

# **SRI KRISHNA ARTS AND SCIENCE COLLEGE**

## **FINAL YEAR PROJECT REVIEW - 1**

Guide:

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# PROJECT TITLE

## Adaptive Peer Tutoring and Collaborative Learning Platform Using Machine Learning





# COMPANY DETAILS

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# ABSTRACT

This project introduces an **Adaptive Peer Tutoring and Collaborative Learning Platform** that uses machine learning to create personalized and interactive educational experiences. The platform identifies students' strengths and weaknesses, matches them with suitable peer tutors, and facilitates real-time collaboration. With multilingual support, including regional languages, and progress tracking, it ensures inclusive learning for students from diverse backgrounds. Designed to enhance academic performance through peer interaction, this platform promotes mutual growth and fosters an engaging learning environment.

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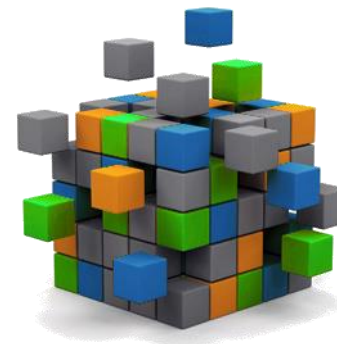
# PROBLEM STATEMENT

1. Students often struggle to understand subjects due to gaps in learning and lack of personalized help.
2. Language barriers hinder effective communication and learning for non-English-speaking students.
3. Current platforms lack real-time adaptive peer collaboration and multi-language support.



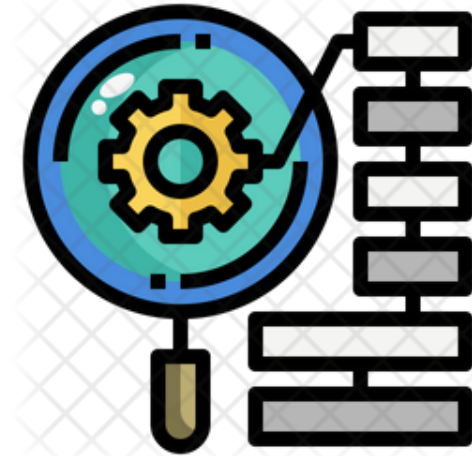
# MODULES

1. User Authentication and Profile Management.
2. Skill Assessment and Data Collection.
3. Peer Matching using Machine Learning.
4. Learning Resource Management & Personalized Content Delivery.
5. Scheduling and Notification Module.
6. Progress Monitoring & Feedback.
7. Multilingual Support.
8. Admin Dashboard.



# PROPOSED METHODOLOGY

1. Requirement Analysis.
2. System Design.
3. Data Collection and Preprocessing.
4. Machine Learning Model Development.
5. Platform Development.
6. Testing.
7. Deployment.



# EXPECTED OUTPUT

1. Use **machine learning algorithms** to analyze students' academic performance and match peers based on complementary skills.
2. Provide **real-time chat, voice, and video-based tutoring sessions** with integrated **language translation**.
3. Offer **localized learning materials** in regional languages (e.g., Tamil, Telugu, Hindi).







# MODULE DESCRIPTION

## 1. User Authentication and Profile Management:

**Objective:** Manage user accounts (students) and preferences (languages, subjects).

### Core Features:

- Sign-up/login functionality.
  - Profile creation (with academic strengths, subjects they need help with, preferred language).
  - Role-based access control (students, admins).
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## **2. Skill Assessment and Data Collection:**

**Objective:** Collect academic data for effective matching of tutors and learners.

### **Core Features:**

- Surveys or quizzes to identify strengths and weaknesses.
  - Data collection on learning styles and preferences.
  - Self-assessment tools for students to rate their skills.
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### **3. Peer Matching using Machine Learning:**

**Objective:** Match students with appropriate peer tutors based on skills.

**Core Features:**

- Use clustering algorithms (e.g., K-Means) to categorize students.
  - Implement collaborative filtering to recommend peer tutors.
  - NLP to analyze student input (e.g., questions or subjects) and match based on the best-fit profiles.
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#### **4. Learning Resource Management & Personalized Content Delivery:**

**Objective:** To provide students with personalized learning resources and content tailored to their academic needs and progress.

