An Integrated Approach For Student's Stress Management In Education

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Abstract- *"An Integrated Approach to Managing Student Stress in Education," integrates data science and web development to address student stress in educational settings. Through a Google Forms survey with 20 questions, we gathered insights from students, teachers, and faculty members regarding their sentiments towards the education system. Leveraging machine learning techniques like SVM, logistic regression, and naive Bayes, we analyzed real-time data to understand student emotions. Excel facilitated data preprocessing and descriptive analytics. Additionally, we developed a Mental Health Tracker with features like journaling, mood tracking, challenges, goal setting, and a planner. Our approach aims to foster a nurturing learning environment by adapting instructional materials based on student feedback, thereby enhancing student well-being and academic success.*

I. INTRODUCTION

In today's educational environment, student well-being and academic success are strangely intertwined. Recognizing the importance of this relationship, our project aims to transform traditional educational practices through mental health interventions. We strive to provide students with an enjoyable learning experience. In addition, our work incorporates real-time mental health monitoring and support systems, empowering students to better manage their emotional well-being. The primary goal of our services is to provide a supportive learning environment that prioritizes academic achievement and psychological well-being. We aim to address the growing concerns about stress and burnout among students by cutting-edge technology and innovative approaches. Ultimately, our work seeks to redefine the education model by prioritizing student well-being. By embracing flexibility, inclusion, and holistic support strategies, we aspire to create an educational ecosystem where every student can reach their full potential academically and emotionally. Through our project, we seek to inspire positive change in educational institutions around the world in a new era of student-centered learning and holistic improvement.

II. LITERATURE SURVEY

[1]TITLE:Feature Engineering for Sentiment Analysis with Logistic Regression
AUTHORS: S. Raj, P. Gupta
This paper focuses on feature engineering techniques for sentiment analysis using logistic regression, highlighting the importance of selecting relevant features.

[2]TITLE:Logistic Regression-Based Sentiment Analysis in Software Engineering
AUTHORS: A. Singh, S. Mathur
This paper explores the application of logistic regression for sentiment analysis in the context of software engineering, addressing the specific challenges and requirements in this domain.

[3]TITLE:Understanding Student Self-Tracking Practices for Stress Management and Mental Wellness
AUTHORS:Roche, D.M., Stiles, W.B., & Carroll, J.M.
This study examines student self-tracking practices for stress management and mental wellness, and how they compare to clinicians' recommendations. The authors conducted focus groups and surveys with students and student health professionals to understand the role of self-tracking in student mental wellness**.**

[4]TITLE:Designing for Student Mental Health: A Survey of College Students' Experiences with Mental Health Apps
AUTHORS:Lin, I.A., & Bae, J.
This study investigates college students' experiences with mental health apps, including their motivations, challenges, and benefits. The authors conducted a survey with students who have used mental health apps to understand their perceptions and preferences.

III. PROBLEM DEFINITION

The main objective of this project is to address the critical issue of student well-being and academic success in the current education system. By addressingthe problems in the curriculum with mental health support, we seek to

transform traditional teaching practices and create more student-centered learning environments. The scope of this project includes addressing the issues faced by students in the current education system and determining if the syllabus caters to a variety of learning requirements and aspirations, as well as incorporating real-time mental health monitoring and support mechanisms.

The existing education system often fails to adequately meet all the needs of students, focusing primarily on academic achievement and neglecting important aspects of mental health and well-being. This care creates students stress, anxiety, and burnout, which degrades their overall academic experience Except for these shortcomings, our work seeks to redefine the education system to prioritize academic competence and emotional resilience through curriculum inclusion of changes in comprehensive mental health support to improve learning environment.

Another important issue in the current educational climate is the lack of equal access to resources and opportunities, especially among students. By addressing these inequities and promoting inclusion, our work aims to create an equitable learning environment that provides opportunities for every student, regardless of background or circumstance, who prospered and reached his full potential.

