

State-Based Plot Coloring

CS 426 Senior Project – Spring 2018
 Haoxuan Lin, Myeongwan Beom, Zachary Young
 Instructors: Dr. Sergiu Dascalu,
 Prof. Devrin Lee
 External Advisor: Mr. Eric Gilchrist



Abstract

State-based Plot Coloring is a software designed to help users monitor the condition of their machines. It allows the users to see the condition of their machines in four different states which are the rolling state, the startup state, the running state, and the shutdown state with different colors. It makes this project useful because it offers the users convenient ways of observing the condition of their machines in four different states.

Goal

The software reads machine data and plots the data with 4 different states using colors to distinguish the states which are shown in Figure 1 and Figure 2. The 4 different states are rolling state, startup state, running state, and shutdown state. The software can virtually display the overlapping state in the Trend Plots, Cascade Plots, and Bode Plots. The user can change colors of the overlapping states. Also, the user can select single or multiple machines to only see the corresponding machine data. For example, in Figure 3 there is only a single polyline because the user selected a single machine to observe its data.

Feature

The software reads machine data and plots the data with 4 different states using colors to distinguish the states (Figure 1). The 4 different states are rolling state, startup state, running state, and shutdown state (Figure 2). The software can virtually display the overlapping state in the Trend Plots, Cascade Plots, and Bode Plots. The user can change colors of the overlapping states. Also, the user can select single or multiple machines to only see the corresponding machine data. For example, there is only a single polyline because the user selected a single machine to only observe the data in Figure 3.

