AI Personal Tutor

Explore the innovative AI Personal Tutor project designed to enhance individualized learning experiences and support educational growth.

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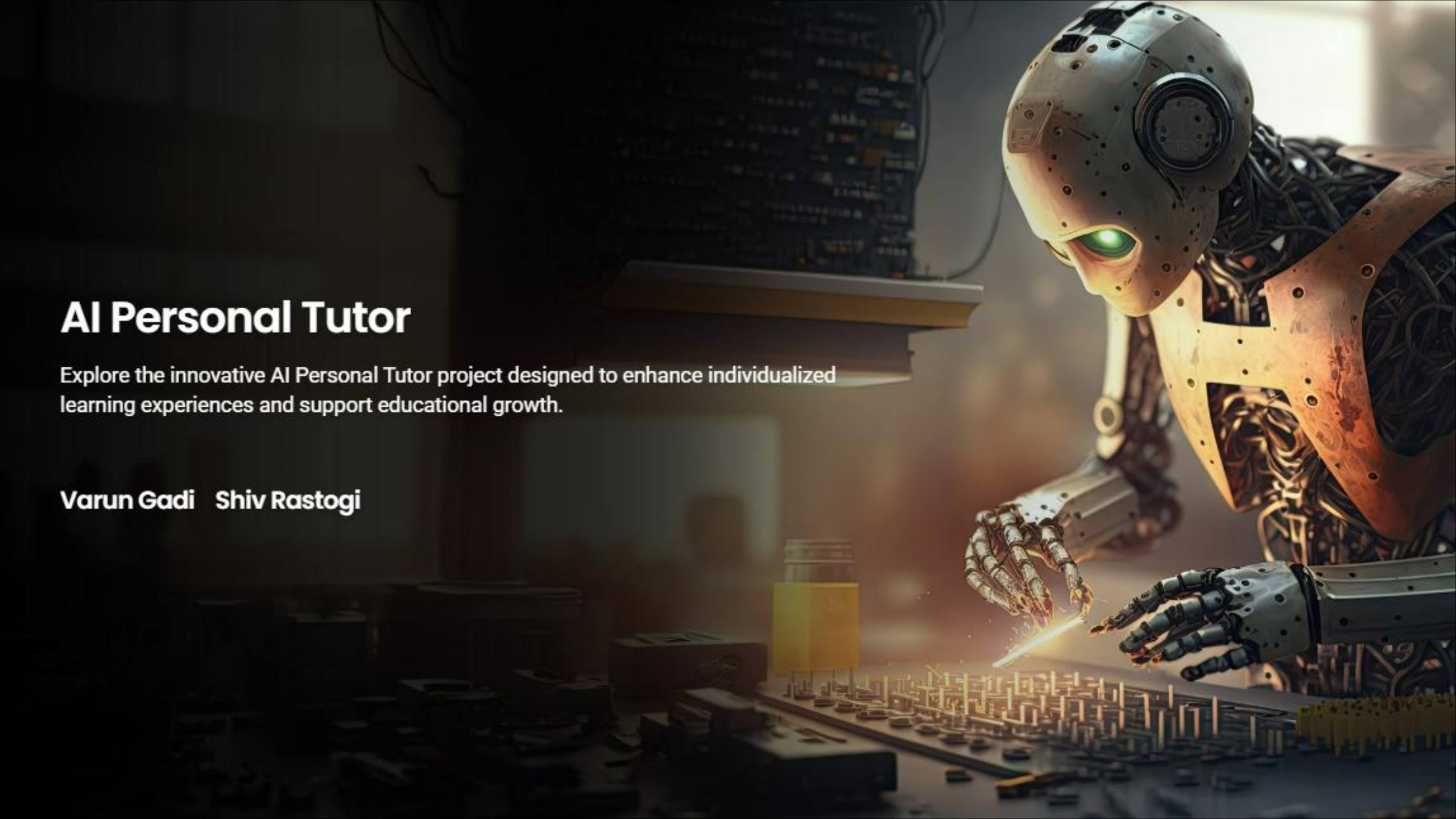


Enhancing Educational Experience

Problem Statement

The project addresses the need for personalized learning to enhance education.

Project Aim

To predict student performance and recommend personalized questions using AI.

Performance Prediction

Utilizing AI to forecast student outcomes based on various metrics.

Personalized Questions

AI-driven recommendations for questions tailored to each student's learning style.