IV. EXISTING SYSTEM

Curriculum Structure: The current curriculum structure often leaves students feeling overwhelmed and stressed due to its lack of flexibility. The standardized format of study materials fails to cater to diverse learning styles and may not adequately address the specific stressors experienced by individuals. As a result, educational institutions must prioritize the development of more personalized learning approaches that align with student interests and future career aspirations. By doing so, students will be better equipped to succeed in their academic pursuits and beyond. This critical issue must be addressed to create a more equitable and effective educational system.

Mental Health Monitoring: Currently, mental health monitoring relies on periodic assessments conducted by teachers or counselors, often through subjective observations or infrequent surveys. There is a lack of real-time tracking, making it challenging to identify immediate concerns and provide timely support.

Students may encounter difficulties accessing mental health resources and support in a timely and individualized manner within the educational process.

Existing policies take a stress management approach, addressing mental illness only after it has arisen.

Mental health support services are often provided separately from the curriculum.

V. PROPOSED SYSTEM

The project aims to address the increasing academic stress experienced by students through sentimental analysis and the integration of mental health support into the curriculum**.**

Recognizing students' diverse learning needs and emotional well-being, the project seeks to identify the loopholes in the current state-board education system through a variety of analyses on real-time data, providing blueprints, and at the same time, a user-friendly website has been developed to track students' mental health for all grades. The goal is to provide a healthy and balanced learning environment by providing quality learning experiences and active mental health support.

Advantages of the proposed system:

- Empower students by addressing their learning experiences.
- Integration of a mental health tracking system offers immediate support based on students' emotional states.
- Real-time support promotes increased student engagement and motivation.
- The proposed system creates a supportive learning environment, reducing the negative impact of stress and burnout.
- Reduced stress levels, increased engagement, and greater satisfaction with the learning process can contribute to higher levels of achievement and success for students.
- Through a flexible curriculum and comprehensive support services, the proposed program aims to address inequalities in educational opportunities and outcomes.

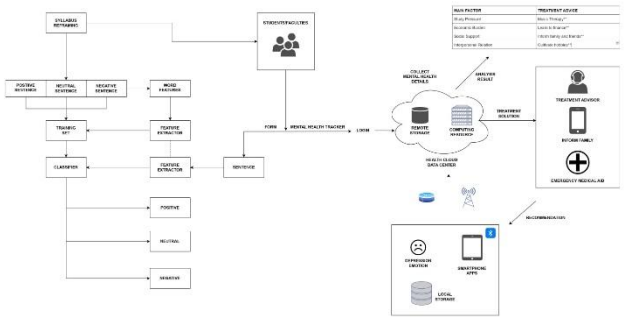

Figure 1: Overall Architecture

VI. IMPLEMENTATION ANDTESTING

The implementation phase of the project involves several key steps to ensure the successful development and deployment of the system. Firstly, a thorough requirement analysis is conducted to understand the project's scope, objectives, and user needs. This involves gathering and analyzing project requirements, identifying key functionalities, and utilizing data science and machine learning algorithms to address student-related problems. Following this, database design is crucial, where the schema, data types, and constraints are defined to optimize performance.

Frontend development focuses on creating intuitive user interfaces using reliable front-end development tools [MERN],while backend development involves implementing server-side logic and APIs using suitable frameworks or languages. Database implementation includes setting up the database environment and executing Firebase according to the database design. Integration testing ensures proper data flow and functionality between frontend and backend components, while user authentication mechanisms are implemented for secure access control.

Feature development encompasses building core application features like user registration, profile management, 21 days of challenges specifically tailored for the user's goals, planner, and journaling, followed by testing and quality assurance to identify and resolve bugs and usability issues. Deployment involves deploying the application to a suitable hosting environment and configuring server settings for stability and security. Post-deployment, monitoring and maintenance tasks ensure optimal performance and address any user feedback, while documentation captures the implementation process and provides guides for future reference.

