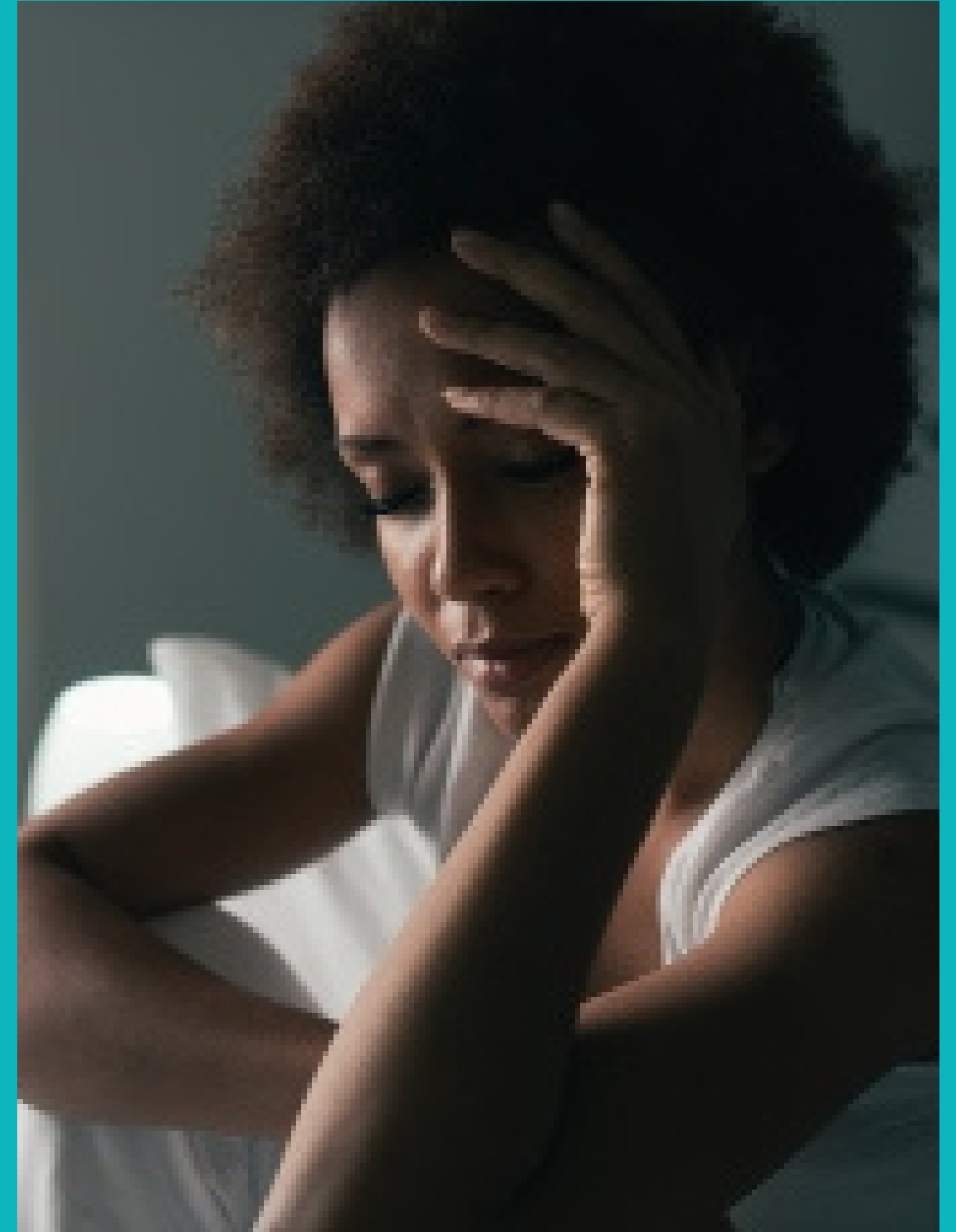


Sleep Disorder Prediction

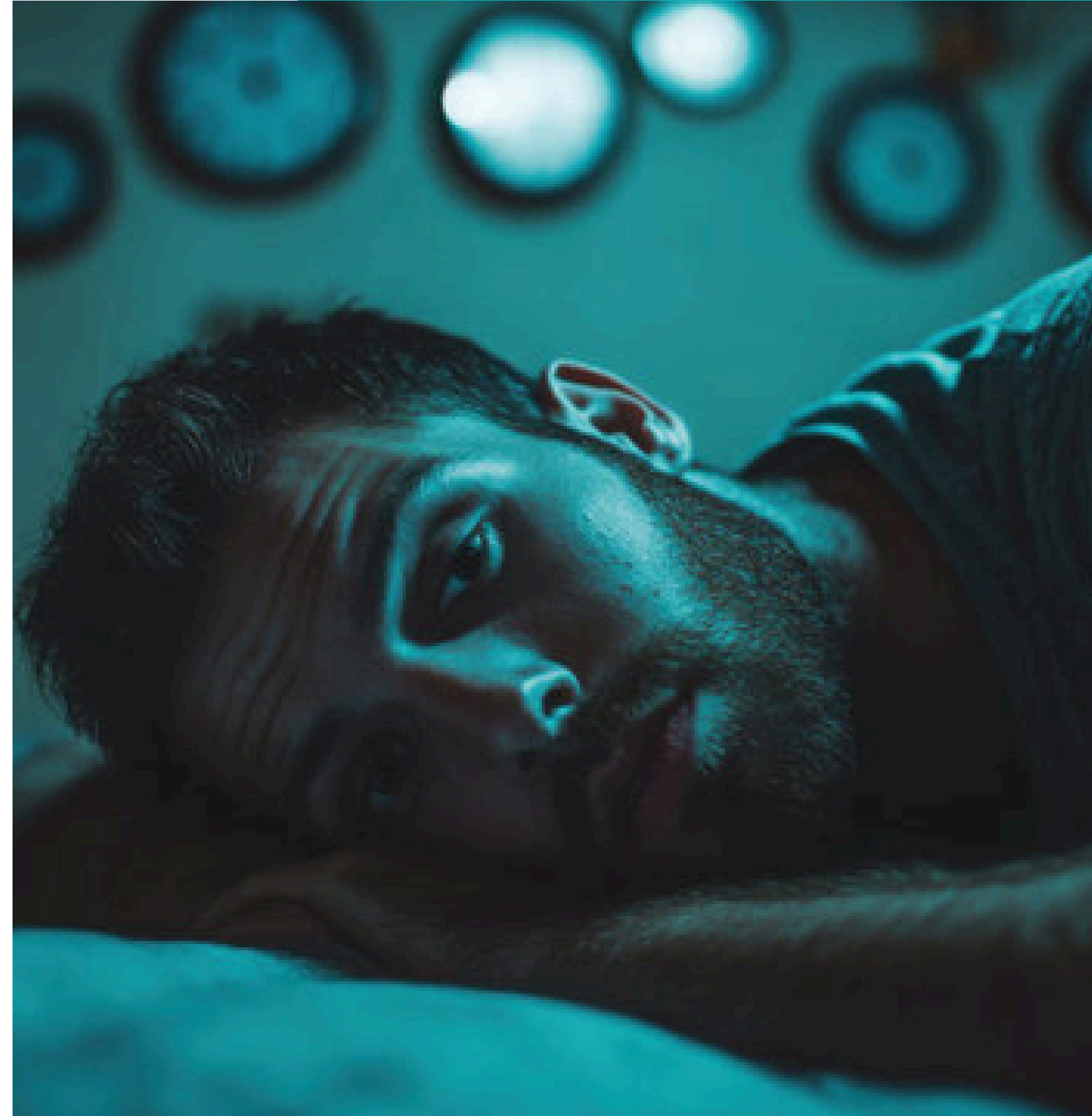




Problem Statement

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



Toolkit Cont...

Model deployment and web development:

- Joblib library
- Streamlit library

Note:

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



Prediction App



Sleep Disorder Prediction App

Enter the following details to predict sleep disorder:

Gender (Male, Female):

Age:

Occupation (Software Engineer, Doctor, Sales Representative, Teacher, Nurse, Engineer, Assistant, Scientist, Lawyer, Self-employed, Manager):

Sleep Duration (Hours):

Quality of Sleep:

Physical Activity Level:

Stress Level:

BMI Category (Underweight, Normal, Overweight, Obese):

Heart Rate:

Daily Steps:

Systolic Blood Pressure:

Diastolic Blood Pressure:

Predict

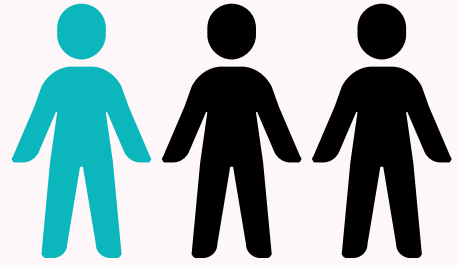
Sleep Disorder Prediction App

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 response 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

