CareerSphere AI-Smart Student Wellness & Career Prediction

Project Synopsis

MASTER OF COMPUTER APPLICATION

PROJECT GUIDE:

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Table of Contents

1   Project Title

CareerSphere AI – Smart Student Wellness & Career Prediction

2   Domain

This project lies in the domain of *Machine Learning*, a subset of Artificial Intelligence that enables systems to learn from data and make intelligent predictions without explicit programming. Machine learning techniques are used in this project to evaluate student behavior, academic performance, and lifestyle factors to generate predictive insights.

In **CareerSphere AI**, algorithms such as the **Random Forest Classifier** and **XGBoost** are applied to analyze student data and provide accurate predictions in three areas — mental health analysis, burnout risk assessment, and internship recommendation. The use of these models allows the system to make data-driven decisions, ensuring precise and personalized outcomes for every student.

3   Problem Statement

Students today face multiple challenges that affect both their academic performance and personal well-being. High levels of stress, mental health issues, and burnout are common, yet often go unmonitored due to lack of timely assessment tools. Additionally, students frequently struggle to identify suitable career paths or internship opportunities aligned with their skills and interests.

This project was selected to address these critical issues by developing **CareerSphere AI – Smart Student Wellness & Career Prediction**. The system provides a unified solution to:

- Assess mental health and detect early signs of stress or anxiety.

- Predict burnout risk based on lifestyle and academic patterns.

- Recommend personalized internships and career opportunities using data-driven analysis.

By leveraging **machine learning algorithms**, including **Random Forest Classifier** and **XGBoost**, the system delivers accurate and actionable insights, enabling students to maintain wellness and make informed career decisions.

4   Project Description

CareerSphere AI – Smart Student Wellness & Career Prediction is designed as an integrated platform to monitor students' mental wellness, predict burnout, and recommend personalized internship opportunities using machine learning techniques. The system collects student data, analyzes behavioral patterns, and provides actionable insights to support well-being and career growth.

The project is structured to have a modular design where each module performs a specific function, but all modules work together to form a unified system. Machine learning algorithms, including **Random Forest Classifier** and **XGBoost**, are implemented to ensure accurate predictions and recommendations.

4.1   Scope of the Work
What will be done:

- Collection of student data through forms and activity tracking.

- Analysis of mental health parameters and lifestyle factors.

- Prediction of burnout risk using machine learning models.

- Recommendation of suitable internships and career paths based on student skills and preferences.

- Visualization of results via dashboards and charts for easy interpretation.

What will not be done:

- This project will not provide medical treatment or replace professional counseling.

- It will not manage actual internship applications; it only provides recommendations.

- The system does not cover students outside the enrolled dataset scope.

4.2   Project Modules

1. Mental Health Checker

- Collects inputs related to mood, stress levels, sleep patterns, and academic pressure.

- Uses **Random Forest Classifier** to classify students into **High, Moderate, or Low** mental wellness categories.