User Interface

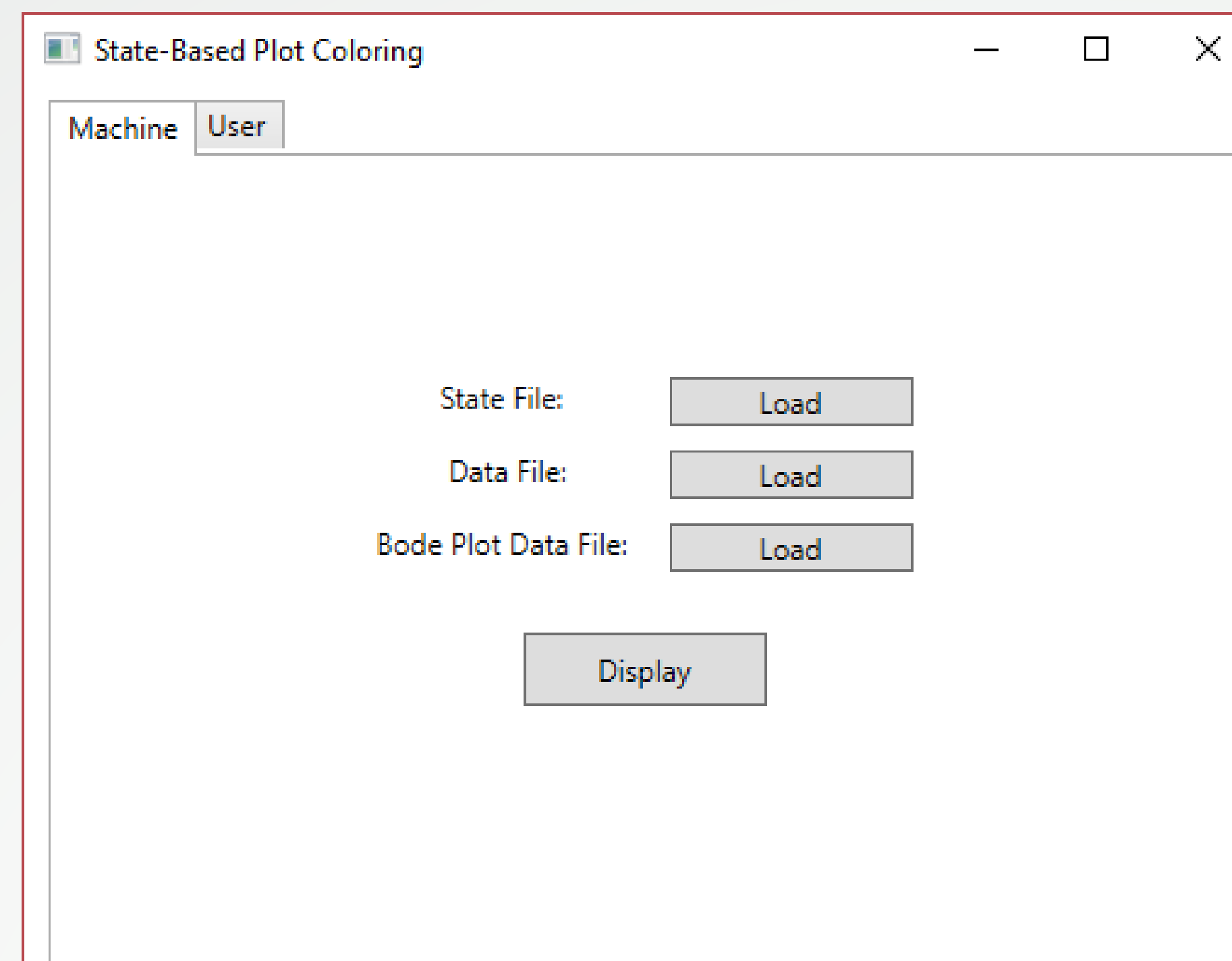


Figure 1. Machine Mode

A user loads the state file, the data file, and the bode plot data file. After loading all files, the user can display the Trend Plot, the Cascade Plot, and the Bode Plot by clicking the “Display” button.

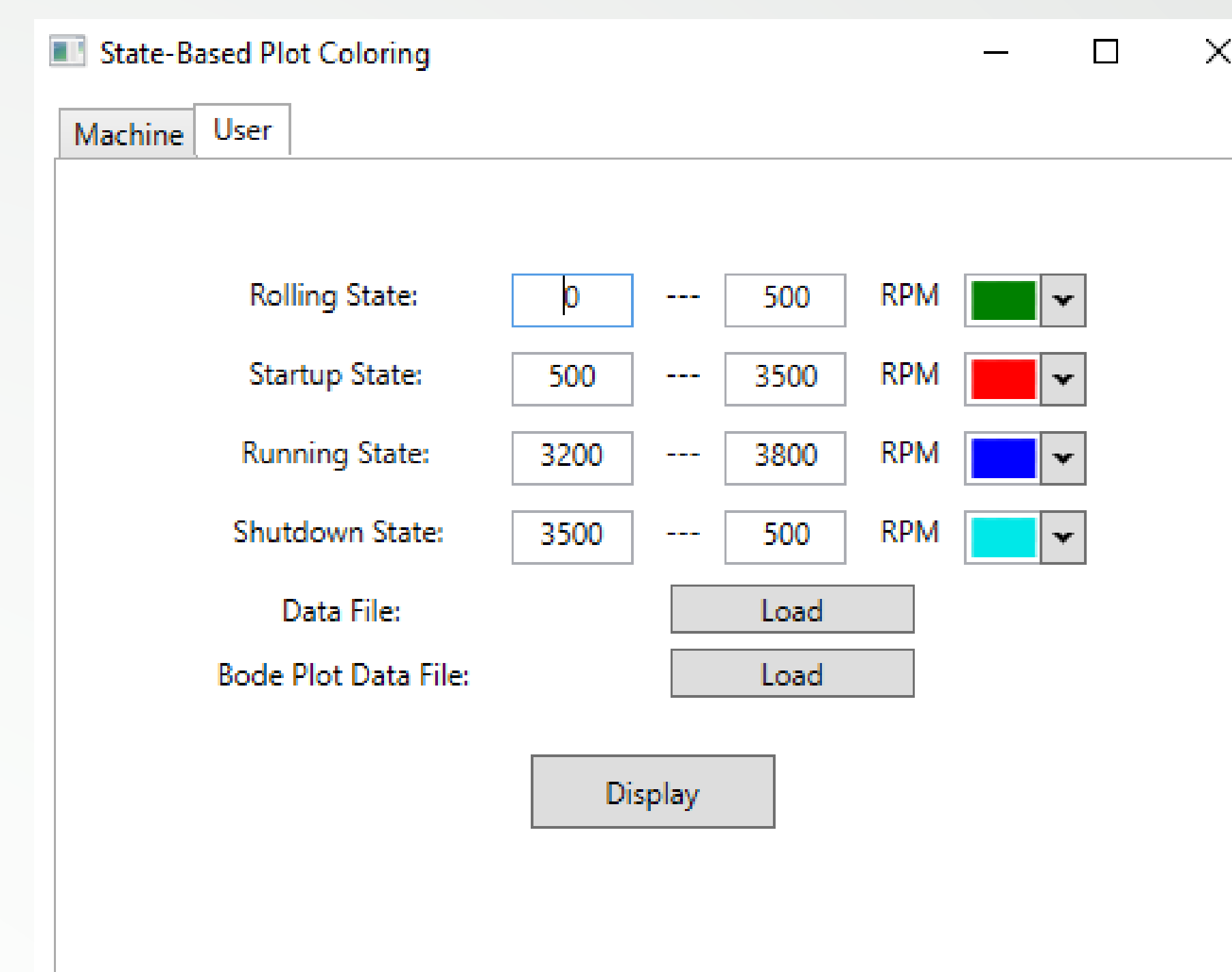


Figure 2. User Mode

A user can define and set the color of each state instead of loading the state file.

