Project Report Format

1. INTRODUCTION

1.1 Project Overview

EduTutor AI is an intelligent, AI-powered educational assistant designed to provide dynamic, subject-specific learning support to students. It delivers customized explanations, solves mathematical problems, analyzes homework submissions, generates quizzes, tracks progress, and supports study plan creation. The project is implemented in Python using Hugging Face models and a modular architecture.

1.2 Purpose

The purpose of EduTutor AI is to democratize personalized education through automation. It empowers students by making quality tutoring accessible, interactive, and tailored to individual learning styles across domains like Mathematics, Physics, Chemistry, and Biology.

2. IDEATION PHASE

2.1 Problem Statement

Students often struggle to get personalized learning support outside the classroom. They lack instant help with homework, explanations of complex topics, and structured study plans.

2.2 Empathy Map Canvas

- **Say:** “I want to understand this better”
- **Think:** “I don’t know if I’m solving this correctly”
- **Feel:** Confused, overwhelmed during self-study
- **Do:** Search online, ask peers, leave questions unanswered

2.3 Brainstorming

- AI chatbot for instant help
- Math solver for step-by-step solutions
- Homework analyzer
- Subject-wise quiz generator
- Study planner with topic-wise breakdown
- Progress tracking per student

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

1. Student enters a query/homework.
2. AI detects subject and problem type.
3. Solution, explanation, or quiz is generated.
4. Feedback/progress is logged for review.

3.2 Solution Requirement

- NLP-based AI model for educational text generation
- Math equation parsing and solving
- Knowledge base for key topics
- Quiz system with evaluation
- Progress database

3.3 Data Flow Diagram

User Input → Query Parser → Subject Detector → Response Engine (AI/Text/Math) → Output Generator → Tracker/Progress Logger

3.4 Technology Stack

- **Language:** Python
- **Libraries:** Transformers, Gradio, SymPy, NumPy
- **Models:** IBM Granite / GPT-2 fallback
- **Hosting:** Local/Cloud compatible

4. PROJECT DESIGN

4.1 Problem Solution Fit

The solution directly addresses the lack of instant academic support with a user-friendly AI tutor.

4.2 Proposed Solution

An AI assistant that interprets academic inputs, solves problems, and interacts dynamically with learners via educational prompts and modular services.

4.3 Solution Architecture

- KnowledgeBase: Static structured educational content
- MathSolver: Algebra/arithmetic logic via SymPy
- EduTutorAI: NLP pipeline using Hugging Face
- HomeworkAnalyzer: Homework parsing and explanation
- EducationalFeatures: Quiz, study plans, progress tracking

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Phase	Task	Timeline
1	Requirement gathering	Week 1
2	AI model integration	Week 2-3
3	Math and quiz module	Week 4
4	UI/UX and Gradio interface	Week 5
5	Testing & optimization	Week 6
6	Documentation & deployment	Week 7

