

State-Based Plot Coloring

CS 426 Senior Project – Spring 2018
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Abstract

State-based Plot Coloring is a software which is designed to help users monitor their condition of machines. It allows users to see their condition of machines into four different states which are a rolling state, a startup state, a running state, and a shutdown state with different colors. It makes this project to be unique because it can offer users convenience way of observation for the condition of their machines in four different states.

Goal

The goal of the software is to create the logic for handling edge cases for General Electric's condition monitoring software. The edge cases are for when a machine is in multiple states at the same time and when multiple machines in the same plot have overlapping data. The software is trying to achieve this for the state-based coloring of data using Trend Plots, Cascade Plots, and Bode Plots. This is needed because it benefits General Electric's condition monitoring software and allows the users of the software to better understand what state their machines are in and if there are problems with the machines.

Feature

The software reads machine data and plots the data with 4 different states using colors to distinguish the states. 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, there is only a single polyline because the user selected a single machine to only observe the data in Figure 3.

User Interface

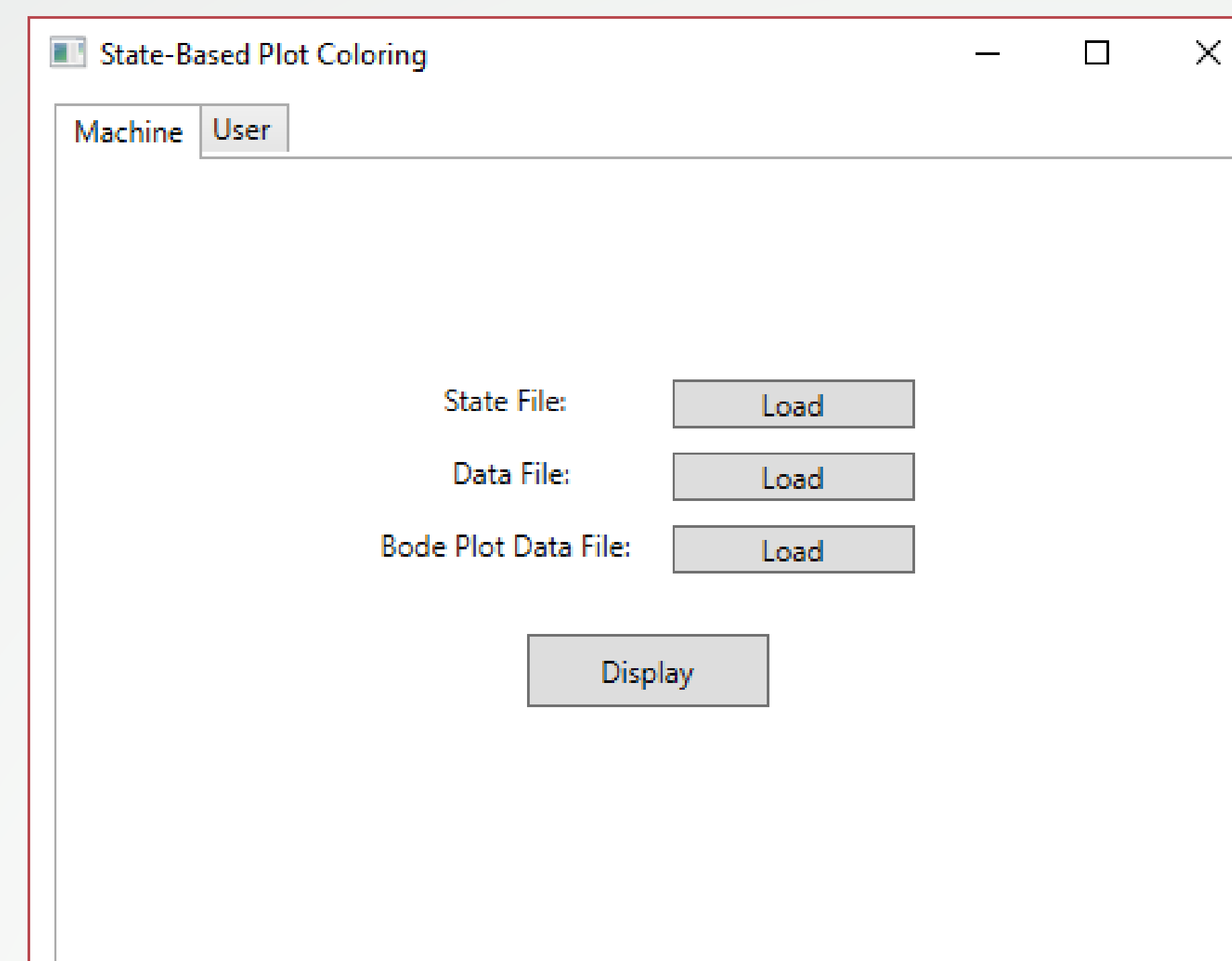


Figure 1. Machine Mode

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.

