



GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

Kommadi, Madhurawada, Visakhapatnam 530 048

(Approved by AICTE, New Delhi, Affiliated to Andhra University, Visakhapatnam)

(Accredited by National Board of Accreditation [NBA] for B.Tech CSE, ECE and IT - valid from 2019-22 and 2022-25)

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Phone: +91-891-2739144, 2739124, 2719125, 2719127 Email id: gvpcew@gmail.com, info@gvpcew.ac.in

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Department of Computer Science and Engineering (AI & ML)

Project Abstract – [ADMITTED BATCH: 2020-2024]

YEAR & BRANCH:

IV B. TECH. – Computer Science and Engineering (AI&ML)

BATCH NO. :02

SECTION:

BATCH DETAILS:

S. No.	Student Regd. No.	Student Name
01	20JG1A4244	Premonvitha Sai Rayana
02	20JG1A4262	Yadlapalli Phani Venkata Bhargavi
03	20JG1A4203	Allampalli Maanvitha
04	20JG1A4223	Kadali Navya Venkata Sahithi

PROJECT GUIDE NAME:

Dr. M R K Krishna Rao

PROJECT TITLE:

Machine Learning based Diagnostic System for Sleep Disorder

Abstract:

Sleep disorders affect a substantial portion of the global population, with an estimated 10-30% grappling with various conditions such as insomnia, sleep apnea and many more. The impact of these disorders extends beyond mere inconvenience, as they can significantly influence overall well-being and lead to the development of other health issues. Recognizing the critical need for early intervention and awareness, our project focuses on leveraging machine learning techniques for predictive modeling and providing personalized suggestions for individuals at risk of sleep disorders. The primary goal is to empower individuals with information about their potential risk levels, even before overt symptoms manifest. By analyzing preliminary data related to sleep patterns, lifestyle, and other relevant factors, our predictive modeling system aims to assess the likelihood of developing sleep disorders. This proactive approach enables individuals to take timely action, whether by seeking professional medical advice or by implementing home-based remedies. Through machine learning algorithms, our system not only predicts the risk level of sleep disorders but also tailors suggestions based on individual traits. This personalized approach ensures that users receive targeted recommendations, ranging from lifestyle modifications to specific home remedies, fostering an environment conducive to healthy sleep.

Domains Where the Project Can Be Implemented:

1. Healthcare Integration
2. Digital Wellness Apps
3. Research and Clinical Studies
4. Fitness and Lifestyle Apps
5. Health Insurance Integration
6. Consumer Electronics Collaboration

Implementation:

In implementing our project, the first crucial step is the acquisition of a diverse dataset encompassing variables such as sleep patterns, lifestyle choices, and existing sleep disorder diagnoses. Following this, a meticulous data preprocessing phase is undertaken, involving cleaning and formatting to ensure consistency and handle any missing values. The subsequent phase involves the selection of pertinent features vital for predicting sleep disorders, considering factors such as sleep duration, bedtime habits, and other relevant lifestyle choices. To build a robust predictive model, machine learning algorithms like Support Vector Machines (SVM), logistic regression, and others are employed, and the model's performance is thoroughly evaluated using key metrics including accuracy, precision, recall, and F1-score on a validation dataset. To facilitate a comprehensive understanding of the data patterns, Python libraries such as Matplotlib and Seaborn are employed for creating visualizations. These visualizations serve to highlight trends and insights derived from the sleep data. Simultaneously, the user interface (UI) development phase incorporates the Streamlit library to craft an intuitive platform. This interface enables users to input their individual traits, allowing the machine learning model to predict their risk of sleep disorders and provide personalized suggestions. The integration of the machine learning model with the UI ensures a seamless and user-friendly experience. Subsequent to the model's integration, rigorous testing and validation are conducted to ensure the accuracy and reliability of the predictive model within the UI. Once the system is deemed robust, deployment follows, making the platform accessible for users to predict their risk of sleep disorders and receive tailored recommendations using streamlit cloud. To foster continual improvement, a feedback mechanism is implemented, collecting user responses to refine the model based on real-world data. Lastly, the entire implementation process, encompassing data sources, preprocessing steps, model architecture, UI design, and evaluation metrics such as F1-score, is meticulously documented to serve as a comprehensive reference for future iterations and collaborations.

Principle Idea:

The project involves the development of a robust machine learning model to predict sleep disorders based on various factors, including lifestyle, behavior, and health indicators. It will further classify the predicted disorders into different risk levels, allowing for a nuanced understanding of their potential impact. Additionally, the system will offer tailored home remedies for individuals displaying early signs or experiencing minor symptoms of sleep disorders. The emphasis is on empowering users to take proactive measures for self-management and improve sleep quality. The professional execution of this project involves rigorous data analysis, feature engineering, and model optimization to ensure accurate predictions and meaningful risk stratification.

Vision:

Our vision is to leverage machine learning for enhanced sleep health. We aim to assess the likelihood of sleep disorders by analyzing individual traits, providing users with insights and personalized remedies. Our goal is to empower individuals to understand, manage, and improve their sleep, fostering a healthier and more fulfilling life.

Base Reference Paper Details:

Title:

Predicting the Risk of Sleep Disorders Using a Machine Learning–Based Simple Questionnaire: Development and Validation Study .

Published Year: 21 September 2023

Journal Name: JOURNAL OF MEDICAL INTERNET RESEARCH

Signature of Project Guide

Dr. M R K Krishna Rao

Professor

Signature of Head of the Department

Dr. Dwiti Krishna Bebart

Associate Professor