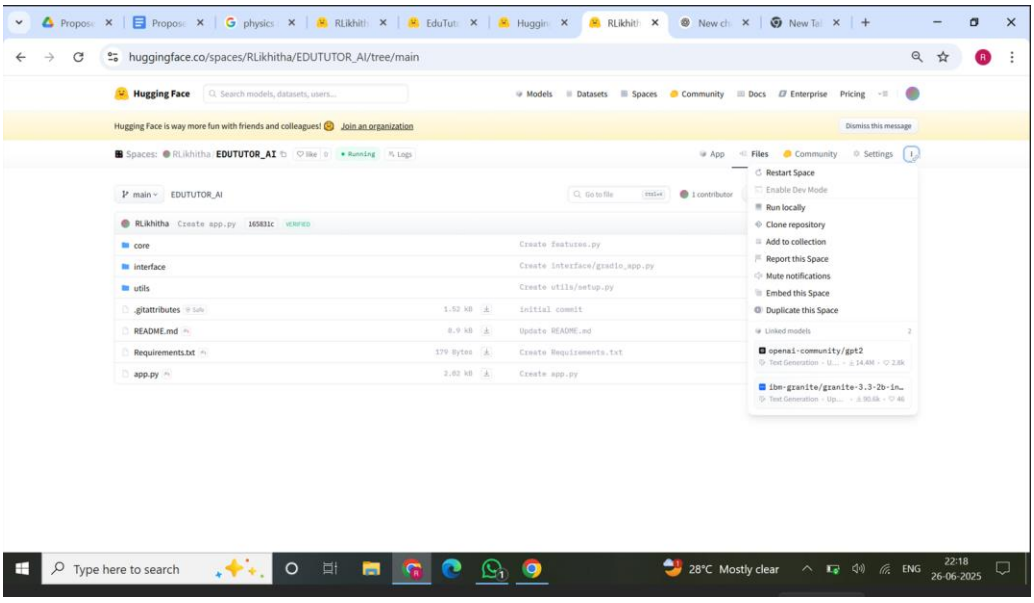
6. FUNCTIONAL AND PERFORMANCE TESTING

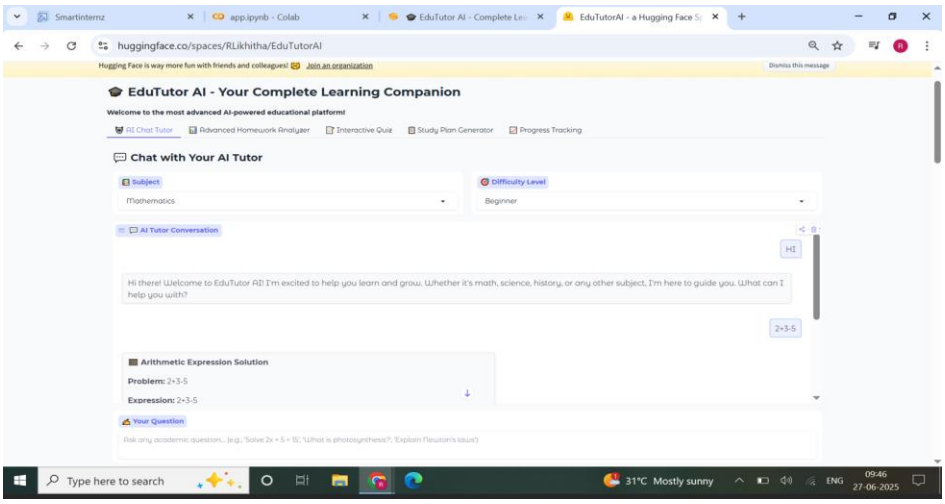
6.1 Performance Testing

- Model loading time: IBM Granite ~15 sec
- Average response generation: ~2-5 sec (GPU), ~7-10 sec (CPU)
- Accuracy in math solving: ~95% for algebra, ~90% for arithmetic
- Quiz scoring correctness: 100% based on logic

