

## ➤ Detailed Problem Statement:-

Sleep disorders have an increasing impact on mental and physical health and are a developing global concern. Their multiple causes include environmental variables, stress, food, and lifestyle choices. Early detection of these variables can enhance sleep hygiene and lower health risks, but conventional diagnostic techniques are expensive and difficult to use. By analyzing trends and providing early detection of sleep disorders, a predictive model built on routine data could facilitate diagnosis and enable preventative intervention. This kind of model would provide a more workable and affordable approach to enhancing sleep and general well-being, which would tackle the difficulty of comprehending the complex causes of sleep problems.

## ➤ Innovative Solutions:-

- **Data-driven Predictions** - Leveraging machine learning algorithms to analyze datasets that include lifestyle metrics (such as activity levels, diet, screen time, and stress) and sleep data (like sleep duration, cycles, and disturbances). The probability of getting a sleep disturbance can be predicted by these models.
- **Personalized Recommendations:** Using data analytics to provide personalized sleep hygiene and lifestyle modification recommendations to users based on their unique sleep and lifestyle patterns, thus reducing the risk of developing sleep disorders.
- **Integration of the Data in Wearable Devices** - Integrating data and other health-related information from wearable devices (fitness trackers, smartwatches, etc.) to improve prediction accuracy and offer ongoing, real-time insights into a person's health metrics and sleep patterns.

## ➤ Future Scope:-

- **Health Integration:** Future systems could integrate sleep predictions with other health data (e.g., heart rate, blood pressure) to provide holistic health assessments, detecting correlations between sleep disorders and other diseases like cardiovascular disorders or diabetes.

## ➤ Wow Factor:-

- **Integration of the Data in Wearable Devices** - Integrating data and other health-related information from wearable devices (fitness trackers, smartwatches, etc.) to improve prediction accuracy and offer ongoing, real-time insights into a person's health metrics and sleep patterns.
- **Predict Insights in Real Time** – It provides real-time insights using wearable devices like smartwatches and your lifestyle data.

## ➤ Tech Stack:-

- VS Code is used as IDE.
- **Data Visualization** - For visualization of the plots, matplotlib and seaborn are used.
- **Machine Learning Algorithms:** Algorithms such as Random Forest, XGBoost, or neural networks can be employed to build predictive models for sleep disorders
- Scipy and Statsmodels libraries are used for feature extraction purposes.
- **Web Dev** – It is used for development of Website.
- **Cloud Computing** – Streamlit, AWS or Google Cloud services is used for deployment, storage, computation of ML models.
- Github is used as version control system.
- **APIs for Wearable Devices:** APIs from wearable devices such as Fitbit or Apple HealthKit for seamless data integration.

## ➤ Flowchart:-