**Core Features:**

- Content recommendation system based on student performance and preferences.
  - Dynamic delivery of learning materials (videos, articles, quizzes) in preferred formats.
  - Integration of subject-specific resources to address identified knowledge gaps.
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## 5. Progress Monitoring & Feedback:

**Objective:** Track the progress of students and ensure the system improves over time.

### Core Features:

- Collect feedback after sessions (students and tutors).
  - Monitor improvements in academic performance (quiz results, ratings).
  - Data-driven feedback to improve matchmaking and learning sessions.
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## 6. Multilingual Support:

**Objective:** Provide language support to make the platform accessible to non-English speakers.

### **Core Features:**

- Multi-language registration and session support (e.g., Tamil, Telugu, Hindi, etc.).
  - Real-time translation for chat and content using NLP or translation APIs.
  - Allow students and tutors to choose their preferred languages for better understanding.
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## 7. Admin Dashboard:

**Objective:** Monitor the platform's usage, track student progress, and manage users.

### Core Features:

- Admin panel to oversee user profiles and interactions.
  - Reporting tools for session statistics, feedback, and performance tracking.
  - User management (deleting or editing profiles).
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# SOFTWARE SPECIFICATION

## 1. Functional Requirements:

- **User Authentication & Profile Management:** Role-based access, profile creation for students/tutors, and secure login.
  - **Skill Assessment & Data Collection:** Quizzes and surveys to assess student strengths, weaknesses, and learning preferences.
  - **Peer Matching Using Machine Learning:** Match students to appropriate tutors using clustering algorithms and collaborative filtering.
  - **Learning Resource Management & Personalized Content Delivery:** Personalized content delivery based on student profiles and learning styles.
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- **Progress Monitoring & Feedback:** Track student progress, provide feedback, and refine peer matching algorithms over time.
  - **Multilingual Support:** Real-time translation for a multilingual interface and session support.
  - **Admin Dashboard:** User management and monitoring platform usage and performance.
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## 2. Non-Functional Requirements

- **Performance:** Scalable to handle multiple users, real-time communication, and minimal latency.
  - **Security:** SSL encryption, OAuth2 for secure login, and data protection.
  - **Usability:** Intuitive interface with easy navigation and multilingual support.
  - **Scalability:** Cloud-based architecture for platform scalability.
  - **Availability:** High availability with minimal downtime.
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### 3. Tools Used:

- **Frontend:** React.js, HTML, CSS.
  - **Backend:** Django, Python
  - **Machine Learning:** Scikit-learn, TensorFlow
  - **Database:** SQLite/PostgreSQL
  - **Real-time Communication:** WebRTC, Zoom API
  - **Security:** OAuth2, SSL Encryption
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# HARDWARE SPECIFICATION

## Processor:

- **CPU:** AMD Ryzen 7 4800H (8 cores, 16 threads)
- **Base Clock Speed:** 2.9 GHz
- **Max Turbo Speed:** 4.2 GHz

## Graphics:

- **GPU:** NVIDIA GeForce GTX 1660 Ti or RTX 2060 (depending on the variant)
- **VRAM:** 6 GB GDDR5 (for GTX 1660 Ti) or 6 GB GDDR6 (for RTX 2060)

## Memory (RAM):

- **RAM Size:** 16 GB DDR4
- **RAM Speed:** 3200 MHz
- **Upgradable:** Yes (supports up to 32 GB)\_\_\_\_\_



## **Storage:**

- **Primary Storage:** 512 GB PCIe Gen 3 SSD
- **Secondary Storage:** Option for an additional 2.5" HDD/SSD

## **Display:**

- **Screen Size:** 15.6 inches
- **Resolution:** Full HD (1920 x 1080)
- **Refresh Rate:** 144Hz (for gaming-focused smoothness)

## **Battery:**

- **Battery Capacity:** 48 Wh
  - **Battery Life:** Approx. 7-8 hours (depends on usage)
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### **Ports and Connectivity:**

- **USB Ports:** 2 x USB 3.2 Type-A, 1 x USB 3.2 Type-C
- **Ethernet:** 1 x RJ-45 port
- **HDMI:** 1 x HDMI 2.0
- **Audio:** 3.5mm headphone/microphone combo jack
- **Wi-Fi:** Wi-Fi 6 (802.11ax)
- **Bluetooth:** Bluetooth 5.0

### **Operating System:**

- **OS:** Windows 10 Home or Pro (depends on the variant)
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**THANK YOU**

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