Learning Progress Tracking

Monitoring student progress over time to provide real-time feedback.

Technologies and Models Used in Development

- **FastAPI for Backend Development**

  Utilizes FastAPI to create a robust backend for the application.

- **Streamlit for Frontend Interface**

  Employs Streamlit to provide an interactive frontend experience.

- **LSTM for Knowledge Tracing**

  Applies LSTM models to effectively trace user knowledge over time.

- **SVD for Question Recommendations**

  Uses SVD to generate personalized question recommendations based on user data.

- **XGBoost for Performance Prediction**

  Incorporates XGBoost for accurate predictions of user performance.

Innovative Solutions for Student Learning

- **LSTM Model for Knowledge Tracing**

  Utilizes LSTM to monitor and analyze student interactions for personalized learning insights.

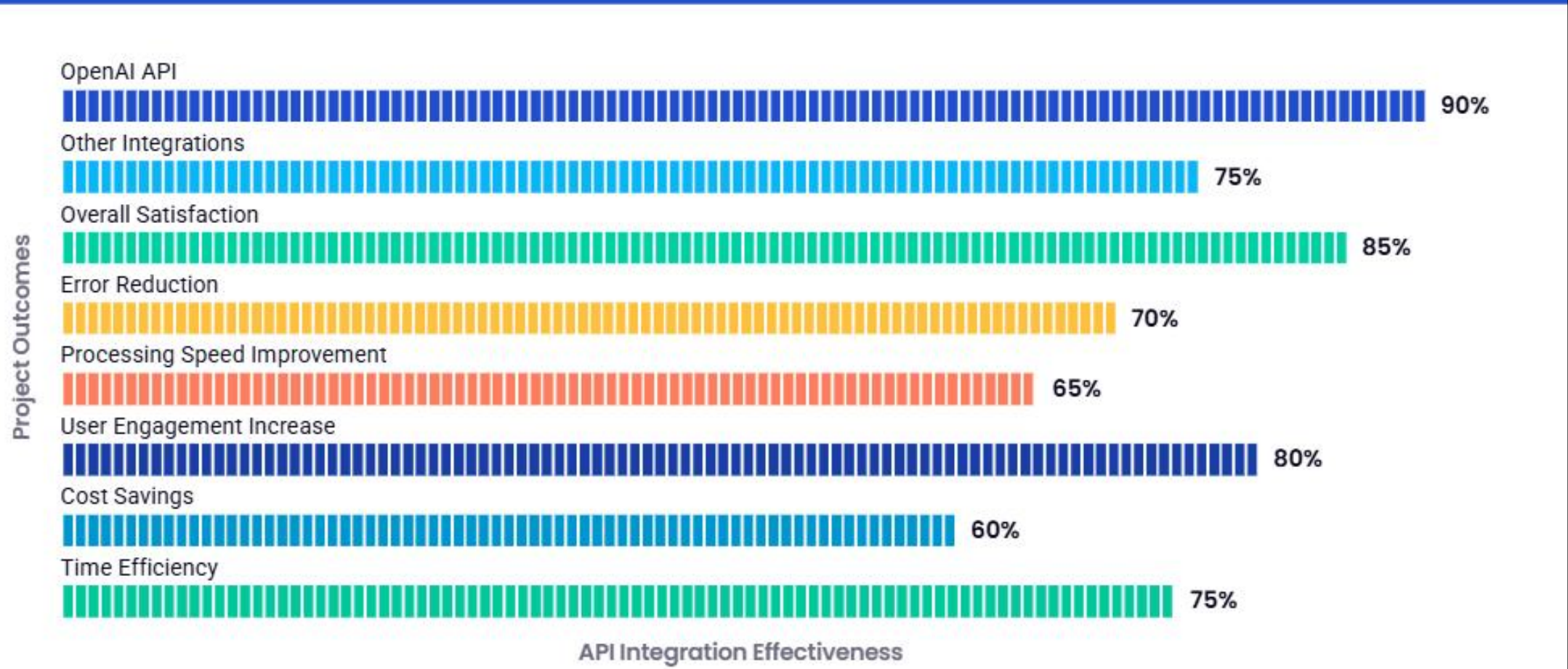
- **SVD Model for Question Recommendations**

  Implements SVD for adaptive question suggestions tailored to individual student needs.

