SLEEP DATA ANALYSIS

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PLAN OF ACTION

1. Motivation
2. Block diagram
3. Pseudo Code
4. Code Snippet
5. Analysis
6. Learning Outcomes
7. Steps to build a python package

MOTIVATION

How lack of sleep can increase diabetes risk

TOI Lifestyle Desk / etimes.in / May 8, 2024, 09:00 IST

Maintaining 7-9 hours of sleep is essential for adult health and reduces diabetes risk. Factors like night shift work, disrupted circadian rhythms, and hormonal imbalances due to inadequate sleep can lead to severe health issues.

Seven to 9 hours of sleep is appropriate for an adult to maintain optimal health. The modern lifestyle's demand for reduced sleep has significant repercussions, extending beyond tiredness to serious health issues, including diabetes.

Recent study with a cohort of 248000 people, found that people who slept 5 or fewer(3-4) hours each night were at a higher risk (16% and 41% respectively) of type 2 diabetes, than those who slept 7 to 8 hours, even if they followed a healthy diet.

Cited from :https://timesofindia.indiatimes.com/life-style/health-fitness/health-news/how-lack-of-sleep-can-increase-diabetes-risk/articleshow/109922360.cms

Poor Sleep In Your 40s Linked to Faster Brain Aging Later In Life

Cited from: https://www.healthline.com/health-news/poor-sleep-midlife-faster-brain-aging

How sleep deprivation can cause inflammation

April 29, 2024

Cited from: https://www.health.harvard.edu/healthbeat/how-sleep-deprivation-can-cause-inflammation

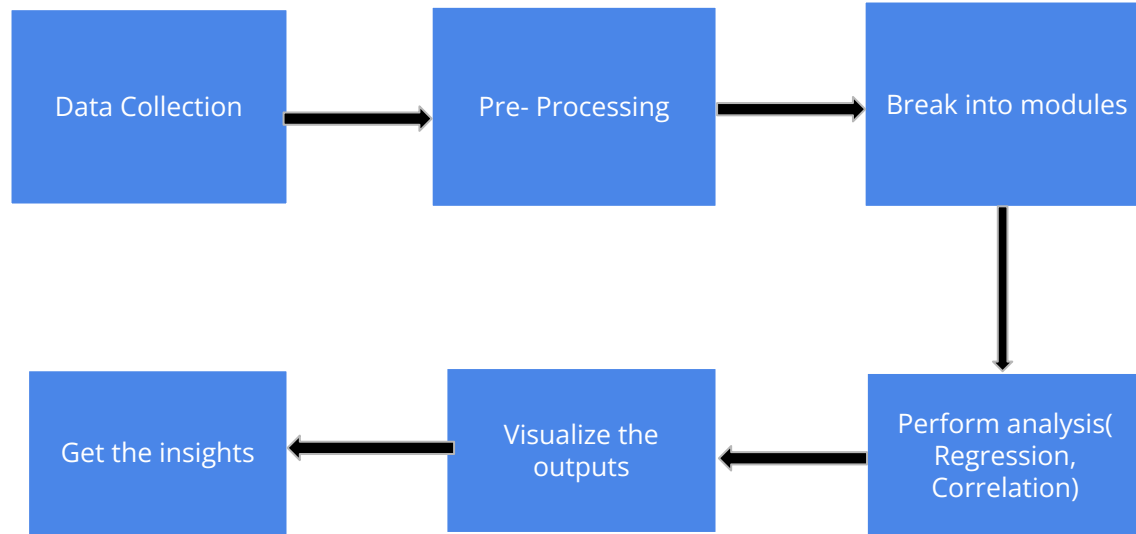## Students, parents struggle to reset body clock as schools reopen

Mini Thomas / Jun 3, 2024, 04:08 IST

Cited from https://timesofindia.indiatimes.com/city/bengaluru/students-parents-struggle-to-reset-body-clock-as-schools-reopen/articleshow/110647156.cms

And the list goes on.....