VII. RESULTAND DISCUSSION

1. Sentimental Analysis

In this section, we present the results of applying SVM, Naive Bayes, and Logistic Regression algorithms for classification tasks. Both algorithms were trained on a labeled dataset and evaluated using both training and testing data. The following summarizes their performance metrics:
Train Accuracy: 94%
Test Accuracy: 98%

All SVM, Naive Bayes, and Logistic Regression algorithms achieved accuracy in both the training and testing phases, with a training accuracy above83% and a test accuracy above 90%. These results indicate that both models generalized well to unseen data, demonstrating their robustness and effectiveness in accurately classifying instances.

Fig 1.1-Visualization ofData distributions underCounselor_Accessibility, Teacher_Support,Fairness_Transparency, and Student_Motivationusing WEKA

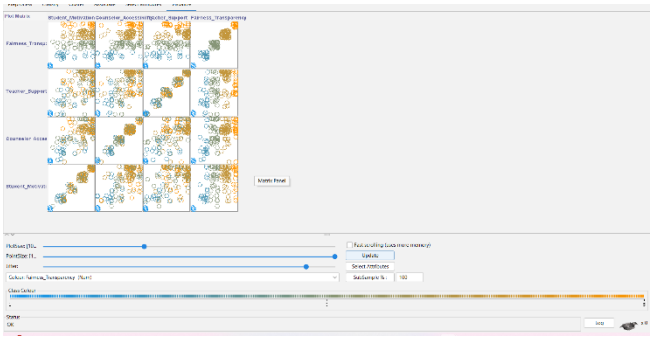

Fig 1.2- Visualization ofData distributions under Counselor_Accessibility, Teacher_Support, Fairness_Transparency, and Student_Motivationwith WEKA using Classifier

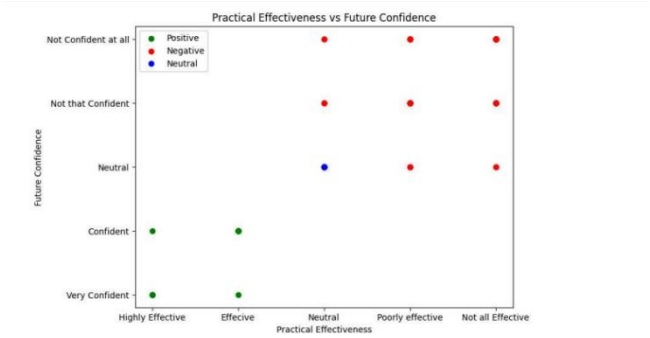

Fig 1.3-"STUDENT'S SENTIMENTAL ANALYSIS" Illustrates the classification of emotions which is done using Logistic Regression (green-positive, red-negative, and blue-neutral)on "Future_Confidence" vs "Practical_Effectiveness"

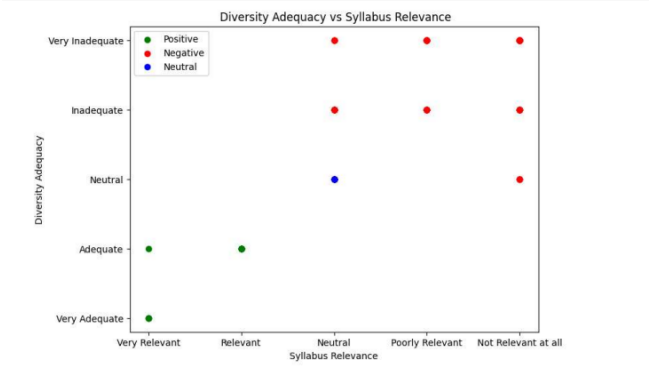

Fig1.4- "STUDENT'S SENTIMENTAL ANALYSIS" Illustrates the classification of emotions which is done using Logistic Regression (green-positive, red-negative, and blue-neutral)on "Syllabus_Relevance" vs "Diversity_Accuracy"