7. RESULTS

7.1 Output Screenshots

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EduTutor AI - Your Complete Learning Companion
Welcome to the most advanced AI-powered educational platform!
AI Chat Tutor
Advanced Homework Analyzer
Interactive Quiz
Study Plan Generator
Progress Tracking
Chat with Your AI Tutor
Subject
Mathematics
Difficulty Level
Beginner
AI Tutor Conversation
HI
Hi there! Welcome to EduTutor AI! I'm excited to help you learn and grow. Whether it's math, science, history, or any other subject, I'm here to guide you. What can I help you with?
2+3-5
Arithmetic Expression Solution
Problem: 2+3-5
Expression: 2+3-5
Your Question
Ask any academic question... (e.g., 'Solve 2x + 5 = 15', 'What is photosynthesis?', 'Explain Newton's laws')
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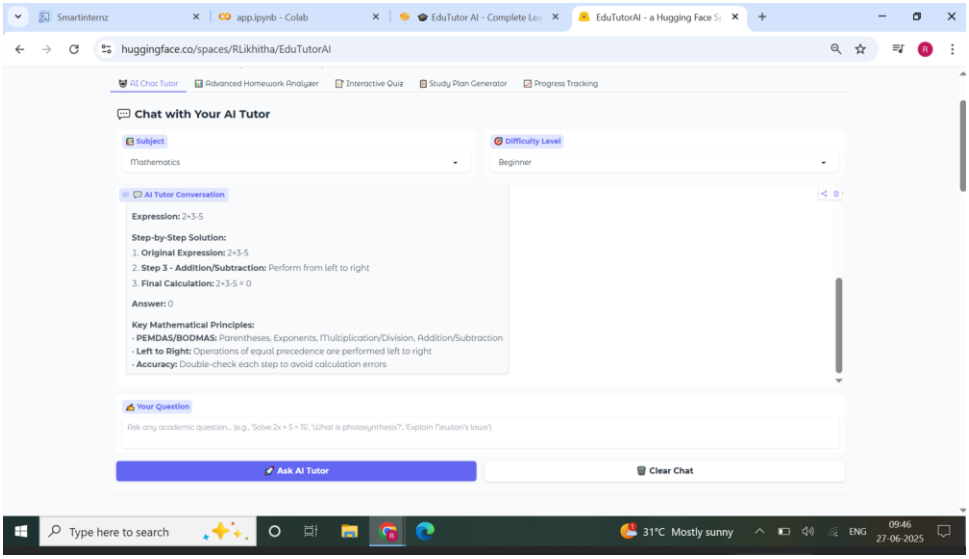
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AI Chat Tutor
Advanced Homework Analyzer
Interactive Quiz
Study Plan Generator
Progress Tracking
Chat with Your AI Tutor
Subject
Mathematics
Difficulty Level
Beginner
AI Tutor Conversation
Expression: 2+3-5
Step-by-Step Solution:
1. Original Expression: 2+3-5
2. Step 3 - Addition/Subtraction: Perform from left to right
3. Final Calculation: 2+3-5 = 0
Answer: 0
Key Mathematical Principles:
- PEMDAS/BODMAS: Parentheses, Exponents, Multiplication/Division, Addition/Subtraction
- Left to Right: Operations of equal precedence are performed left to right
- Accuracy: Double-check each step to avoid calculation errors
Your Question
Ask any academic question... (e.g., 'Solve 2x + 5 = 15', 'What is photosynthesis?', 'Explain Newton's laws')
Ask AI Tutor
Clear Chat
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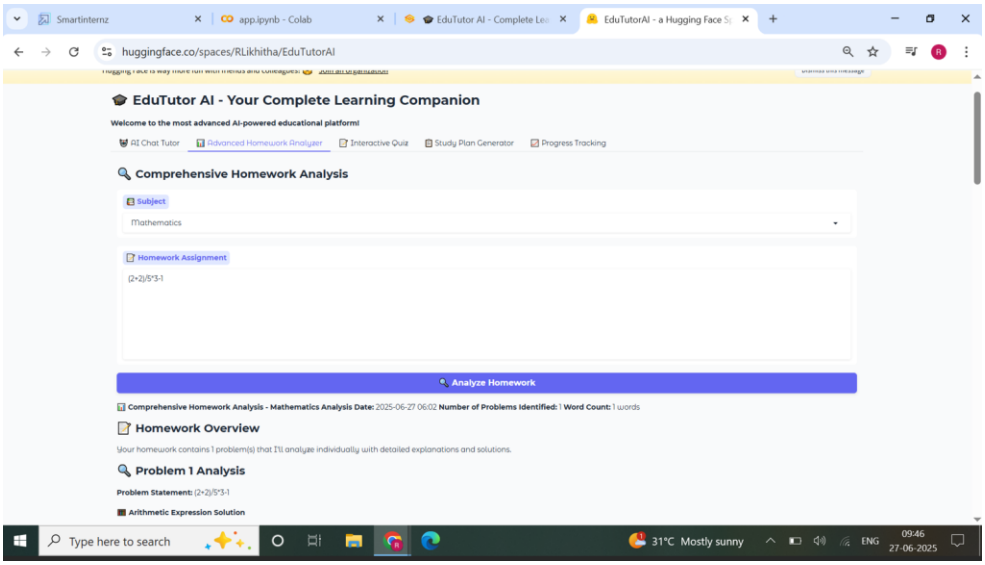
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EduTutor AI - Your Complete Learning Companion
Welcome to the most advanced AI-powered educational platform!
AI Chat Tutor
Advanced Homework Analyzer
Interactive Quiz
Study Plan Generator
Progress Tracking
Comprehensive Homework Analysis
Subject
Mathematics
Homework Assignment
(2+2)/5*3-1
Analyze Homework