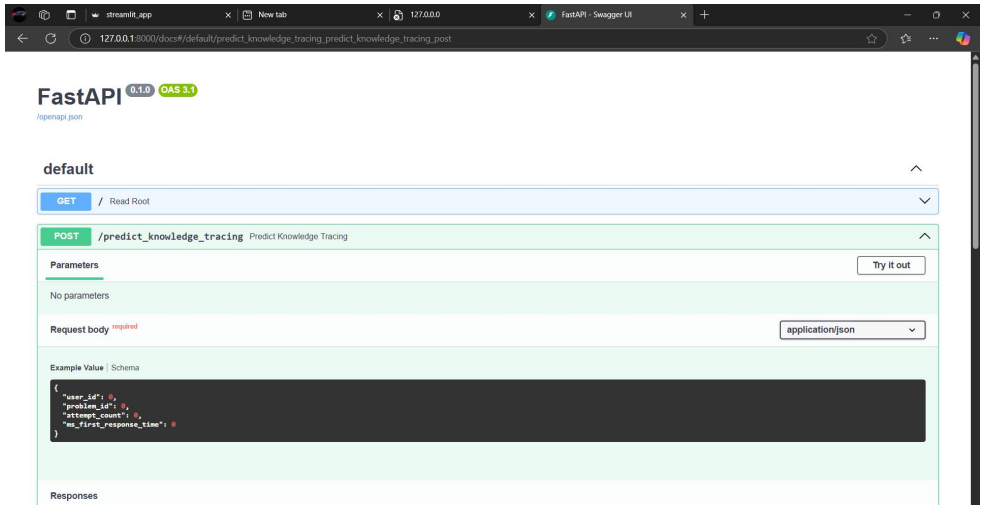
- **XGBoost for Performance Prediction**

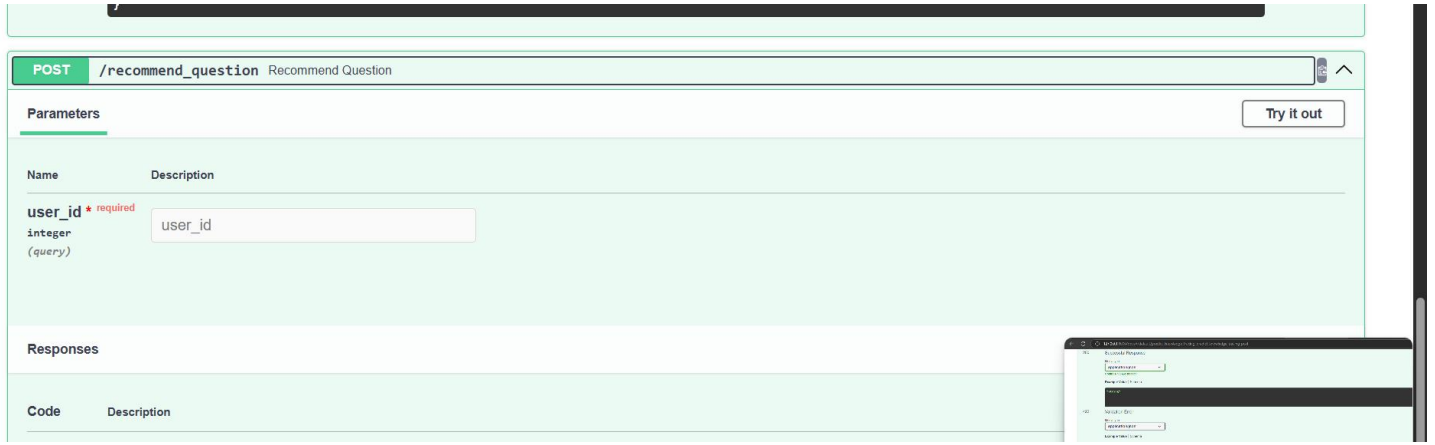
  Employs XGBoost to accurately forecast student performance based on interaction data.