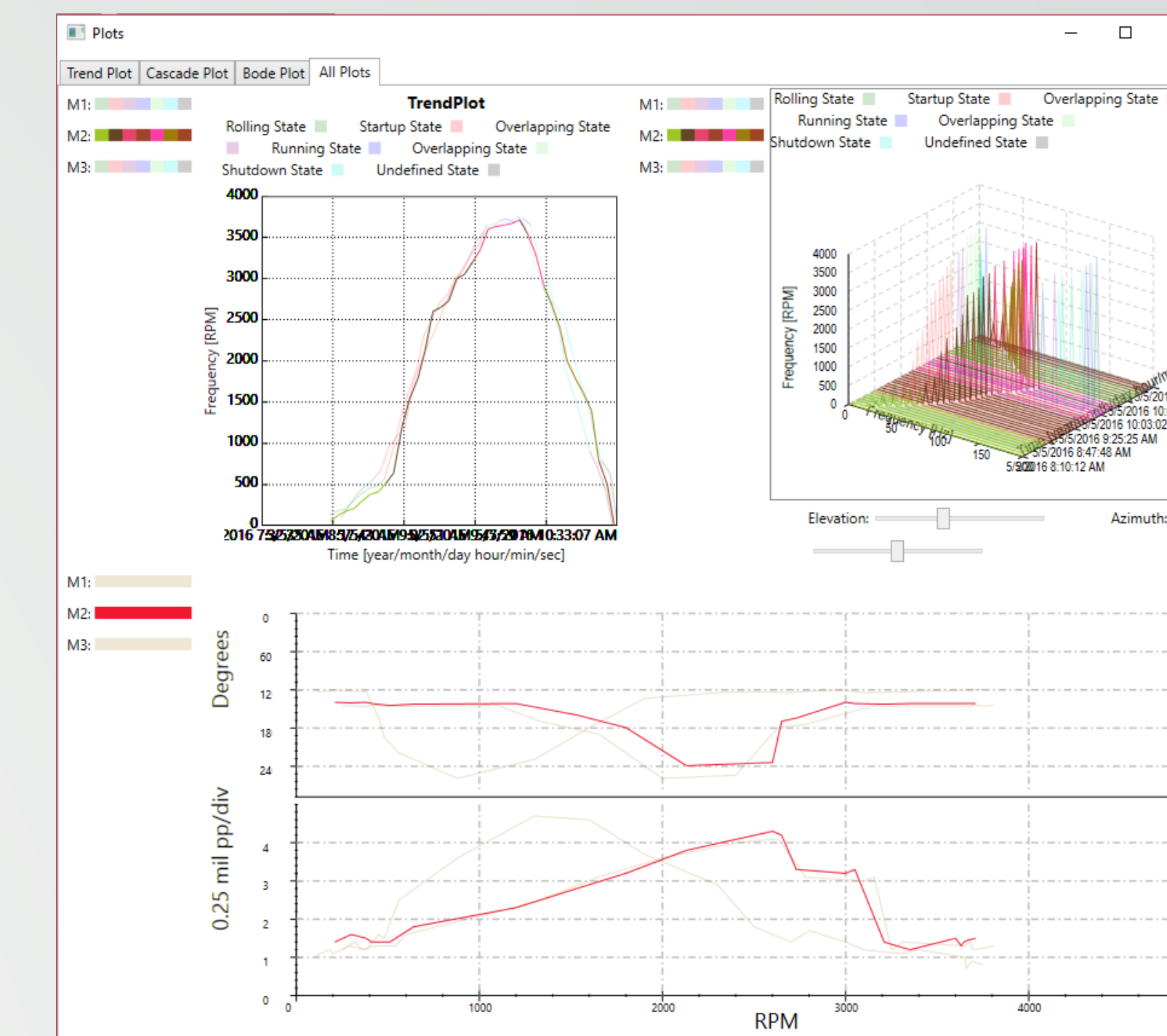


Figure 3. All Plots View

The user selects one of the three plots or all plots view to see the data of machines. Also, the user can select a specific machine to view rather than viewing all machines.