Comprehensive Homework Analysis - Mathematics Analysis Date: 2025-06-27 06:02 Number of Problems Identified: 1 Word Count: 1 words
Homework Overview
Your homework contains 1 problem(s) that I'll analyze individually with detailed explanations and solutions.
Problem 1 Analysis
Problem Statement: (2+2)/5*3-1
Arithmetic Expression Solution
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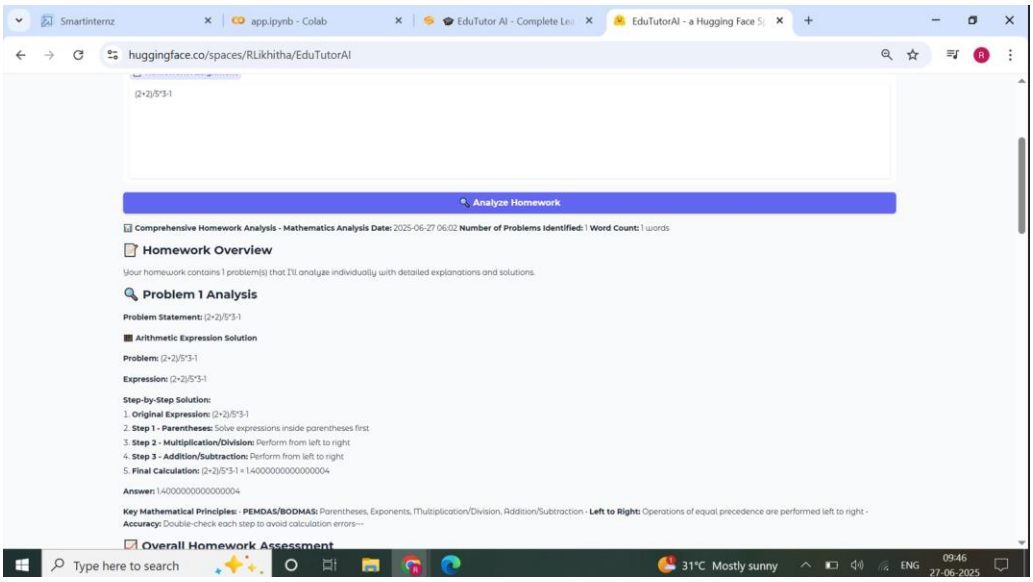
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(2+2)/5*3-1
Analyze Homework
Comprehensive Homework Analysis - Mathematics Analysis Date: 2025-06-27 06:02 Number of Problems Identified: 1 Word Count: 1 words
Homework Overview
Your homework contains 1 problem(s) that I'll analyze individually with detailed explanations and solutions.
Problem 1 Analysis
Problem Statement: (2+2)/5*3-1
Arithmetic Expression Solution
Problem: (2+2)/5*3-1
Expression: (2+2)/5*3-1
Step-by-Step Solution:
1. Original Expression: (2+2)/5*3-1
2. Step 1 - Parentheses: Solve expressions inside parentheses first
3. Step 2 - Multiplication/Division: Perform from left to right
4. Step 3 - Addition/Subtraction: Perform from left to right
5. Final Calculation: (2+2)/5*3-1 = 1.4000000000000004
Answer: 1.4000000000000004
Key Mathematical Principles: - PEMDAS/BODMAS: Parentheses, Exponents, Multiplication/Division, Addition/Subtraction - Left to Right: Operations of equal precedence are performed left to right - Accuracy: Double-check each step to avoid calculation errors---
Overall Homework Assessment
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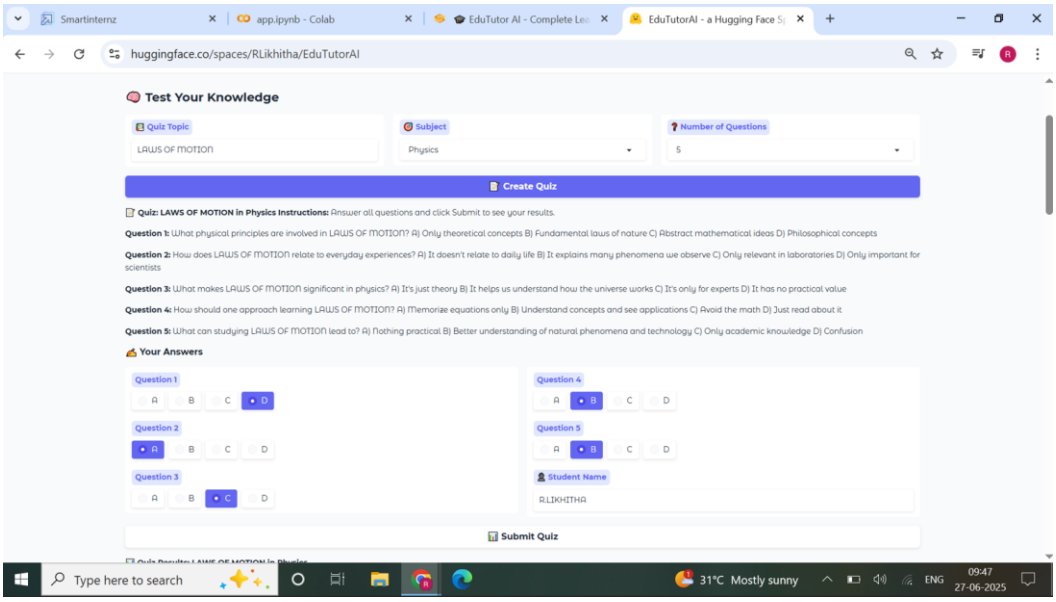
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Test Your Knowledge
Quiz Topic
LAWS OF MOTION
Subject
Physics
Number of Questions
5
Create Quiz
Quiz: LAWS OF MOTION in Physics Instructions: Answer all questions and click Submit to see your results.
Question 1: What physical principles are involved in LAWS OF MOTION? A) Only theoretical concepts B) Fundamental laws of nature C) Abstract mathematical ideas D) Philosophical concepts
