# Yoga, Recommendation, System using, Machine Learning Techniques

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***ABSTRACT:*** **Abstract- The enterprise's many expectations from college students constitute an annoying a part of their instructional lives. younger people are liable to the issues as a result of higher training as they go through personal and social changes. instructional pressure has been proven to lessen learning abilities and reduce motivation to look at. therefore, developing appropriate and effective intervention programs turns into vital. lately, there has been a boom inside the use of on-line fitness web sites and fitness records websites, workout and yoga because of the COVID-19 pandemic. This weblog will offer answers and then preventive measures for ordinary men, however no longer anyone can do it or have the strength to train yoga with their ache and self in mind. converted yoga isn't always an ordinary article. This study is designed to create a clever model that predicts the stairs the pupil can take by contemplating the student's BPM, blood strain (systolic and diastolic), sleep period, and a few programs to clear up their issues. stress associated troubles. The accuracy of the stress prediction version reached 94.4%, and the accuracy of yoga suggestions reached 97.3%.**

**Keywords— Educational strain, blood strain, ordinary workout system mastering, pressure management, Yoga recommendation device.**

## 1. INTRODUCTION

In recent times, nearly the whole thing is changing swiftly, so students are under strain to do many stuffs which are confusing, inconsistent and impossible inside the cultural, monetary and bureaucratic surroundings. consequently, today's college students are extra burdened and irritating than previous generations. this is because the cutting-edge era of college students is seen because the most gifted students and consequently too many expectations are positioned on them and they may be pressured to reap unrealistic expectancies. maximum young people these days be afflicted by depression. One clarification is that it is standard to graduate with accurate grades due to the fact this will boom expert competencies. inside the very last years of college or college, college students face cultural and academic challenges due to the high expectancies of others and their friends. With the increase in on line content, maximum students do now not get much physical interest. life within. problems with blood stress (systolic and diastolic), long sleep and respiratory patterns, interest and patience need to be taken under consideration.

Motivation

Nowadays, students face pressure that impacts their academic performance, reducing their focus and quality of sleep. This issue can be easily resolved by incorporating a personalized yoga routine into their daily schedule. Such customization is accomplished through the methods described by the usage of the system gaining knowledge of strategies.

Research Contribution

- Stress prediction using gadget gaining knowledge of set of rules.
- Yoga advice based totally on the, estimated stress level and unique input provided by the individual.

## 2. LITERATURE SURVEY

The study deeply investigates the intricate relationship between stress and physical activity (PA) along with exercise. It uncovers a significant temporal connection, indicating that stress can impact PA negatively. This negative impact is comparable to how stress influences other health-related behaviours such as smoking, drinking, and drug use, suggesting a broader effect on overall well-being [1].

What's particularly intriguing is the dual nature of stress's influence on behaviour—it can either positively or negatively alter behaviour. This complexity might stem from the fact that exercise serves as both a coping mechanism and a tool for managing stress [1].
Moving to academic performance, the study underscores how stress can act as a barrier, impeding learning and academic achievement. However, it also highlights a promising aspect: the positive impact of practicing yoga on academic performance [2].
The study delves into the physiological mechanisms at play, focusing on the brain's Sympathetic and Parasympathetic nervous systems and their role in regulating heart rate variability (HRV). This insight suggests a potential avenue for using HRV as a measure of stress levels in preventive healthcare strategies [3].
Empirical evidence presented in the study reveals a concerning link between chronic psychosocial stress and hypertension. The study discusses various stress reduction therapies, highlighting transcendental meditation as particularly effective in reducing blood pressure [4].
Furthermore, the study sheds light on the challenges faced by preclinical medical students, showing a correlation between poor sleep quality, high stress levels, and specific stress management strategies like daytime naps. Notably, the study emphasizes that these findings are specific to students from one medical school, suggesting a need for broader research encompassing diverse student populations [5][6].

## 3. PROPOSED WORK

To create a yoga recommendation system, we consider the specific issues someone wants to address, any physical limitations they may have, and how these factors might interact with their current health condition. Our approach involves two models:

- The first model predicts whether someone is experiencing stress addressed on the user-provided parameters, as illustrated in Fig. 1. We use a Random Forest Classifier to achieve this prediction, utilizing various subsets of the dataset and a voting mechanism for accurate results.
- The subsequent model recommends a set of Yoga Postures addressed on the user's specific concerns and parameters. This model incorporated learning techniques, along with embedding and encoding word algorithm extractions of key terms from the input data and implementation of an ANN using TensorFlow's Keras Application Programming Interface. Word2Vec is used for word vectorization, and cosine similarity is employed to measure keyword similarity [9].