Results and API Integration Overview

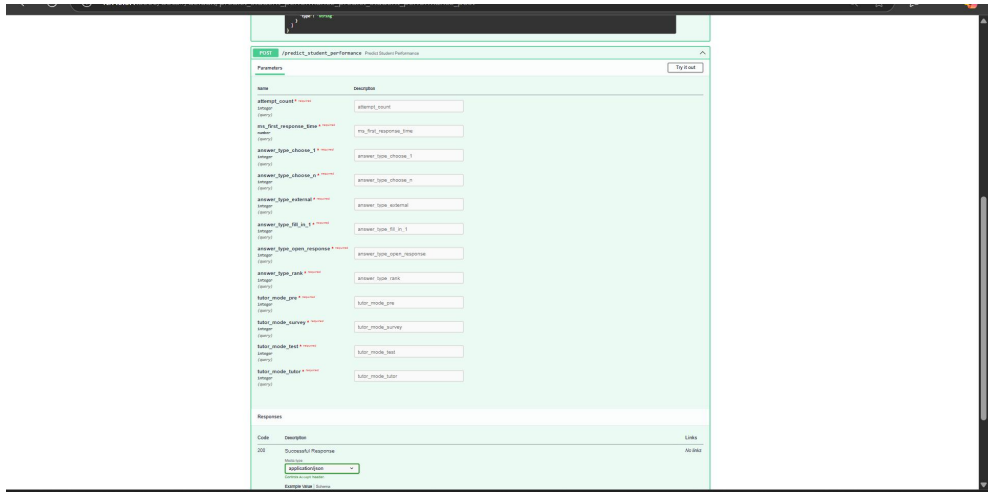


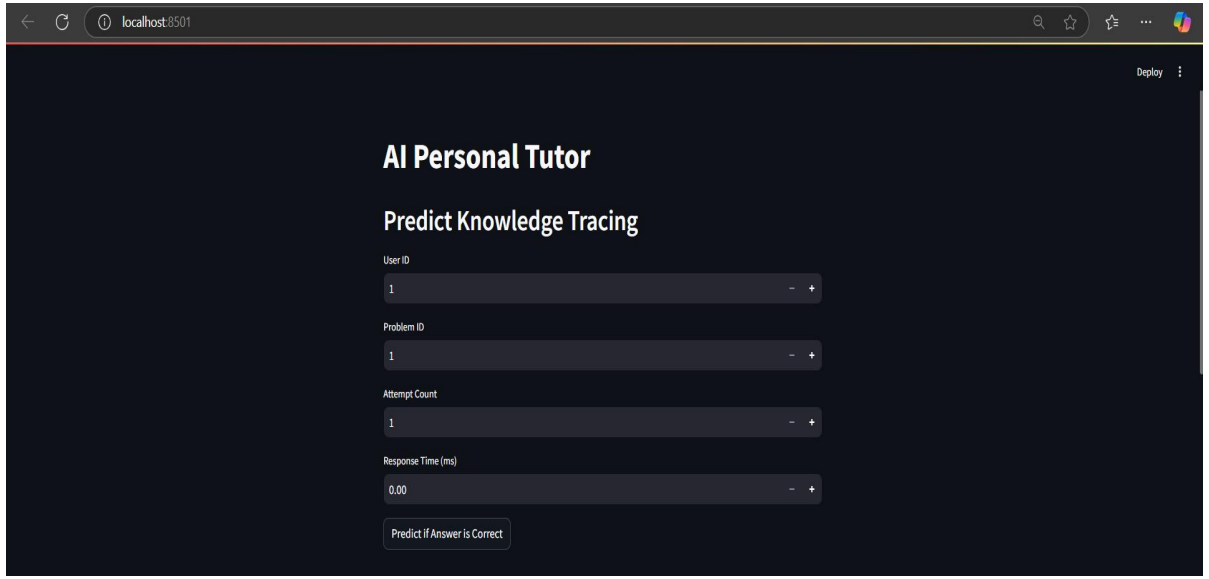
Outputs

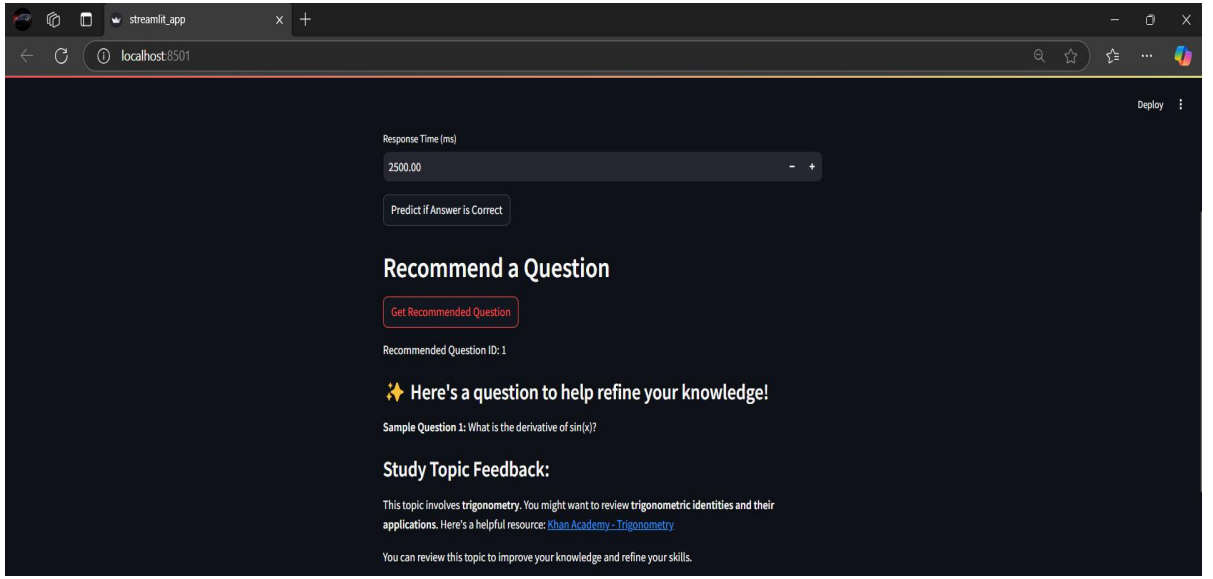

FastAPI
0.1.0
OAS 3.1
/openapi.json
default
GET / Read Root
POST /predict_knowledge_tracing Predict Knowledge Tracing
Parameters
Try it out
No parameters
Request body required