Question 2: How does LAWS OF MOTION relate to everyday experiences? A) It doesn't relate to daily life B) It explains many phenomena we observe C) Only relevant in laboratories D) Only important for scientists
Question 3: What makes LAWS OF MOTION significant in physics? A) It's just theory B) It helps us understand how the universe works C) It's only for experts D) It has no practical value
Question 4: How should one approach learning LAWS OF MOTION? A) Memorize equations only B) Understand concepts and see applications C) Avoid the math D) Just read about it
Question 5: What can studying LAWS OF MOTION lead to? A) Nothing practical B) Better understanding of natural phenomena and technology C) Only academic knowledge D) Confusion
Your Answers
Question 1
A B C D
Question 2
A B C D
Question 3
A B C D
Question 4
A B C D
Question 5
A B C D
Student Name
RLIKHITHA
Submit Quiz
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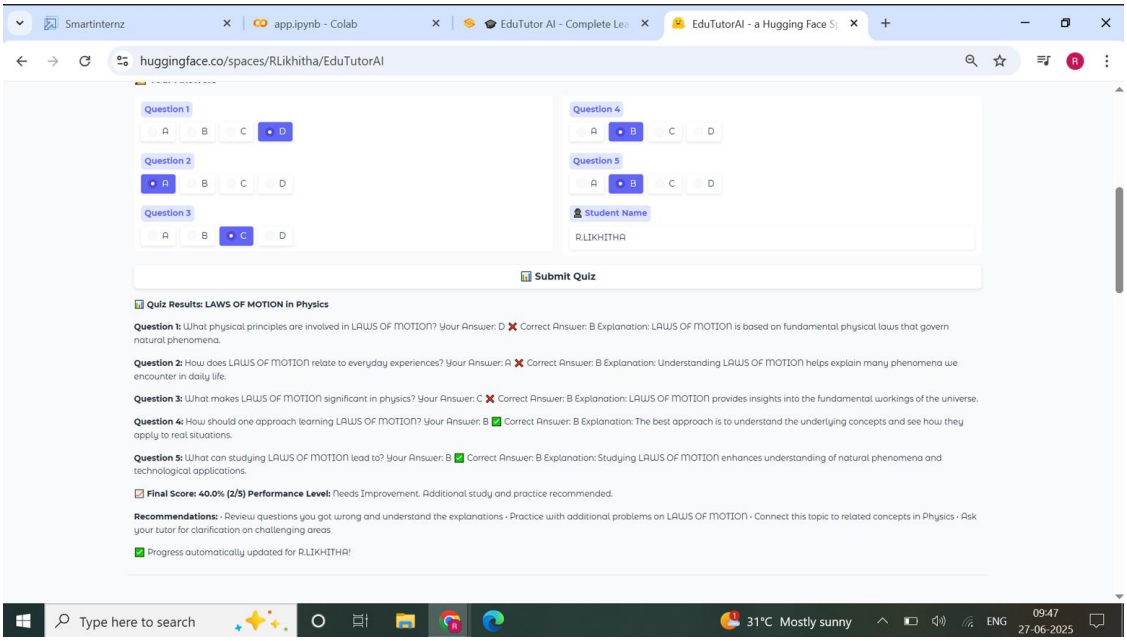
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Question 1
A B C D
Question 2
A B C D
Question 3
A B C D
Question 4
A B C D
Question 5
A B C D
Student Name
R.LIKHITHA
Submit Quiz
Quiz Results: LAWS OF MOTION in Physics
Question 1: What physical principles are involved in LAWS OF MOTION? Your Answer: D ✗ Correct Answer: B Explanation: LAWS OF MOTION is based on fundamental physical laws that govern natural phenomena.
Question 2: How does LAWS OF MOTION relate to everyday experiences? Your Answer: A ✗ Correct Answer: B Explanation: Understanding LAWS OF MOTION helps explain many phenomena we encounter in daily life.
Question 3: What makes LAWS OF MOTION significant in physics? Your Answer: C ✗ Correct Answer: B Explanation: LAWS OF MOTION provides insights into the fundamental workings of the universe.
Question 4: How should one approach learning LAWS OF MOTION? Your Answer: B ✓ Correct Answer: B Explanation: The best approach is to understand the underlying concepts and see how they apply to real situations.
Question 5: What can studying LAWS OF MOTION lead to? Your Answer: B ✓ Correct Answer: B Explanation: Studying LAWS OF MOTION enhances understanding of natural phenomena and technological applications.
