Group Name: SD Visualizers

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Project Write-Up

In this project, we explored the mouse activity dataset, and created an interactive line chart that allows the reader to select the male mice and female mice as separate groups or any two mice and see the differences in their activity and temperature levels in selected time periods. We selected this topic because the study that the dataset originated from examined the ovulation cycle of female mice and corresponding temperature increase across a two week span. Therefore, it becomes intuitive to present the pattern of ovulation cycle as a times series. After some exploratory analysis, we found out that including all mice on the same chart will be a total mess since there are a total of 25+ mice, so we decided to display two trend lines at one time to allow better comparison. Since we have both activity and temperature data, and alternative approaches such as PCA reduction to 1D failed to preserve trend, we create a toggle bar to select one of the features to display to avoid truncated axes. Finally, we grouped every mouse data by 20-minute periods and took the average to smoothen the lines. On the visual side, we create shaded regions for daytime and night time, as well as dashed lines to mark the start of an ovulation cycle, and for temperature we zoom in on the y-axis scale. An important thing to note is that viewers may see the time range for each bin on x axis is inconsistent; however, considering the fact that we want the user to zoom smoothly and the fact that time range is a continuous variable, calculating the bin size based on the scale that the user zoom in or zoom out would be really daunting and might disrupt the interaction.

The development process roughly took 15-18 people hours, including the initial EDA and the website development. We first created different static visualizations around our topic of interest, and determined the base of the interactive visualization. Then we build the javascript. And we fixed the style at the very end. The most time consuming part is the javascript interactive function, because we have five toggle bars and four datasets, updating the rendering is very difficult. As for the teamwork, Evelyn handled most of the EDA, and was responsible for style adjustment and functionality such as sliding windows and zooming. Shoutai is responsible for detailed implementation of the dataset grouping and all of the toggle bars' integration. And Kevin coded the template for the final line chart including the dataset compiling and update pipeline, and tested different interactive design choices such as mouse overlay and side by side display as well as data aggregation choices like 2D to 1D reduction using PCA and using rate of change instead of nominal values.