Architecture

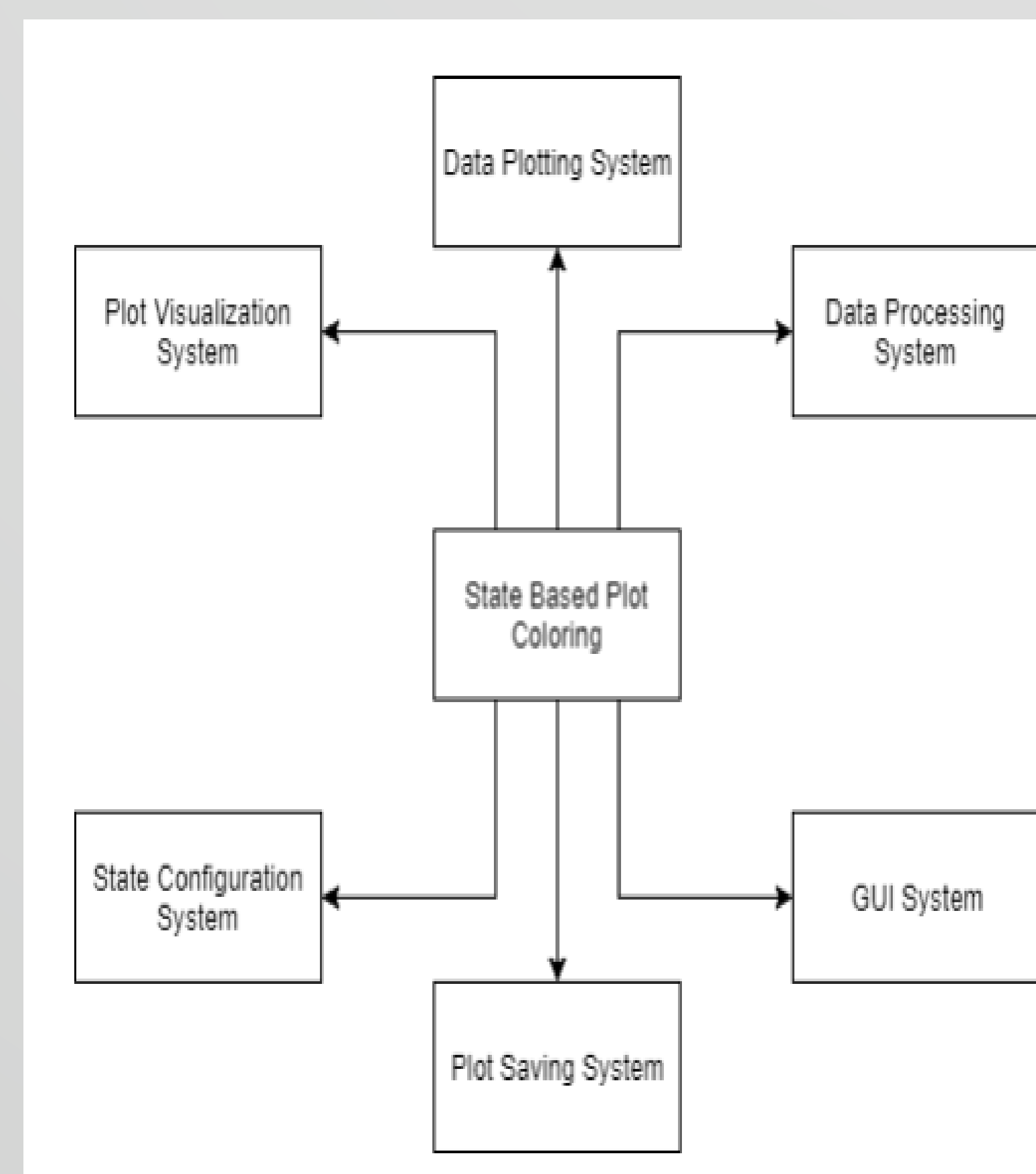


Figure 4. The context model of the State Based Plot Coloring system

Figure 4 shows a high-level design of the system. The plot visualization subsystem allows for each of the three plots to be visible on screen in the correct format. The data processing subsystem handles reading in the data and converts the data into values that can be used by the Plot Visualization subsystem. The state configuration subsystem configures the states to be used for the plots by either machine given or user given values and states. The GUI system handles the User Interface that the users interact with.

Future Work

One of the plans is to provide users the ability to change the color of the polylines in the Bode Plot. Other Plans are to display an X mark on the point where the user clicked, to display the plot dynamically rather than reading the statically displaying the data file, and to validate input data whether its format is correct.

Conclusion

The objective of the project is to let the users observe what states their machines are in and check whether their machines have problems. This is done by visualizing the data of the machines using four different states in the Trend Plot, Cascade Plot, and Bode plot.

This Project was developed in Spring 2018 as part of the course CS 426 Senior Project in Computer Science