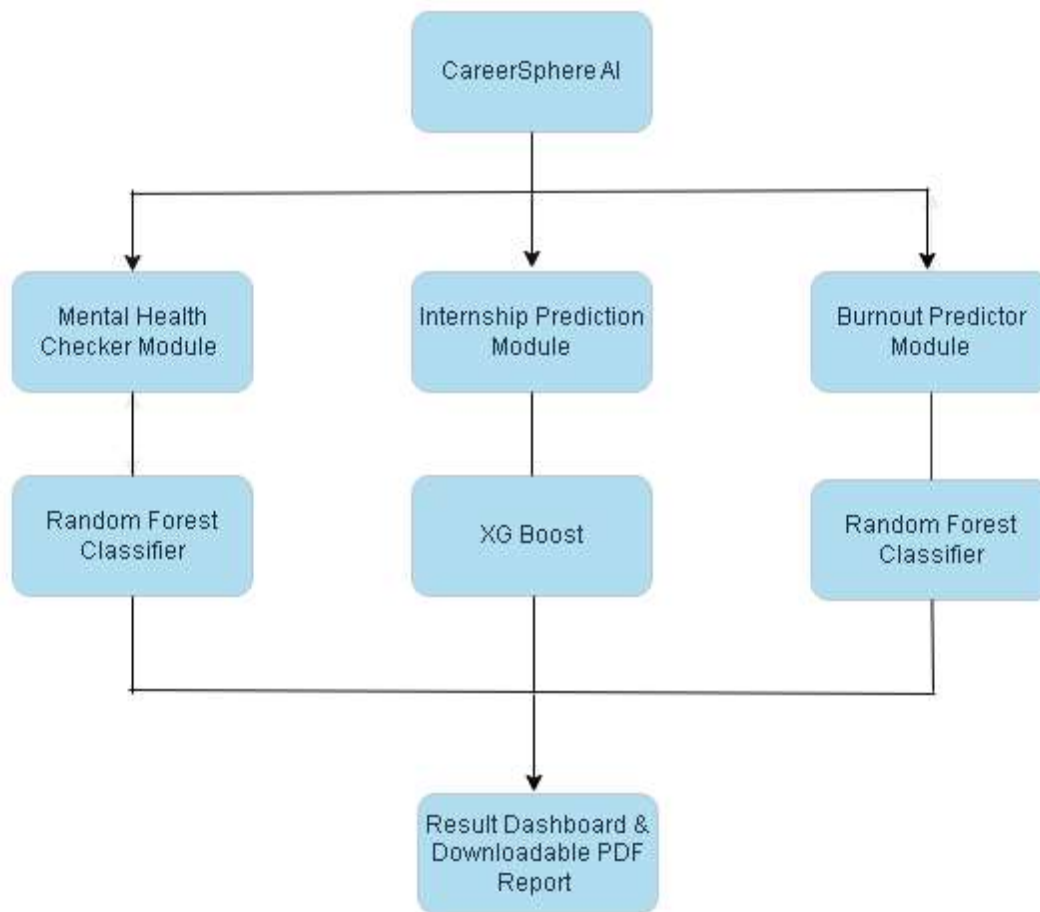● Provides actionable suggestions and generates a **downloadable wellness report** summarizing scores.

2. Internship Prediction

● Evaluates academic performance, skills, and student preferences.

● Uses **XGBoost** algorithm to predict suitable internship opportunities.

● Assigns **High, Moderate, or Low** suitability scores for each opportunity.

● Generates a **downloadable internship recommendation report**.

3. Burnout Prediction

● Monitors workload, lifestyle patterns, and stress levels.

● Uses **Random Forest Classifier** to predict burnout risk levels (**High, Moderate, Low**).

● Provides **visual charts** and a **downloadable burnout report** to help students manage stress proactively.

High Level System Architecture Diagram

5 Implementation Methodology

The implementation of **CareerSphere AI** follows a structured approach to collect data, process it, train machine learning models, and generate actionable insights. The methodology ensures accuracy, reliability, and usability for students.

Step 1: Data Collection

- Student data is collected through secure forms, including **academic performance, lifestyle habits, mental health indicators**, and skill profiles.

● All input data is anonymized to maintain privacy.

Step 2: Data Preprocessing

● Cleaning missing or inconsistent data.

● Feature extraction and normalization to prepare data for machine learning models.

● Categorical data (like stress levels, sleep patterns) is encoded for model compatibility.

Step 3: Model Training

● **Mental Health Checker:** Trained using **Random Forest Classifier** on labeled student wellness datasets.

● **Burnout Prediction:** Trained using **Random Forest Classifier** on historical workload and lifestyle data.

● **Internship Prediction:** Trained using **XGBoost** on student skill, performance, and internship datasets.