application/json
Example Value | Schema
{
"user_id": 0,
"problem_id": 0,
"attempt_count": 0,
"ms_first_response_time": 0
}
Responses

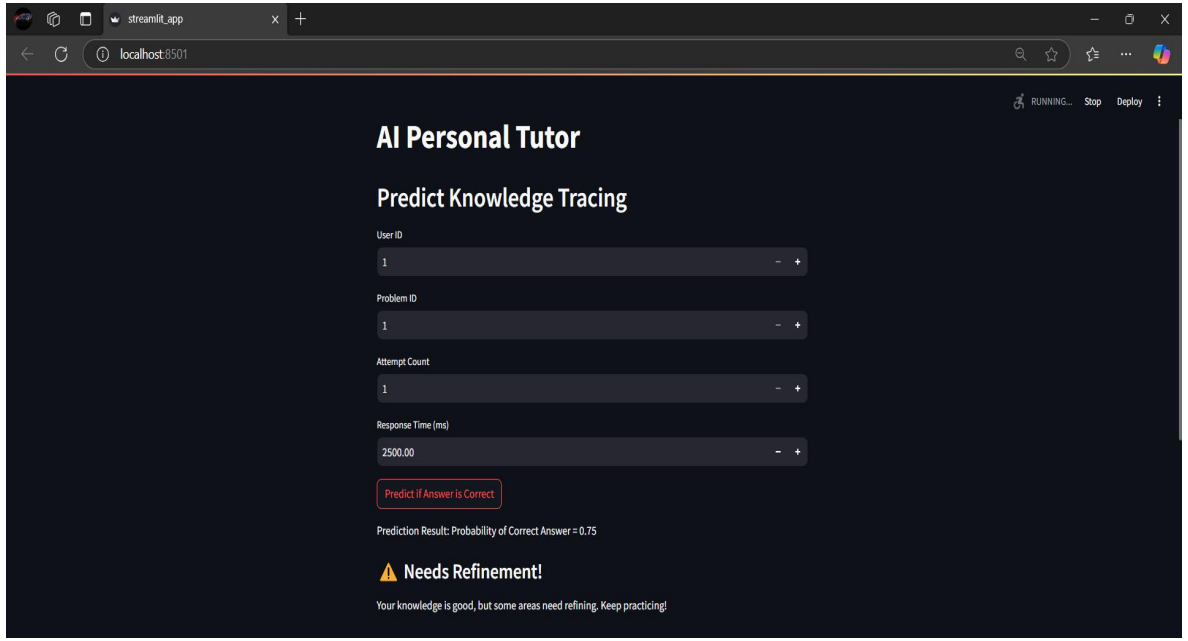

POST /recommend_question Recommend Question
Parameters
Try it out
Name
Description
user_id * required
integer
(query)
user_id
Responses
Code
Description