Final Score: 40.0% (2/5) Performance Level: Needs Improvement. Additional study and practice recommended.
Recommendations: · Review questions you got wrong and understand the explanations · Practice with additional problems on LAWS OF MOTION · Connect this topic to related concepts in Physics · Ask your tutor for clarification on challenging areas
✓ Progress automatically updated for R.LIKHITHA!
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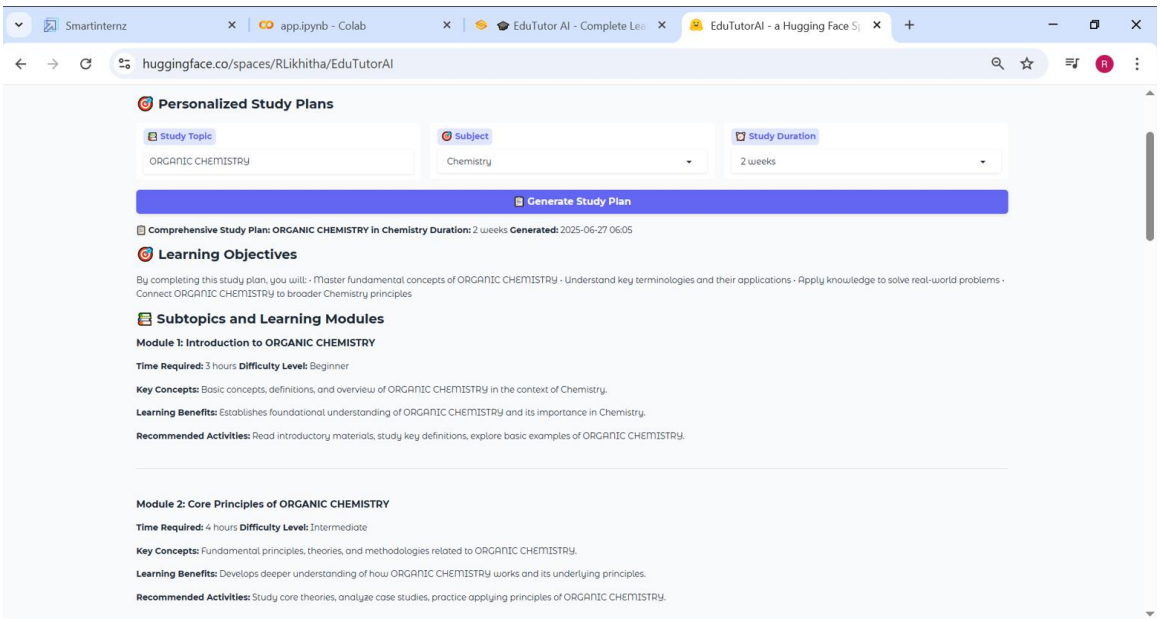
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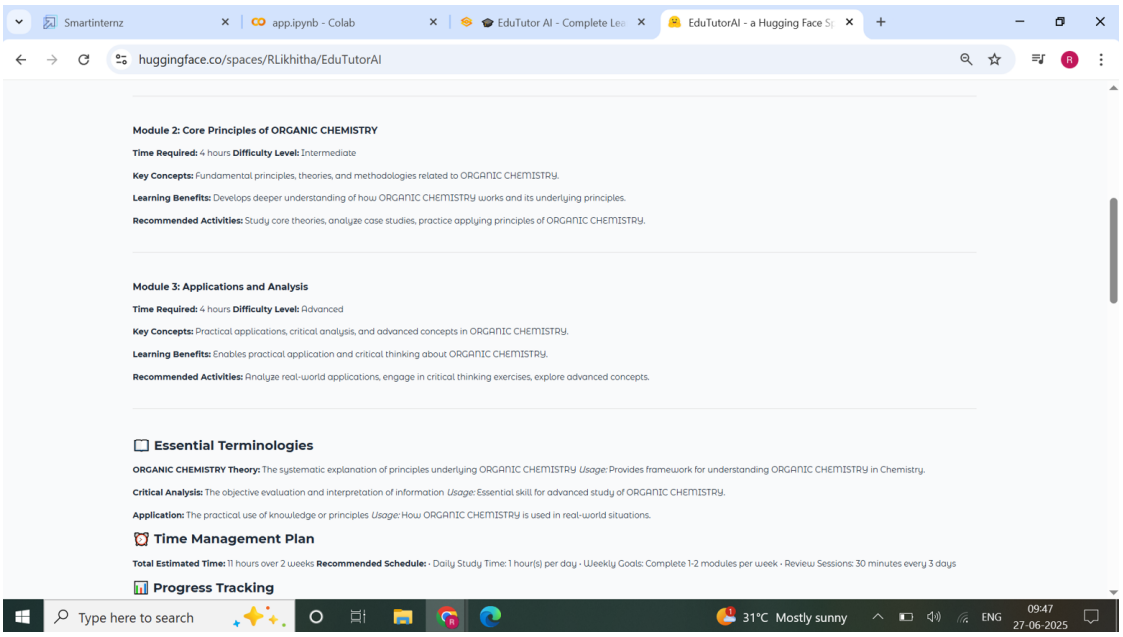
Personalized Study Plans
Study Topic
ORGANIC CHEMISTRY
Subject
Chemistry
Study Duration
2 weeks
Generate Study Plan
Comprehensive Study Plan: ORGANIC CHEMISTRY in Chemistry Duration: 2 weeks Generated: 2025-06-27 06:05
Learning Objectives
By completing this study plan, you will: · Master fundamental concepts of ORGANIC CHEMISTRY · Understand key terminologies and their applications · Apply knowledge to solve real-world problems · Connect ORGANIC CHEMISTRY to broader Chemistry principles
Subtopics and Learning Modules
Module 1: Introduction to ORGANIC CHEMISTRY
Time Required: 3 hours Difficulty Level: Beginner
Key Concepts: Basic concepts, definitions, and overview of ORGANIC CHEMISTRY in the context of Chemistry.
Learning Benefits: Establishes foundational understanding of ORGANIC CHEMISTRY and its importance in Chemistry.
Recommended Activities: Read introductory materials, study key definitions, explore basic examples of ORGANIC CHEMISTRY.
Module 2: Core Principles of ORGANIC CHEMISTRY
Time Required: 4 hours Difficulty Level: Intermediate
Key Concepts: Fundamental principles, theories, and methodologies related to ORGANIC CHEMISTRY.
Learning Benefits: Develops deeper understanding of how ORGANIC CHEMISTRY works and its underlying principles.
Recommended Activities: Study core theories, analyze case studies, practice applying principles of ORGANIC CHEMISTRY.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Module 2: Core Principles of ORGANIC CHEMISTRY
Time Required: 4 hours Difficulty Level: Intermediate
