervising professor's. If you have any questions or suggestions, please feel free to email us for further discussion.