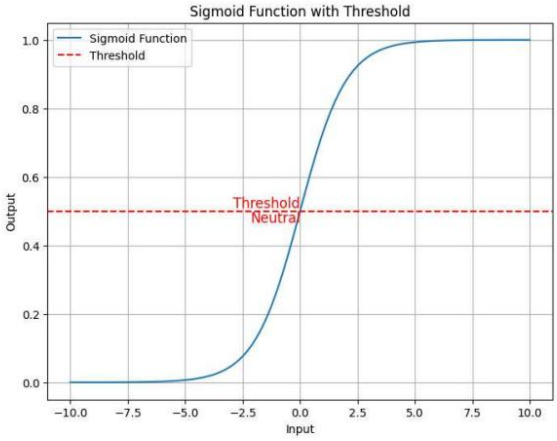

Fig1.5- "STUDENT'S SENTIMENTAL ANALYSIS" Illustrates the Sigmoid function used in "logistic regression" for classification

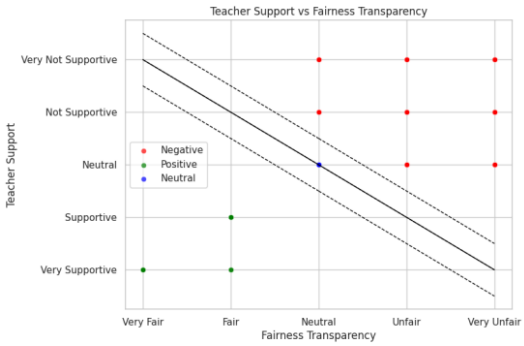

Fig1.6- "STUDENT'S SENTIMENTAL ANALYSIS" Illustrates the classification of emotions which is done using SVM (green-positive, red-negative, and blue-neutral)on "Fairness_Transparency" vs "Teacher_Support"

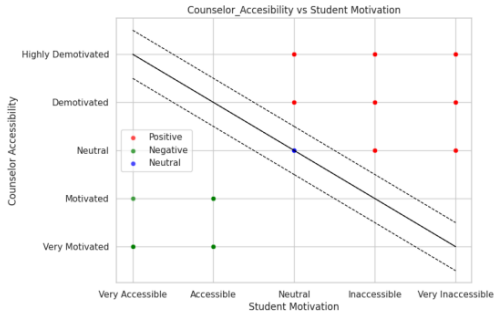

Fig1.7- "STUDENT'S SENTIMENTAL ANALYSIS" Illustrates the classification of emotions which is done using SVM (green-positive, red-negative, and blue-neutral)on "Student_Motivation" vs "Counselor_Accessibility"

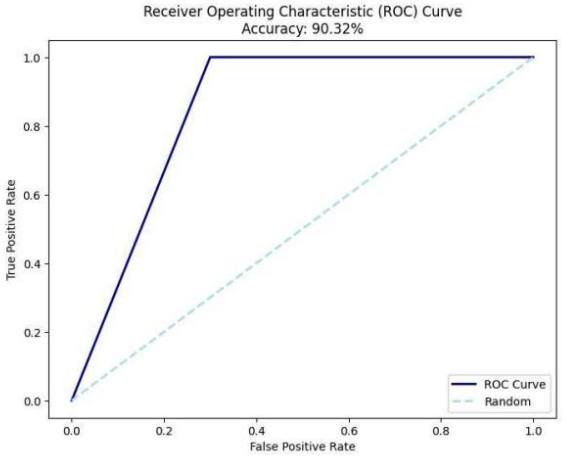

Fig1.6- "STUDENT'S SENTIMENTAL ANALYSIS" Illustrates ROC curve for accuracy

```
MEAN :  18.628947368421052
MEDIAN :  5.0
MODE :  1
STANDARD DEVIATION :
user_no                    43.877671
Diversity_Adequacy          1.183607
Syllabus_Relevance          1.109952
Practical_Effectiveness     1.159613
Future_Confidence           1.145549
dtype: float64
VARIANCE :
user_no                  1925.250000
Diversity_Adequacy          1.400926
Syllabus_Relevance          1.231994
Practical_Effectiveness     1.344702
Future_Confidence           1.312284
dtype: float64
```