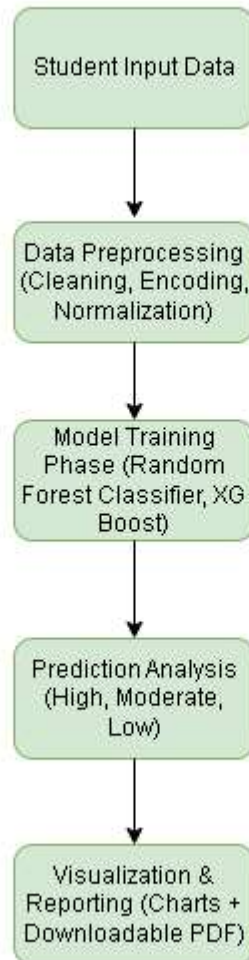● Models are evaluated using **accuracy, precision, recall, and F1-score** to ensure reliability.

Step 4: Prediction & Classification

● Each module predicts outcomes in **High, Moderate, or Low** categories based on trained models.

● Thresholds for classification are defined based on model outputs and historical data.

Step 5: Dashboard & Report Generation

● Predictions are visualized on interactive dashboards using charts and graphs.

● **Downloadable PDF reports** are generated for mental health, burnout, and internship suitability, allowing students to track and save their results.

Machine Learning Workflow Diagram

Student Input Data

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Data Preprocessing (Cleaning, Encoding, Normalization)

↓

Model Training Phase (Random Forest Classifier, XG Boost)

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Prediction Analysis (High, Moderate, Low)

↓

Visualization & Reporting (Charts + Downloadable PDF)

6   Technologies to be used

6.1   Software Platform
   a)   **Front-end**

The front-end of *CareerSphere AI* has been developed using modern web technologies to ensure an intuitive and responsive user interface.

- **HTML5** – For creating structured web pages.

- **CSS3** – For styling and responsive page layouts.
- **JavaScript (ES6)** – For interactivity and dynamic content handling.
- **Chart.js / ApexCharts** – For generating interactive visualizations such as bar, radar, and donut charts in reports.
- **Bootstrap 5** – To design a mobile-friendly and consistent UI across all modules.

b) **Back-end**
The back-end is responsible for data management, model integration, and report generation.

- **PHP (v8.0)** – Used as the server-side scripting language for handling requests, user sessions, and communication with the database.

- **Python (v3.12)** – Used for implementing and training the machine learning models (Random Forest and XGBoost).

- **MySQL (v8.0)** – Acts as the primary database for storing student data, predictions, and user information.

- **XAMPP Server** – Provides the development environment integrating Apache, PHP, and MySQL.

6.2 Hardware Platform

The project is designed to run on a standard computing system with the following specifications:

- **Processor:** Intel Core i5 or higher

- **RAM:** Minimum 8 GB

- **Hard Disk:** Minimum 512 GB (SSD preferred)

- **Operating System:** Windows 10 / 11 (64-bit)

- **Editor/IDE:** Visual Studio Code (v1.92) and Jupyter Notebook

- **Browser:** Google Chrome / Microsoft Edge (latest version)

6.3   Tools

The following tools and libraries have been used during various stages of the project development life cycle:

Tool/Library	Vendor/Source	Version	Purpose
Visual Studio Code	Microsoft	1.92	Code editing and front-end development
XAMPP	Apache Friends	8.0.30	Local server setup with PHP and MySQL
Python	Python Software Foundation	3.12	ML model training and implementation
Scikit-learn	Open Source	1.5.1	For Random Forest Classifier implementation
XGBoost	Open Source	2.1.0	For high-accuracy internship prediction
Pandas,Numpy	Open Source	Latest	For dataset manipulation and numerical operations
Matplotlib, Seaborn	Open Source	Latest	For visual analysis during model testing
Chart.js/ ApexCharts	Open Source	Latest	For report visualization in web dashboard
jsPDF	Parallax/ Open Source	2.5.2	For generating downloadable PDF reports

7   Advantages of this Project

The **CareerSphere AI** system provides multiple benefits to students, academic institutions, and administrators by integrating wellness assessment with intelligent career guidance. Some of the major advantages are listed below:

1. **Holistic Student Development:**

   The system goes beyond academics by analyzing mental health, burnout risk, and career interests together, promoting overall student well-being.