Key Concepts: Fundamental principles, theories, and methodologies related to ORGANIC CHEMISTRY.
Learning Benefits: Develops deeper understanding of how ORGANIC CHEMISTRY works and its underlying principles.
Recommended Activities: Study core theories, analyze case studies, practice applying principles of ORGANIC CHEMISTRY.
Module 3: Applications and Analysis
Time Required: 4 hours Difficulty Level: Advanced
Key Concepts: Practical applications, critical analysis, and advanced concepts in ORGANIC CHEMISTRY.
Learning Benefits: Enables practical application and critical thinking about ORGANIC CHEMISTRY.
Recommended Activities: Analyze real-world applications, engage in critical thinking exercises, explore advanced concepts.
Essential Terminologies
ORGANIC CHEMISTRY Theory: The systematic explanation of principles underlying ORGANIC CHEMISTRY Usage: Provides framework for understanding ORGANIC CHEMISTRY in Chemistry.
Critical Analysis: The objective evaluation and interpretation of information Usage: Essential skill for advanced study of ORGANIC CHEMISTRY.
Application: The practical use of knowledge or principles Usage: How ORGANIC CHEMISTRY is used in real-world situations.
Time Management Plan
Total Estimated Time: 11 hours over 2 weeks Recommended Schedule: · Daily Study Time: 1 hour(s) per day · Weekly Goals: Complete 1-2 modules per week · Review Sessions: 30 minutes every 3 days
Progress Tracking
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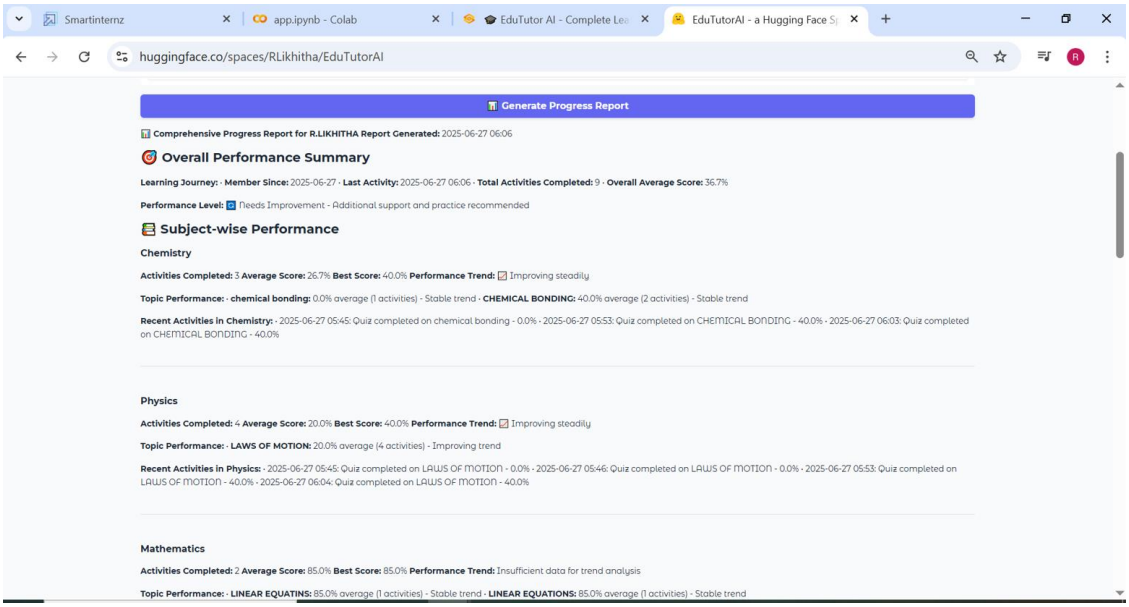
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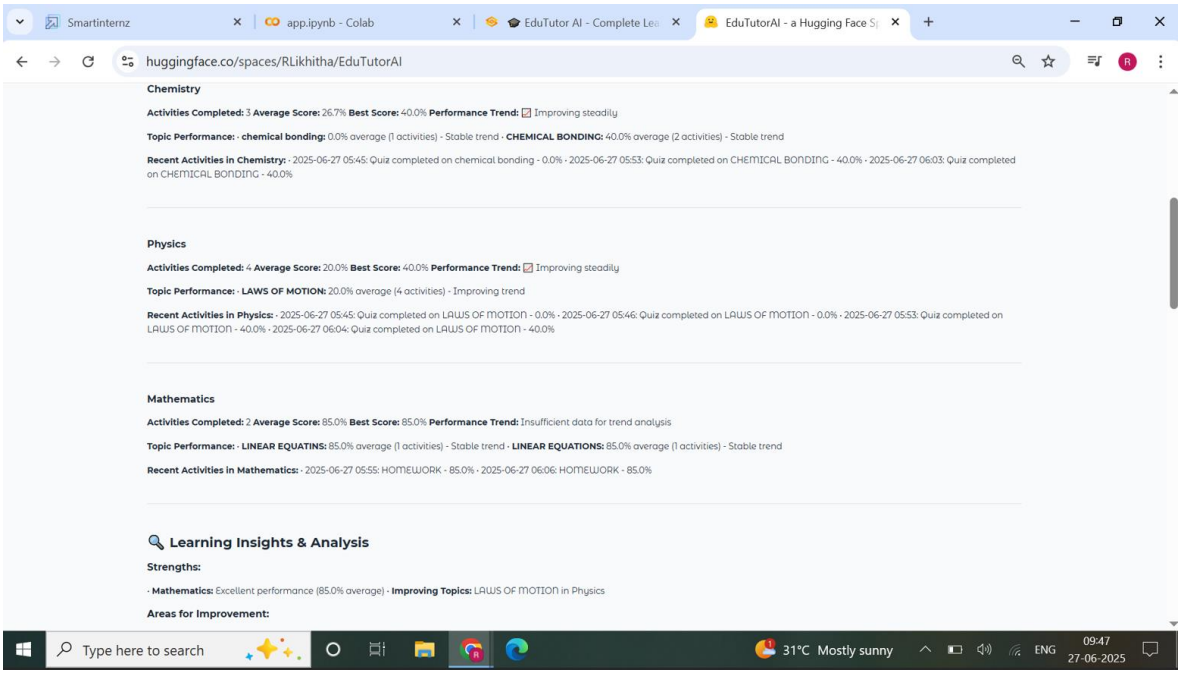
Generate Progress Report
Comprehensive Progress Report for R.LIKHITHA Report Generated: 2025-06-27 06:06
Overall Performance Summary
Learning Journey: · Member Since: 2025-06-27 · Last Activity: 2025-06-27 06:06 · Total Activities Completed: 9 · Overall Average Score: 36.7%
Performance Level: Needs Improvement - Additional support and practice recommended
Subject-wise Performance
Chemistry
Activities Completed: 3 Average Score: 26.7% Best Score: 40.0% Performance Trend: Improving steadily
