Project Proposal
Math 404
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Overview

The focus of our project is to investigate the sleep patterns of employees with unconventional work schedules. We aim to explore whether we can accurately predict an individual's sleep based on their work schedule and assess if there is a significant change in sleep when there is a shift in their work schedule. Additionally, we plan to investigate whether a more traditional work schedule (e.g., 9-5) has a positive impact on the sleep quality of employees.

Our Data

Our plan for this portfolio project is to analyze time series data about railroad employees that have abnormal work and sleep schedules. [This](#) is the dataset we plan on using, which logs the sleep schedule and work schedule of hundreds of employees over the course of multiple days. We decided on this dataset because of the volume of data, the lack of missing values, and the consistency of each subject in the study. We are hoping to use the information to answer/address the following questions (subject to change based on future findings and lectures):

1. Can we accurately predict a person's sleep based on their work schedule?
2. How does their sleep change when their work schedule changes?
3. Is a 9-5 job healthier for a person's sleep?

Metrics and Methods

Since we haven't learned all the tools we could potentially use for the project, we looked ahead in our textbook and investigated the methods that could be useful. One method that we are considering is the mixture of experts, which will help us find a linear correlation. Additionally, we might use a Cluster algorithm to find a correlation between employees. We can also use Hidden Markov Models to account for hidden variables that we can't observe in the study. To predict, we hope to use the skills we gained from last semester's portfolio project to create random forests.

Collaboration

We will collaborate closely, dividing tasks evenly to ensure a balanced workload. We plan to work together in-person and remotely to ensure efficient progress. Regular check-ins will be scheduled to discuss findings, troubleshoot challenges, and refine our approach based on emerging insights.