2. **Early Detection of Mental Health Issues:**

   Using the *Random Forest Classifier*, the system can identify early signs of stress, anxiety, or burnout, allowing students to seek help before the situation worsens.

3. **Personalized Career and Internship Recommendations:**

   The *XGBoost* model provides accurate and personalized internship recommendations based on student profiles, skills, and academic data, helping students make informed career choices.

4. **Data-Driven Decision Making:**

   Predictions and reports are generated from real data, reducing human bias and ensuring that each recommendation is supported by statistical evidence.

5. **Time-Saving and Efficient:**

   Students no longer need to manually search for opportunities or complete lengthy surveys—AI automates the process, delivering results within seconds.

6. **Interactive and User-Friendly Interface:**

   The use of visual charts, categorized scores (High, Moderate, Low), and downloadable PDF reports makes the system engaging and easy to interpret for users of all backgrounds.

7. **Scalable and Extensible Platform:**

   The modular design allows new predictive models and features to be added easily, such as skill development tracking or academic performance forecasting.

8. **Institutional Benefit:**

   Colleges and universities can use the platform to monitor student well-being trends, improve academic support systems, and plan proactive interventions.

8   Future Scope and further enhancement of the Project

The **CareerSphere AI** system has significant potential for expansion and improvement in both functionality and user experience. As technology and educational analytics evolve, several enhancements can be implemented to make the platform more intelligent, accessible, and impactful.

1. **Mobile Application Integration:**
   A dedicated Android and iOS application can be developed to allow students to access wellness reports and internship recommendations conveniently on their mobile devices.

2. **AI-Powered Chatbot Assistance:**
   A conversational chatbot can be introduced to guide students through their reports, explain their burnout or mental health results, and suggest improvement strategies in real time.

3. **Integration with University Databases:**
   Linking the system with institutional databases and Learning Management Systems (LMS) will enable automatic data updates related to attendance, grades, and participation patterns for better analysis.

4. **Enhanced Mental Health Support:**
   Collaboration with certified counselors or psychologists can be integrated so that students identified at risk can directly connect to professional help through the platform.

5. **Gamification and Badges:**
   Introducing achievement badges or wellness points can motivate students to maintain healthy habits and engage more actively with the platform.

6. **Multilingual and Voice Support:**
   Implementing regional language options and voice commands will make the system more inclusive, especially for students who face difficulties in English communication.

7. **Advanced Predictive Analytics:**
   Future versions can include deep learning models for more accurate behavior prediction, academic performance forecasting, and domain-specific career recommendations.

8. **Institutional Dashboard for Analytics:**
   A separate admin dashboard can be built for institutions to visualize trends in student wellness, burnout levels, and career readiness, helping them make informed academic decisions.

9   Team Details

Project Name & ID	Course Name	Student ID	Student Name	Role	Signature
CareerSphere AI-Smart Student Wellness & Career Prediction	Master of Computer Application	TCA2463123	Vatsal Negi	Developer	
		TCA2463114	Sonu	Designer	
		TCA2463106	Shivam Kumar	Tester	

10 Conclusion

The **CareerSphere AI** project successfully combines the domains of *Machine Learning* and *Student Wellness* to create a smart, data-driven platform that predicts mental health status, burnout risk, and suitable career opportunities. By integrating advanced algorithms such as the **Random Forest Classifier** and **XGBoost**, the system ensures high accuracy and reliability in predictions while maintaining ease of use through an interactive web interface.

The project stands out due to its **innovative multi-module design**, which not only focuses on academic growth but also emphasizes the emotional and psychological well-being of students— an area often overlooked in traditional career platforms. The inclusion of **personalized reports**, **visual insights**, and **AI-based recommendation mechanisms** makes the system both practical and impactful.

Moreover, the project's modular structure allows seamless future expansion, enabling the integration of advanced analytics, chatbot assistance, and multilingual accessibility. Overall, **CareerSphere AI** represents a forward-thinking approach toward holistic student development, bridging the gap between education, wellness, and technology through intelligent automation.

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