Topic Performance: · chemical bonding: 0.0% average (1 activities) - Stable trend · CHEMICAL BONDING: 40.0% average (2 activities) - Stable trend
Recent Activities in Chemistry: · 2025-06-27 05:45: Quiz completed on chemical bonding - 0.0% · 2025-06-27 05:53: Quiz completed on CHEMICAL BONDING - 40.0% · 2025-06-27 06:03: Quiz completed on CHEMICAL BONDING - 40.0%
Physics
Activities Completed: 4 Average Score: 20.0% Best Score: 40.0% Performance Trend: Improving steadily
Topic Performance: · LAWS OF MOTION: 20.0% average (4 activities) - Improving trend
Recent Activities in Physics: · 2025-06-27 05:45: Quiz completed on LAWS OF MOTION - 0.0% · 2025-06-27 05:46: Quiz completed on LAWS OF MOTION - 0.0% · 2025-06-27 05:53: Quiz completed on LAWS OF MOTION - 40.0% · 2025-06-27 06:04: Quiz completed on LAWS OF MOTION - 40.0%
Mathematics
Activities Completed: 2 Average Score: 85.0% Best Score: 85.0% Performance Trend: Insufficient data for trend analysis
Topic Performance: · LINEAR EQUATINS: 85.0% average (1 activities) - Stable trend · LINEAR EQUATIONS: 85.0% average (1 activities) - Stable trend



8. ADVANTAGES & DISADVANTAGES

Advantages:

- AI-powered dynamic learning
- Subject-specific feedback
- Quiz and study planner features
- Suitable for all difficulty levels

Disadvantages:

- Requires GPU for optimal performance
- Dependency on internet for model loading

9. CONCLUSION

EduTutor AI demonstrates how AI can revolutionize learning by offering instant, interactive, and personalized educational support. Its modular, subject-specific approach ensures a scalable and learner-friendly experience.

10. FUTURE SCOPE

- Mobile app interface
- Integration with LMS (Learning Management Systems)

- Speech-to-text input for hands-free interaction
- Multi-language support
- Analytics dashboard for teachers

11. APPENDIX

- **Source Code:** Available on request or via GitHub
- **Dataset Link:** Not applicable
- **GitHub & Project Demo Link:**
  Github:
  https://github.com/R-Likhitha/EduTutor-AI-Personalized-Learning-with-Generative-AI-and-LMS-Integration
  Project Demo Link:
  https://drive.google.com/file/d/1FrinFD1BzFGOfm1vvS-ci-rYHcQNP_Aq/view?usp=sharing