BLOCK DIAGRAM

PSEUDO CODE: PROJECT.PY

```
# 1. Import required libraries and modules
Import necessary libraries for data analysis and visualization (e.g., Pandas, Seaborn, Matplotlib)
Import custom analysis classes (e.g., DataLoader, DataAnalysis, etc.)

# 2. Define the load_data function
Function load_data():
        # Load the dataset
        Create DataLoader object to automatically load the built-in CSV file
        Display dataset information (e.g., head, shape, data types)
        Return the DataFrame for further analysis

# 3. Define the analyze_age_vs_sleep_quality function
Function analyze_age_vs_sleep_quality(df):
        # Perform analysis for Age vs Sleep Quality
        Create DataAnalysis object with the DataFrame
        Call plot_age_vs_sleep_quality() to visualize the relationship
        Calculate the correlation coefficient between Age and Sleep Quality
        Print the correlation result

# 4. Define the analyze_sleep_duration function
Function analyze_sleep_duration(df):
        # Perform analysis for Sleep Duration vs Sleep Quality
        Create SleepDurationAnalysis object with the DataFrame
        Call process_sleep_times() to process the sleep duration data
        Call plot_sleep_time_vs_quality() to visualize the relationship

# 5. Define the analyze_physical_activity function
Function analyze_physical_activity(df):
        # Perform analysis for Physical Activity vs Sleep Quality
        Create PhysicalActivityAnalysis object with the DataFrame
        Call plot_physical_activity_vs_sleep_quality() to visualize the relationship
```

```
# 6. Define the analyze_dietary_habits function
Function analyze_dietary_habits(df):
        # Perform analysis for Dietary Habits vs Sleep Quality
        Create DietaryHabitsAnalysis object with the DataFrame
        Call plot_dietary_habits_vs_sleep_quality() to visualize the relationship

# 7. Define the analyze_sleep_disorders function
Function analyze_sleep_disorders(df):
        # Perform analysis for Sleep Disorders vs Sleep Quality
        Create SleepDisorderAnalysis object with the DataFrame
        Call plot_sleep_disorder_vs_sleep_quality() to visualize the relationship

# 8. Define the final_comprehensive_analysis function
Function final_comprehensive_analysis(df):
        # Perform the final comprehensive analysis (correlation matrix)
        Create FinalAnalysis object with the DataFrame
        Call correlation_matrix() to visualize the correlation matrix of all factors

# 9. Define the main function
Function main():
        # Load the data
        df = Call load_data()
        # Perform various analyses
        Call analyze_age_vs_sleep_quality() with the loaded data
        Call analyze_sleep_duration() with the loaded data
        Call analyze_physical_activity() with the loaded data
        Call analyze_dietary_habits() with the loaded data
        Call analyze_sleep_disorders() with the loaded data
        Call final_comprehensive_analysis() with the loaded data

# 10. Execute the main function if the script is run directly
If __name__ == "__main__":
        Call main()
```