By integrating the output of the first model into the second model,. This approach ensures personalized and effective yoga guidance, considering various health and wellness factors. Will also be a parameter.

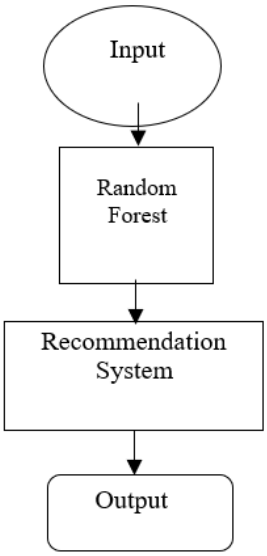


Figure 1: Diagram depicting the Yoga recommendation process

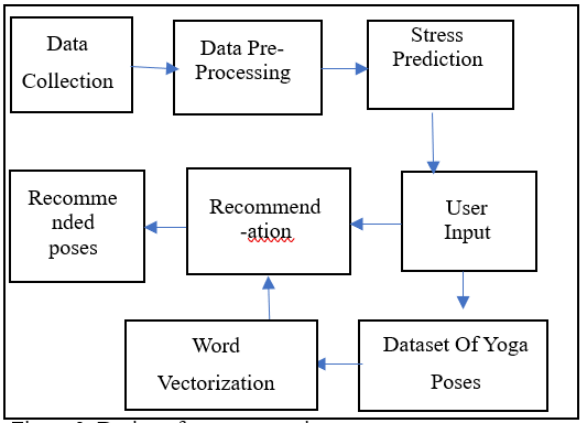


Figure 2: Design of yoga suggestion system

This initiate the process by gathering input from both physical and psychological surveys to assess if someone is experiencing stress, utilizing a Random Forest Classifier as illustrated in Figure 2. This classifier constructs numerous decision trees based on Random Forest uses subsets of the dataset and employs a voting mechanism to derive the final output. This approach results in superior accuracy compared to individual decision trees and helps mitigate overfitting concerns.

Following the initial stress prediction, the 2nd modules We will suggest yoga poses based on user-provided arguments. This subsequent model integrates deep learning methodologies alongside encoded and embedded algorithms for words. Extractions key terms from the input document and implement an ANN using TensorFlow's Keras functional API. The Word2Vec algo will facilitate, and the cosine similarity metric will ascertain the Calculating similarity between keywords A and B adheres to the methodology outlined in references [9] and [10].

$$\mathrm{Sin}(A,B) = \mathrm{Cos}(\theta) = \frac{A.B}{||A||||B||}$$

The concept of cosine similarity is employed to determine the similarity between words, denoted as vectors A and B. This similarity calculation aids in assessing the closeness between terms, as outlined in equation - 1. By converting words into vectors, the model accurately gauges the similarity between them. The Output of the 2nd model delivers a collection of Yoga positions tailored to the user's needs, based on their input and the calculated similarity between terms.

## 4. IMPLEMENTATION

The recommended module is structured into 2 stage. In the initial phase, stress prediction is conducted Based on physical metrics and surveys employing the 'random-forest' algorithm. To train our initial model, we compiled a dataset of 100 students encompassing diverse attributes and questionnaires pertaining to -

within the n the 2nd degree Yoga postures are recommended based on the key terms or issues provided by the user. This system includes a record listing yoga poses along with their Advantages and explanations. Stemming, vectorization, and word embedded algos are utilized to convert the document into vectors. The TensorFlow functional API is employed for this purpose.

**Table 1: Data from N -estimator**

| N estimators | Train AUC | Test AUC |
|---|---|---|
| 2 | 0.98 | 0.87 |
| 4 | 0.85 | 0.85 |
| 6 | 0.88 | 0.87 |
| 8 | 0.90 | 0.89 |
| 10 | 0.92 | 0.90 |
| 12 | 0.93 | 0.91 |
| 14 | 0.94 | 0.92 |
| 16 | 0.95 | 0.93 |