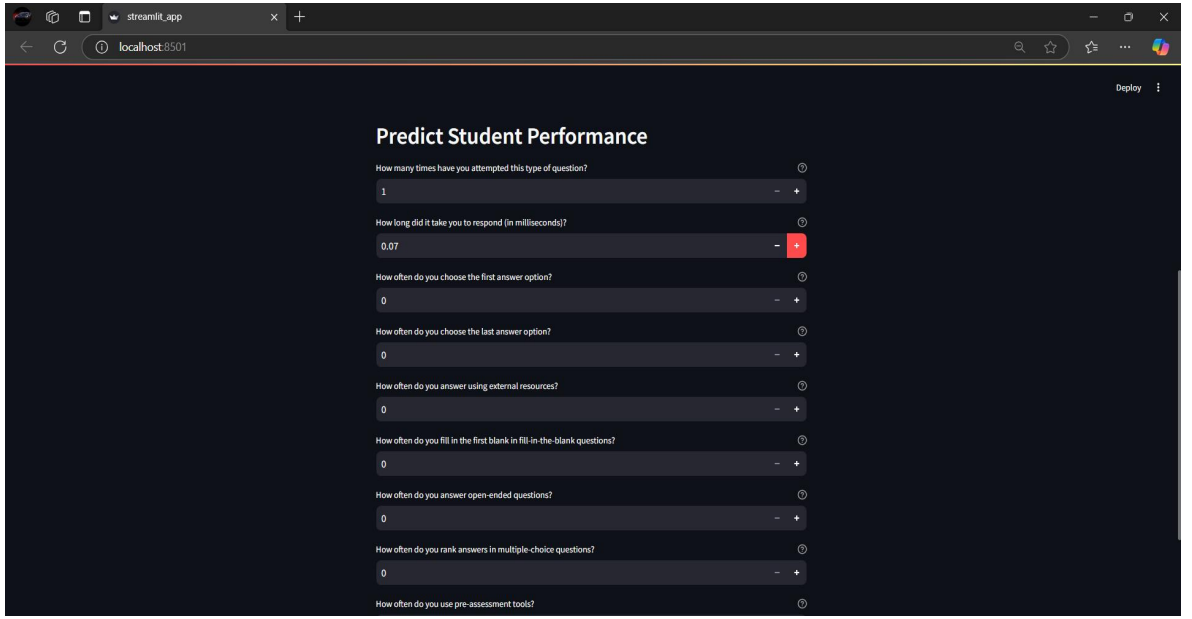
127.0.0.1:8000/docs#/default/predict_knowledge_tracing_predict_knowledge_tracing_post
200
Successful Response
No links
Media type
application/json
Controls Accept header.
Example Value | Schema
"string"
422
Validation Error
No links
Media type
application/json
Example Value | Schema
{
"detail": [
{
"loc": [
"string",
0
],
"msg": "string",
"type": "string"
}
]
}
POST /recommend_question Recommend Question
Snipping Tool




localhost:8501
Deploy
AI Personal Tutor
Predict Knowledge Tracing
User ID
1
Problem ID
1
Attempt Count
1
Response Time (ms)
0.00
Predict if Answer is Correct


streamlit_app
localhost:8501
Deploy
Response Time (ms)
2500.00
Predict if Answer is Correct
Recommend a Question
Get Recommended Question
Recommended Question ID: 1
✨ Here's a question to help refine your knowledge!
Sample Question 1: What is the derivative of sin(x)?
Study Topic Feedback:
This topic involves trigonometry. You might want to review trigonometric identities and their applications. Here's a helpful resource: Khan Academy - Trigonometry
You can review this topic to improve your knowledge and refine your skills.


streamlit_app
localhost:8501
RUNNING...
Stop
Deploy
AI Personal Tutor
Predict Knowledge Tracing
User ID
1
Problem ID
1
Attempt Count
1
Response Time (ms)
2500.00
Predict if Answer is Correct
Prediction Result: Probability of Correct Answer = 0.75
⚠ Needs Refinement!
Your knowledge is good, but some areas need refining. Keep practicing!


streamlit_app
localhost:8501
Deploy
Predict Student Performance
How many times have you attempted this type of question?
1
How long did it take you to respond (in milliseconds)?
0.07
How often do you choose the first answer option?
0
How often do you choose the last answer option?
0
How often do you answer using external resources?
0
How often do you fill in the first blank in fill-in-the-blank questions?
0
How often do you answer open-ended questions?
0
How often do you rank answers in multiple-choice questions?
0
How often do you use pre-assessment tools?