CODE SNIPPET

```python
import pandas as pd  # Library for handling data


class DataLoader:
    def __init__(self, file_path="Health_Sleep_Statistics.csv"):
        self.file_path = file_path  # Set the file path
        self.df = None  # Initialize dataframe
        self.load_data()  # Load data when the object is created

    # Load dataset from CSV file
    def load_data(self):
        self.df = pd.read_csv(self.file_path)

    # Display basic info about the dataset
    def display_info(self):
        print(self.df.head())  # First few rows of the data
        print(self.df.size)  # Total number of elements
        print(self.df.shape)  # Shape of the dataframe
        print(self.df.info())  # Info about the dataframe
        print(self.df.describe())  # Summary statistics
        print(self.df.isna().sum())  # Missing values
        print(self.df.duplicated().sum())  # Duplicated rows
        print(self.df.columns)  # Column names
```

```python
/sleep_data_anlysis/__init__.py
# Importing DataLoader to handle loading and processing of
datasets
from .data_loader import DataLoader


# Importing DataAnalysis class for general analysis and
correlation of data
from .data_analysis import DataAnalysis


/project.py
# Import the main classes from the package
from sleep_data_analysis.data_loader import DataLoader
from sleep_data_analysis.data_analysis import DataAnalysis
```
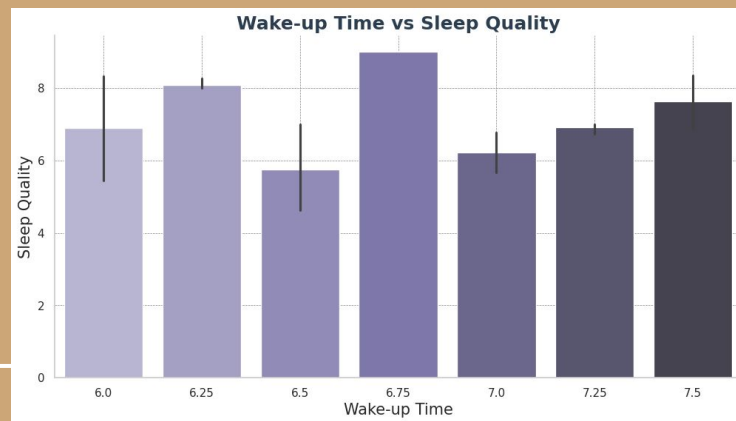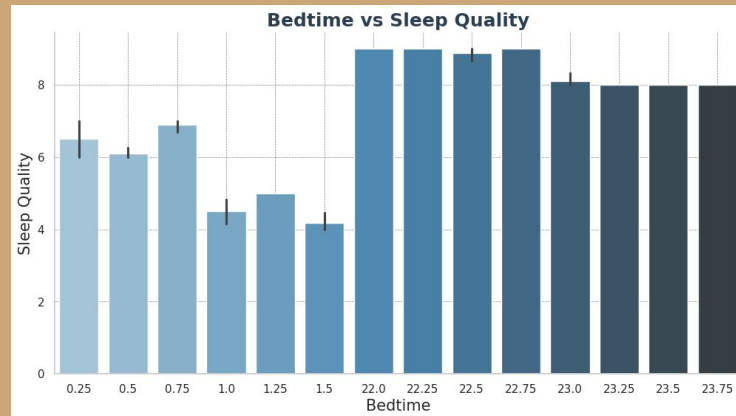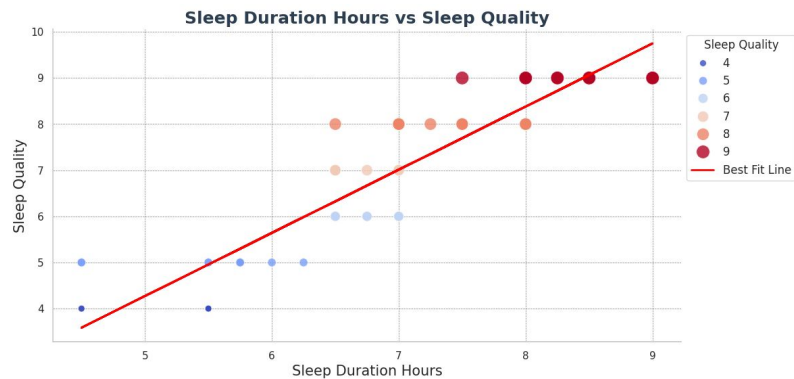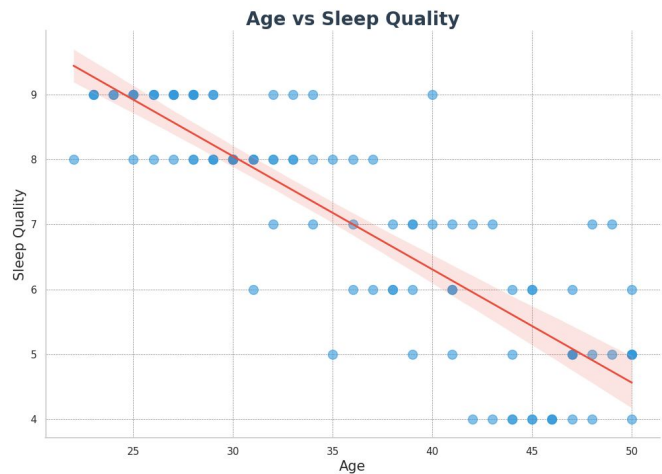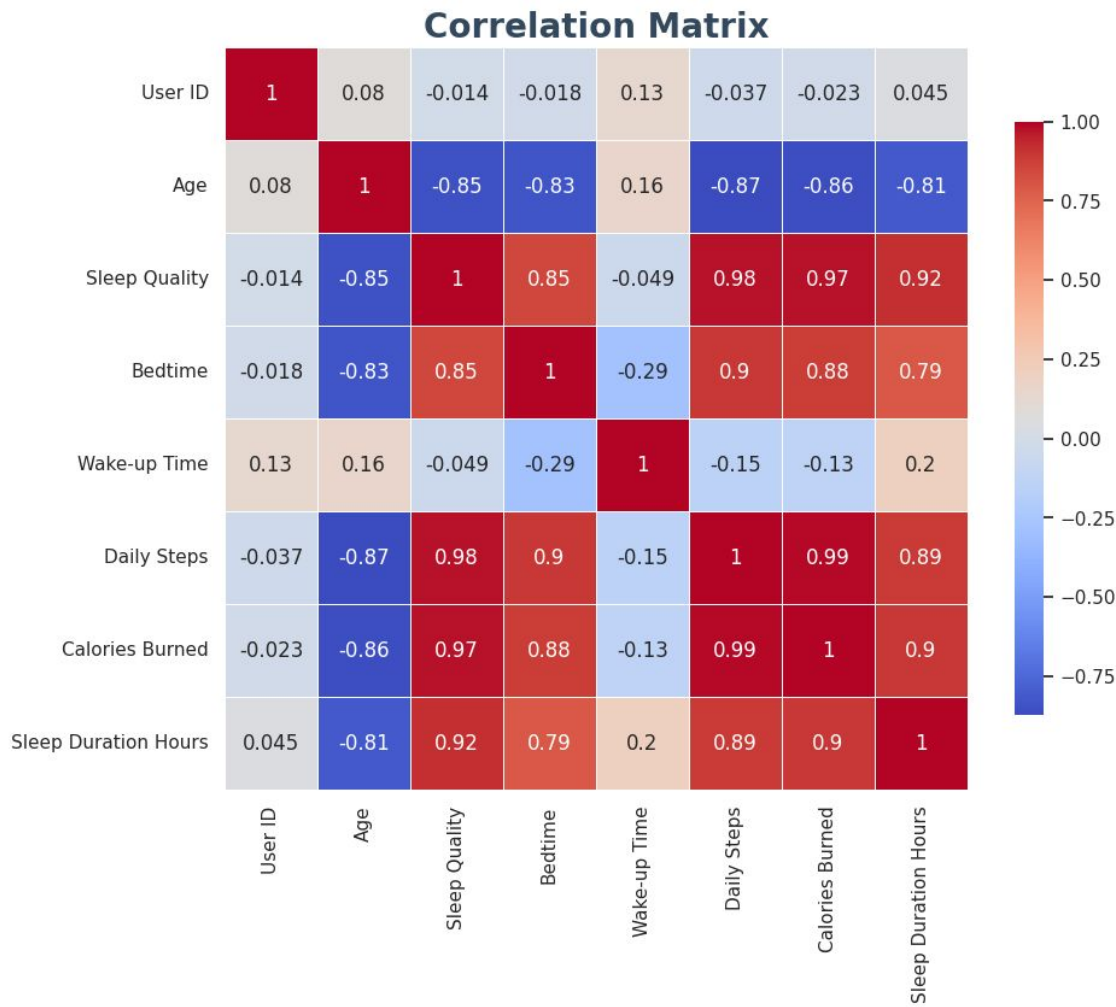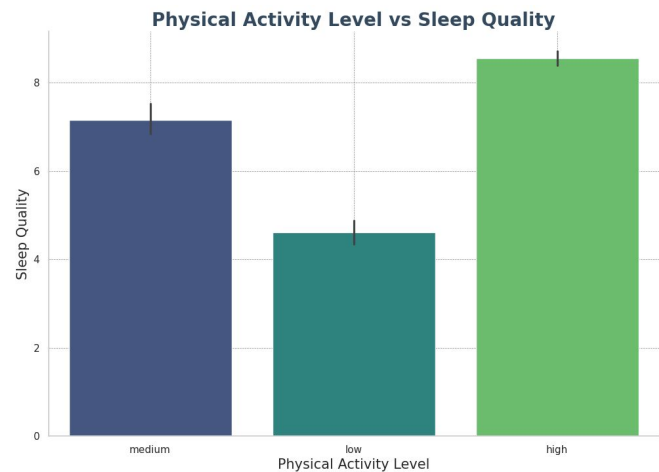
Pythonic features used:

Classes, method, objects, constructors
Imports
Modular coding
Converting to package and many more…..

ANALYSIS

ANALYSIS

LEARNING OUTCOMES

1. Data analysis tools
2. Data Cleaning and Preprocessing
3. Exploratory Data Analysis (EDA)
4. Regression and Correlation Analysis
5. Visualization and Reporting
6. Error Handling and Debugging
7. Understanding the Impact of Sleep Data
8. **Modular coding**
9. **Building a Python Package**

sleep-data-analysis 0.4

```
pip install sleep-data-analysis
```

Verified details ✔
These details have been verified by PyPI

Maintainers

prithvirajkt

Meta

○ Author: Prithviraj K Tagadinamani ✉

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Unverified details
These details have **not** been verified by PyPI

Project links

🏠 Homepage

Meta

○ License: MIT License
○ Author: Prithviraj K Tagadinamani
○ Requires: Python >=3.6

Last but not the least, lets learn to create your own python package

STEPS TO BUILD A PYTHON PACKAGE

1. Organize Your Project Structure ➡️
2. Create the `setup.py` File
3. Create a `requirements.txt` File
4. Create a `MANIFEST.in` File:
5. Create `__init__.py` File:
6. Build the Package:
   python setup.py sdist bdist_wheel
7. Create account in Pypi
8. Upload the Package to PyPI
   pip install twine
   Twine upload dist/*
9. Install Your Package and use
   pip install sleep_data_analysis

```
sleep_data_analysis/
│
├── sleep_data_analysis/        # Main package directory
│   ├── __init__.py             # Marks this directory as a package
│   ├── data_loader.py          # Your module file
│   ├── data_analysis.py        # Your module file
│   ├── sleep_duration_analysis.py # Your module file
│   ├── physical_activity_analysis.py # Your module file
│   ├── dietary_habits_analysis.py # Your module file
│   ├── sleep_disorder_analysis.py # Your module file
│   ├── final_analysis.py       # Your module file
│
├── setup.py                    # Setup script for installation
├── README.md                   # Description of your package
├── requirements.txt            # External dependencies
├── MANIFEST.in                 # File to include non-Python files
├── LICENSE                     # License file
```

```
! pip install sleep_data_analysis

Requirement already satisfied: sleep_data_analysis in /usr/local/lib/python3.10/dist-packages (0.3)
Requirement already satisfied: numpy in /usr/local/lib/python3.10/dist-packages (from sleep_data_analysis) (1.26.4)
Requirement already satisfied: pandas in /usr/local/lib/python3.10/dist-packages (from sleep_data_analysis) (2.2.2)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.10/dist-packages (from sleep_data_analysis) (3.8.0)
Requirement already satisfied: seaborn in /usr/local/lib/python3.10/dist-packages (from sleep_data_analysis) (0.13.2)
Requirement already satisfied: scikit-learn in /usr/local/lib/python3.10/dist-packages (from sleep_data_analysis) (1.5.2)
Requirement already satisfied: scipy in /usr/local/lib/python3.10/dist-packages (from sleep_data_analysis) (1.13.1)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib->sleep_data_analysis) (1.3.0)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib->sleep_data_analysis) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib->sleep_data_analysis) (4.54.1)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib->sleep_data_analysis) (1.4.7)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib->sleep_data_analysis) (24.1)
Requirement already satisfied: pillow>=6.2.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib->sleep_data_analysis) (10.4.0)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib->sleep_data_analysis) (3.2.0)
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib->sleep_data_analysis) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from pandas->sleep_data_analysis) (2024.2)
Requirement already satisfied: tzdata>=2022.7 in /usr/local/lib/python3.10/dist-packages (from pandas->sleep_data_analysis) (2024.2)
Requirement already satisfied: joblib>=1.2.0 in /usr/local/lib/python3.10/dist-packages (from scikit-learn->sleep_data_analysis) (1.4.2)
Requirement already satisfied: threadpoolctl>=3.1.0 in /usr/local/lib/python3.10/dist-packages (from scikit-learn->sleep_data_analysis) (3.5.0)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.7->matplotlib->sleep_data_analysis) (1.16.0)
```

THANK YOU

KIRA MURRAY