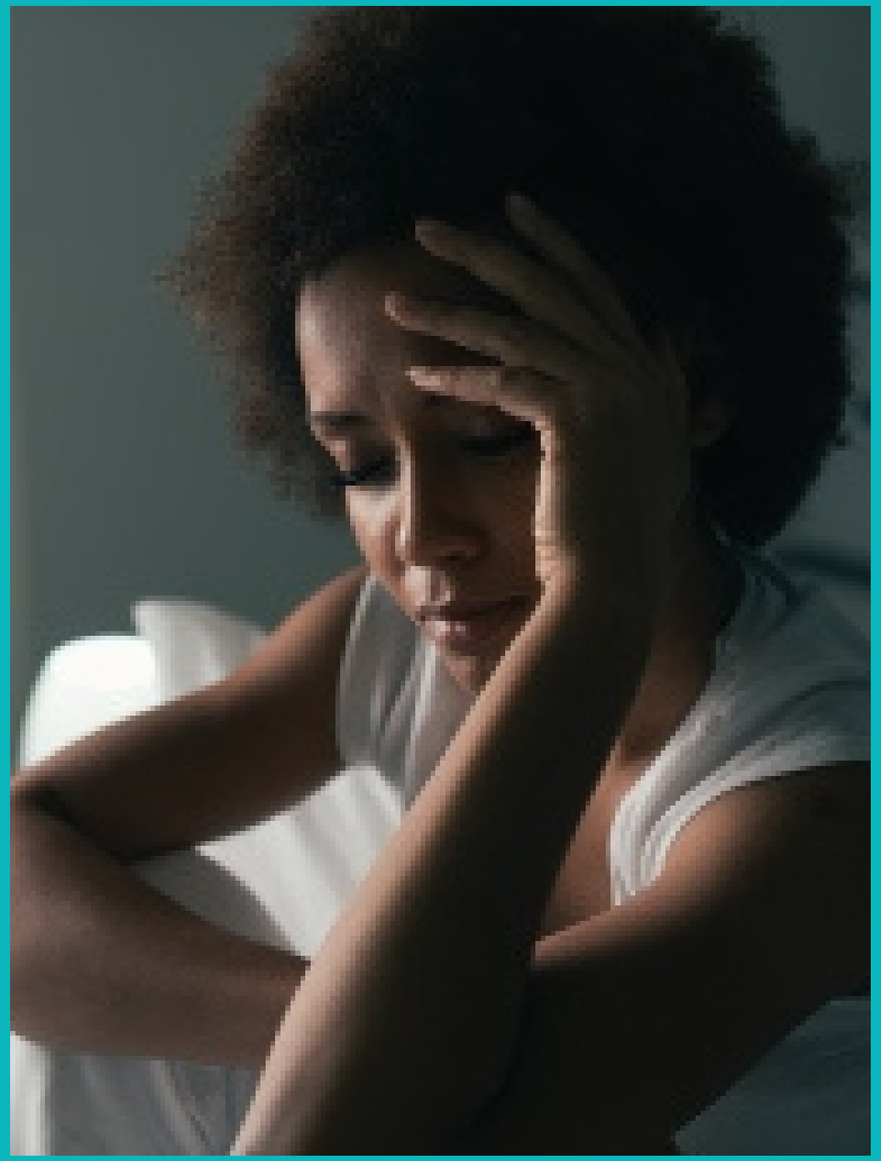
Sleep Disorder Prediction



Problem Statement

According to Alnawwar et al., there is an interest in the use of physical activity as a treatment for sleep disorders (Alnawwar et al., 2023).

An evidence-based data review was conducted to establish the accuracy of the statement.

Solution

To develop a web application that predicts whether a person has a sleep disorder or not.
The sleep disorders include insomnia and sleep apnea.

Toolkit

Classification models:

- Support Vector Machines
- Decision Trees
- Random Forest

Evaluation metrics:

- Precision
- Recall
- F1-Score

Note:

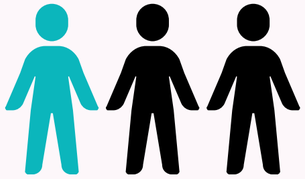
Accuracy was not used due to the imbalanced data on target variable

Predicition App

Sleep Disorder Predicition App

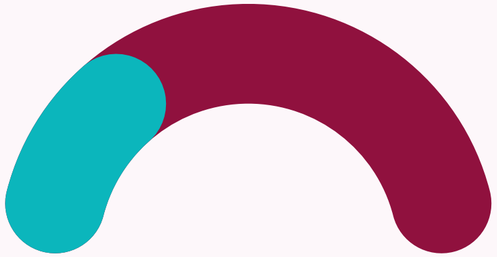
This app allows the user to enter their details on:
Gender, Age, Occupation, Sleep_Duration, Quality_of_Sleep, Physical_Activity_Level, Stress_Level, BMI_Category, Heart_Rate, Daily_Steps, Blood pressure (Systolic_BP, Diastolic)
Upon clicking the predict button, the user is provided with a reponse whether they have a sleep disorder or not.

Statistics



1 in 3 adults

Do not get enough sleep



30% to 40%

Report insomnia symptoms.

50-70 million

Americans experience sleep disorder

Social Impact

This problem was tackled in alignment with SDG 3 (Health).
Lack of enough sleep has been linked to serious health risks such as heart disease, diabetes, obesity, and a reduced lifespan by up to 4.7 years for women and 2.4 years for men.

Conclusion/Observation

- There is a strong correlation between:
  - quality of sleep and sleep duration
  - daily steps and physical activity levels
  - stress level and heart rate

- There is a weak correlation between age and quality of sleep.
- Random Forest performed well, having been evaluated using F1-score, recall, and precision.

References

https://www.cureus.com/articles/178269-the-effect-of-physical-activity-on-sleep-quality-and-sleep-disorder-a-systematic-review.pdf

GitHub Link

https://github.com/chemutai254/Sleep-Disorder-Prediction/blob/main/ML_WEEK_2/sleep_disorder_prediction.ipynb

Thank you!

Nancy Chemutai