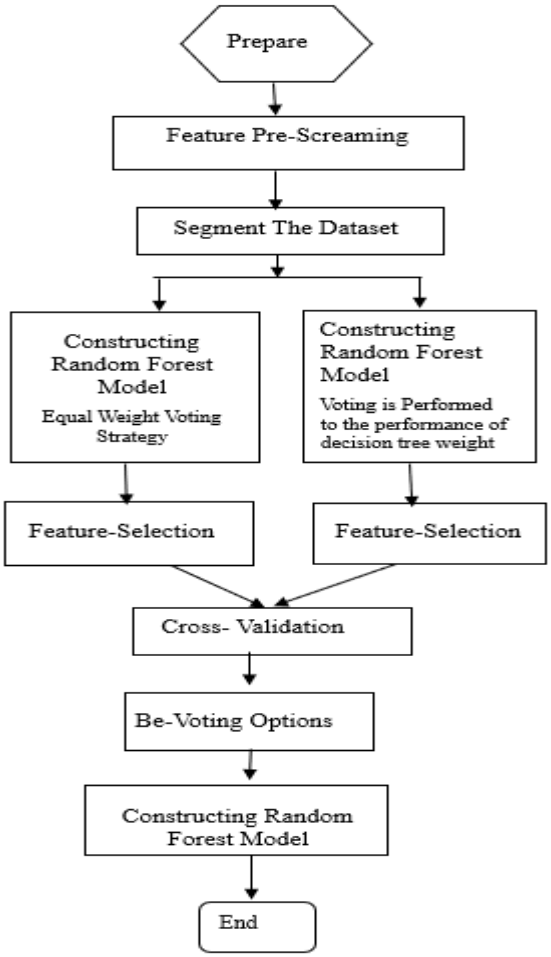


Figure 3: Random Forest classifier

This module provides recommendations for a set of yoga poses.
To position into effect synthetic Neural community [11] as given in figure 4

The implemented artificial neural network includes:

- 1 layer for input
- 1 layer for dense
- 1 layer for output
- Utilizes SoftMax activation
- Trained for 100 epochs

Beat per minute (BPM)

- Sleep
- Respiration sample
- Awareness
- Patience

To collect our data, gathered data from university students across scenarios such as prior to exams, during interviews, movie watching, question-solving, and in various other scenarios.

To implement the 1st module, utilized the Random Forest algorithm [12], known for its ensembled learning approach. This generates multiple decision trees using various subsets of the dataset and employs a voting mechanism for the final prediction. To compile our dataset, we collected information from university students in diverse situations, including Prior to exams, during interviews, while watching movies, solving questions, and in various other situations.

To create the 1st model, we utilized the Random Forest algo [12], known for its approach. This generates multiple descion tree using distinct subsets of the dataset and employs a voting mechanism to arrive at the final prediction.

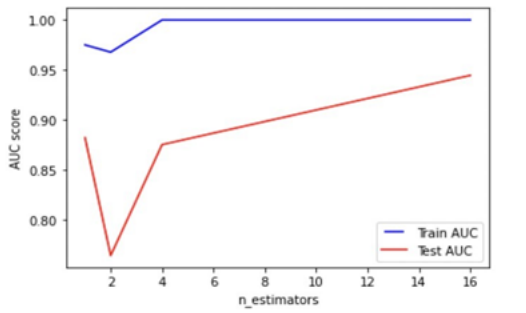


Figure 4: Effectiveness in predicting stres

Figure 4: Effectiveness in predicting stress

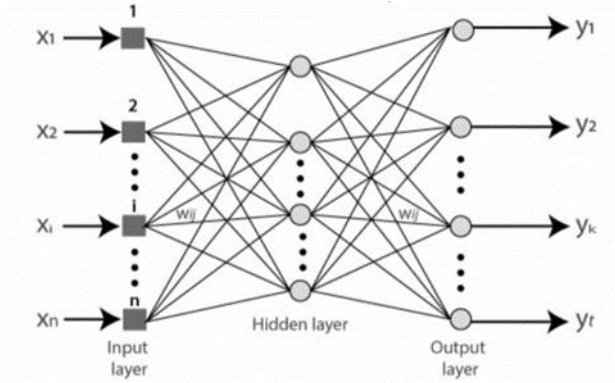


Figure 5: Displays the Artificial Neural Network.

The recommendations cover a range of poses such as Yoga Nidra, alternate nostril breathing, eye workouts, and deep breathing from the diaphragm. Additionally, studying the effects of these techniques on university students is part of the plan.

## 5. METHODOLOGY

In this segment, we are able to speak the techniques and strategies used to create 3 machine learning models which encompass the stress prediction model, yoga advice model, and yoga posture detection and correction model. moreover, we will additionally speak the strategies required for creating the photo consumer interface of our system.