Fig1.6- "STUDENT'S SENTIMENTAL ANALYSIS" Description of the data set

```
Confusion Matrix:
 [[ 7  3]
 [ 0 21]]

Classification Report:
              precision    recall  f1-score   support

           0       1.00      0.70      0.82        10
           1       0.88      1.00      0.93        21

    accuracy                           0.90        31
   macro avg       0.94      0.85      0.88        31
weighted avg       0.92      0.90      0.90        31
```

Fig1.6- "STUDENT'S SENTIMENTAL ANALYSIS" Confusion Matrix and Classification Report

2. *BeWell - Mental Health Tracker*

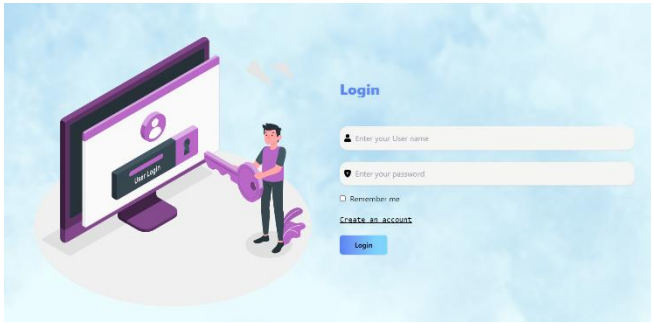

Fig b.1- Login and signup page

Fig b.2- Dashboard

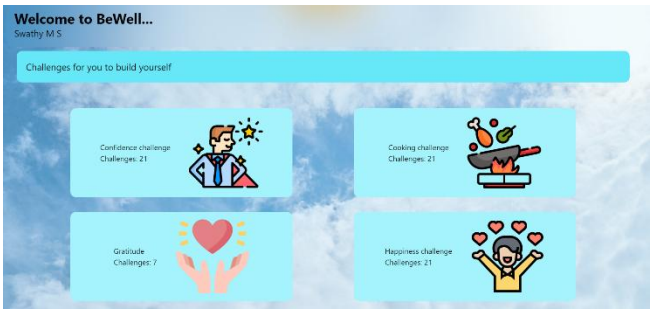

Fig b.3- 21 days challenge

Fig b.4- 21 days challenge

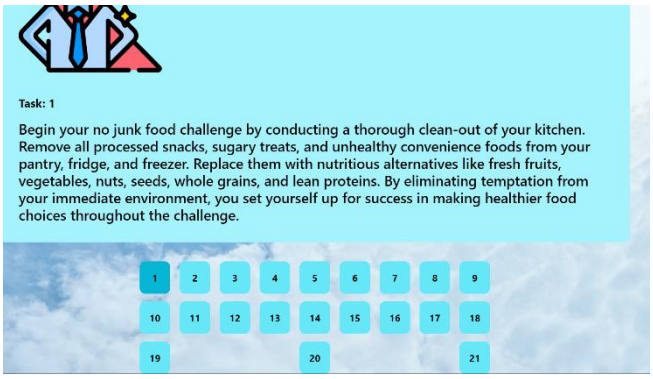

Fig b.5- 21 days challenge- Task recommendation for a specific goal

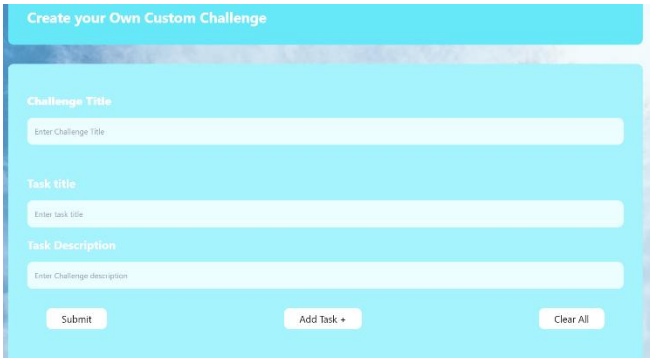

Fig b.6- Custom challenges/Tasks

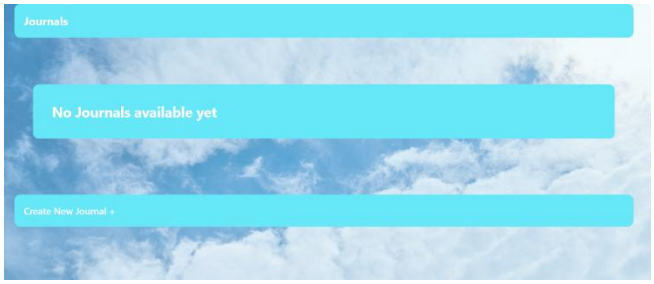

Fig b.7- Journaling

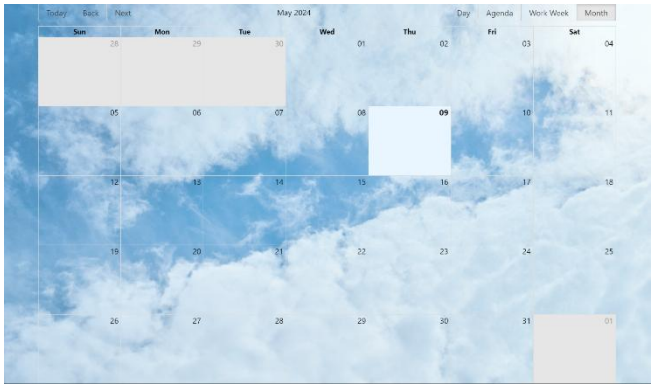

Fig b.8 – Planner

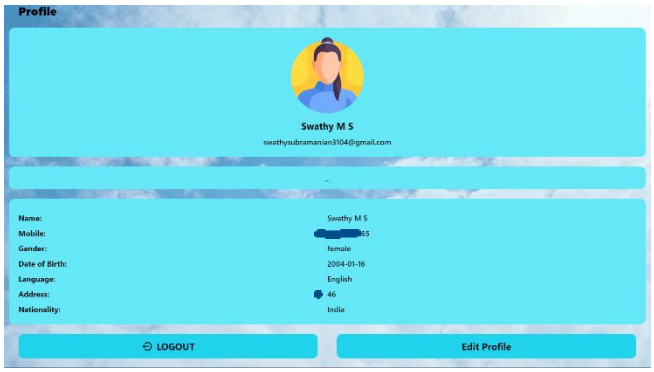

Fig b.9- User Profile

VIII. FUTURE ENHANCEMENT

Podcast Suggestions: Audio content can be a valuable resource for relaxation, inspiration, and personal growth. We will curate a diverse selection of podcasts focused on mental health, mindfulness, self-care, and personal development. Users can discover and listen to podcasts directly within the Be Well app, enhancing their mental wellness journey.

Article and Music Suggestions: We recognize the importance of engaging content in promoting mental well-being. To inspire and uplift users, we will offer curated articles and music recommendations tailored to their interests and preferences. These resources will serve as sources of inspiration, motivation, and relaxation.

Community Building: Connection and support are integral to mental health recovery and resilience. We will introduce community features within the Be Well app, enabling users to connect with like-minded individuals, share experiences, offer encouragement, and participate in group activities and discussions. The Be Well community will serve as a supportive space for fostering meaningful connections and mutual support.

XI. ACKNOWLEDGEMENT

I thank the Almighty for showering His blessings upon me in completing the project. I submit this project with a deep sense of gratitude and reverence for my beloved parents for their moral support and encouragement.

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