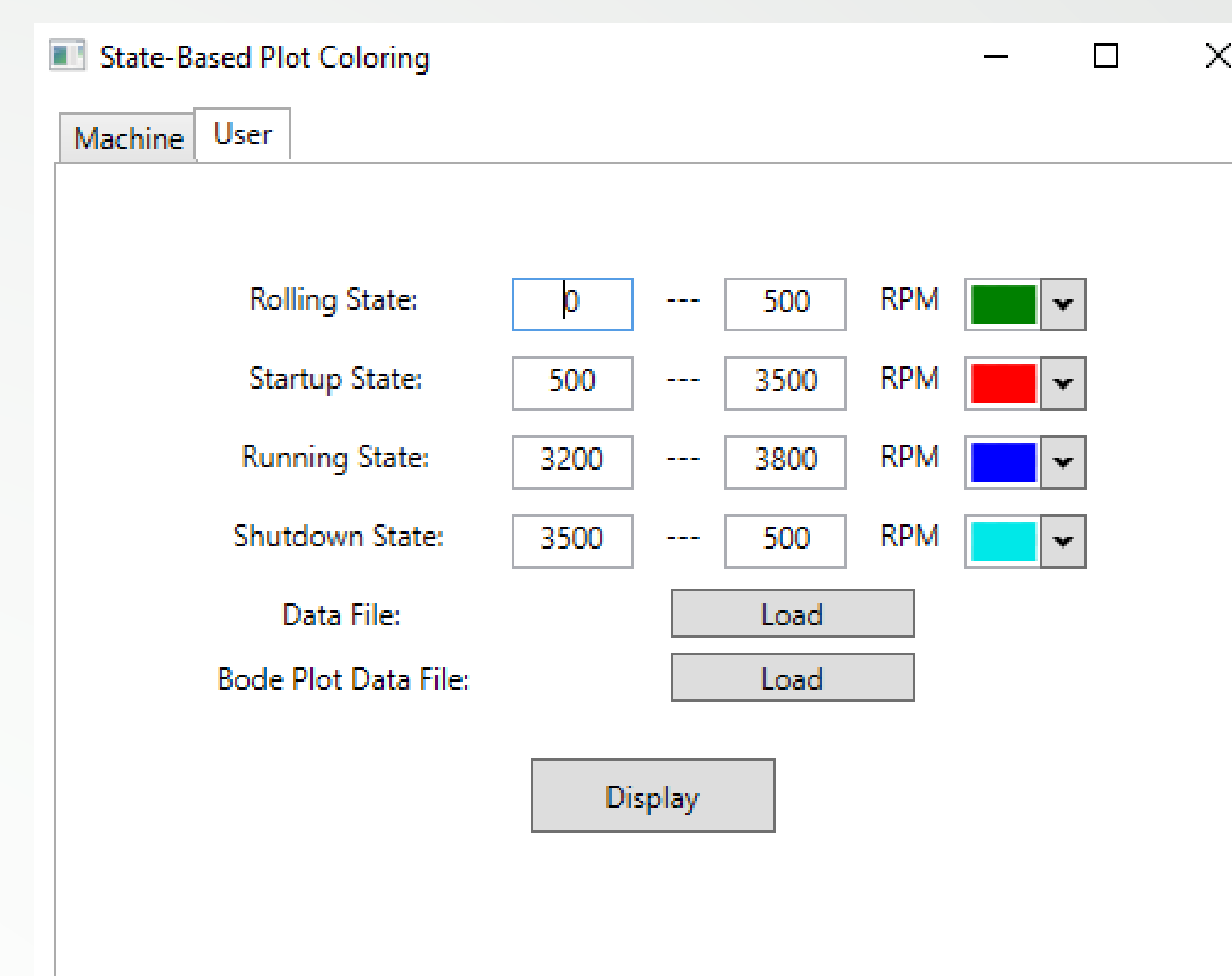


Figure 2. User Mode

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

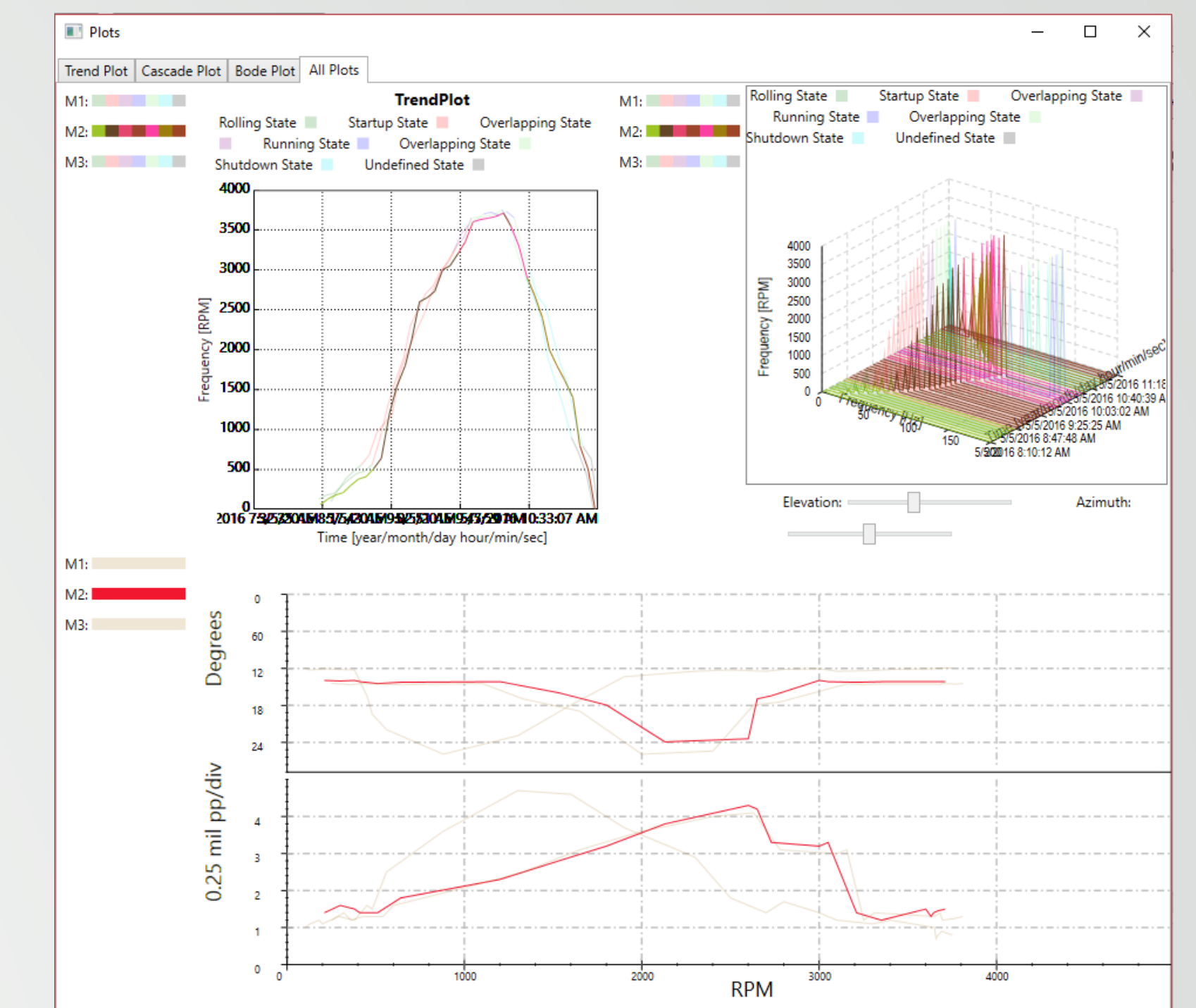


Figure 3. All Plots View

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

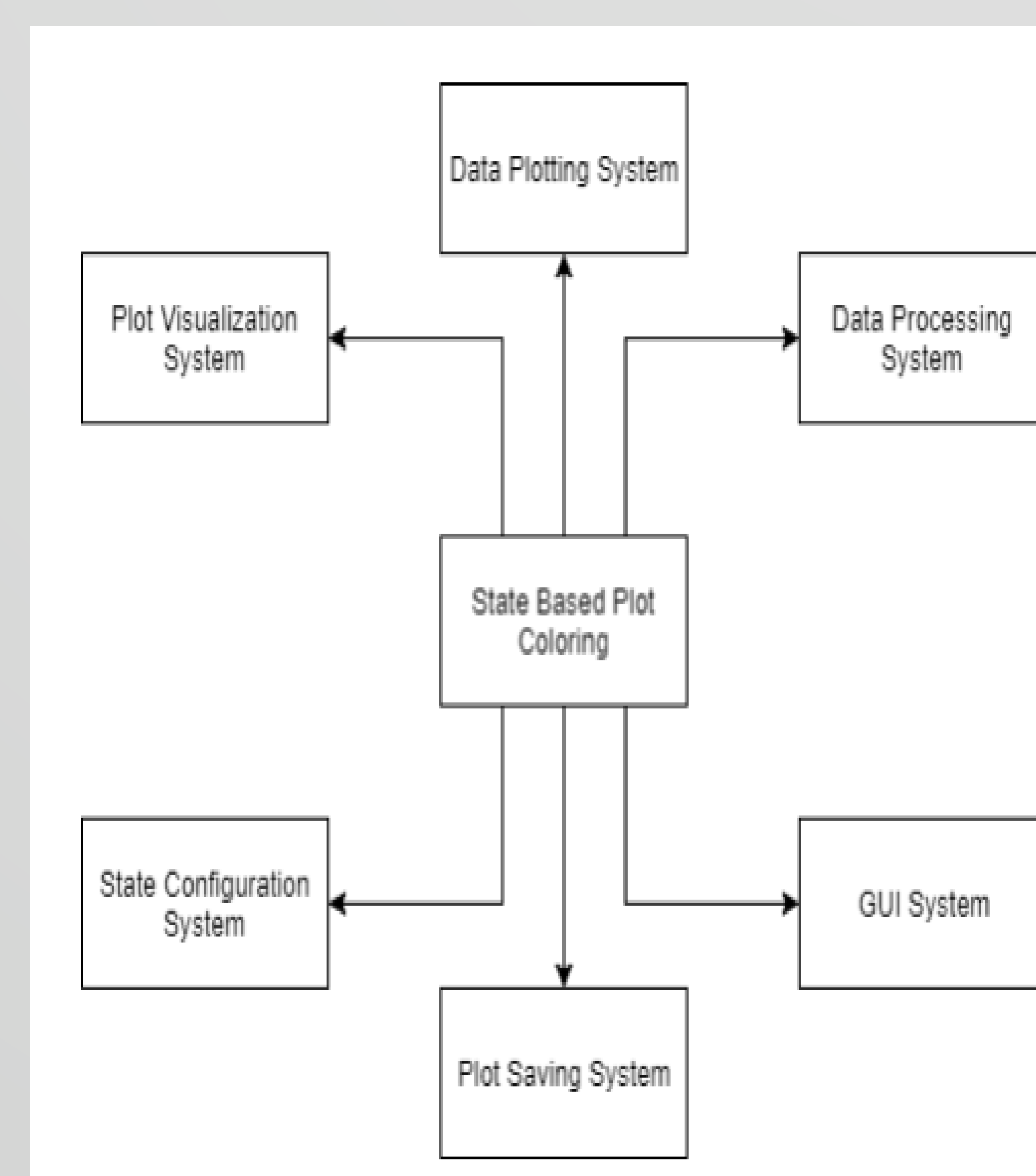


Figure 4. The context model of the State Based Plot Coloring system

The plot visualization subsystem allows for each of the three plots to be visible on screen in the correct format. The data processing subsystem will handle reading in the data and converting the data into values that can be used by the Plot Visualization subsystem. The state configuration subsystem will configure the states to be used for the plots by either machine given or user given values and states. The data plotting subsystem handles plotting the data points to each plot. The GUI system handles the User Interface that the users will be interacting with.

Future Work

One of plans is to provide users to be able to change the color of the polylines in the Bode Plot. Other Plans are to display an X mark on the point that user clicked and to better optimize the screen when resizing the window.

Conclusion

The objective of the project is intended to be designed to let the users be able to observe what states their machines are in and check whether their machines have problems by visualizing the data of machine in the Trend Plot, Cascade Plot and Bode plot with the 4 different states.