- STRESS DETECTION VERSION

So, one can create an effective gadget learning model, it is important to have a robust dataset to educate it on. For this mission, we amassed statistics from college students in a spread of different situations, starting from before exams to whilst looking a film. by way of amassing information from various

conditions, we aimed to create a dataset that turned into diverse and consultant of actual-global scenarios.

The set of rules used for making the strain prediction version is Random forest. it's a kind of supervised mastering that entails growing multiple selection bushes and combining them to make better predictions. In this situation, the n-estimators hyperparameter determines the wide variety of bushes to create before making a very last prediction, max_features determine the most quantity of features a node will have before a split, and min_sample_leaf units the minimum range of data points required to create a brand-new split. The Gini Index components may be used to calculate the possibility of an element being categorized for a wonderful elegance.

- YOGA POSE RECOMMENDATION SYSTEM

Our gadget is designed to advocate yoga poses based on particular key-words or issues supplied with the aid of our person. The vectors allow us to research and procedure the statistics greater efficaciously, making it easier to identify the applicable yoga postures for the person's unique wishes.

a) Installing the package:

To begin, we want to import various programs, dependencies, and libraries which might be necessary for implementing phrase vectorization, synthetic neural networks, and acting numerous operations on the dataset.

b) Eliminating Stop words

Stop words are phrases which can be generally utilized in a language but do now not offer any meaningful context or statistics. on this step, we use an imported library to dispose of the forestall words from the dataset.

c) Doing away with special characters

special characters together with punctuations, hashtags, or consumer mentions can intervene with the overall performance of the set of rules. consequently, it is crucial to do away with them earlier than intending with the evaluation.

d) Growing dictionary

in this step, we create an empty dictionary to keep the specific words as key phrases in conjunction with their vector embeddings.

e) Enforcing artificial neural community:

The implementation of an synthetic Neural community concerned the usage of TensorFlow Keras functional utility programming interface..

f) Developing a function to advocate poses:

eventually, we create a feature that takes goal words from the consumer and offers encouraged poses the usage of the artificial Neural community. The characteristic makes

- YOGA POSE DETECTION AND CORRECTION MODEL

Integration of live Feed camera machine using OpenCV and Media pipe

a) The stay feed camera gadget is included the usage of OpenCV - OpenCV is an open-source pc vision toolkit that includes a
b) Media pipe is included to identify the essential key points in the snap shots and reduce the weight on the image class version –

## 6. RESULTS DISCUSSION

Upon completing each component, A precision of 94.44% was attained for the stress estimation component, while the yoga poses estimation module achieved a correctness of 97.3%, as indicated in Table 1.

Figure 4 illustrates the precision versus n_estimators graph depicts the performance of the Random Forest classifier. AUC score, as a metric, reflects the effectiveness of the model, with a higher AUC score indicating better accuracy. N_estimators, which is a hyperparameter, plays a crucial role in optimizing the model's performance. denoting the number of trees formed before voting, plays a pivotal role. Increasing n_estimators generally enhances accuracy but may slow down system performance. In this instance, an n_estimator value of 16 corresponds to an accuracy nearing 95%, deemed optimal. For evaluating the effectiveness of the yoga recommendation system was evaluated by assessing a set of 150 recommended yoga poses in terms of their accuracy

**Table 2: Analysis of the yoga recommendation system**

| Type Of recommendation | No. of Candidates |
|---|---|
| Precisely Accurate Guidance | 146 |
| Less accurate Guidance | 6 |
| Total recommendation | 150 |
| Accuracy | 97.3 |

After assessing the recommended yoga poses, we determined that out of the 150 suggested poses, 146 were highly effective for addressing the specified physically and mentally conditions, while 6 postures were found to be less suitable. In a study involving 50 university students who practiced the recommended yoga poses for 30 days, we noted that 36 students consistently adhered to the yoga routine, while 14 were not as consistent, as provided in Figure 5. Among the 36 who maintained consistency, 31 experienced a notable reduce in stress levels, reflected in normalized bpm and blood pressure reading.

## 7. CONCLUSION

In our study with 50 participants practicing yoga Sans taught by our system for 30 days, we found that 36 students maintained consistent practice, while 14 were less consistent. Among the consistent group, 31 experienced a significant decrease in stress levels, reflected in normalized blood pressure and heart rate. However, 5 students in this group did not show notable changes. Among the less consistent group, 5 students showed some reduction in stress, but 9 did not demonstrate noticeable differences.
The stress prediction model achieved a notable level of precision at 94.4%. while the yoga posture recommendation system performed exceptionally well with a precision of 97.3%.

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