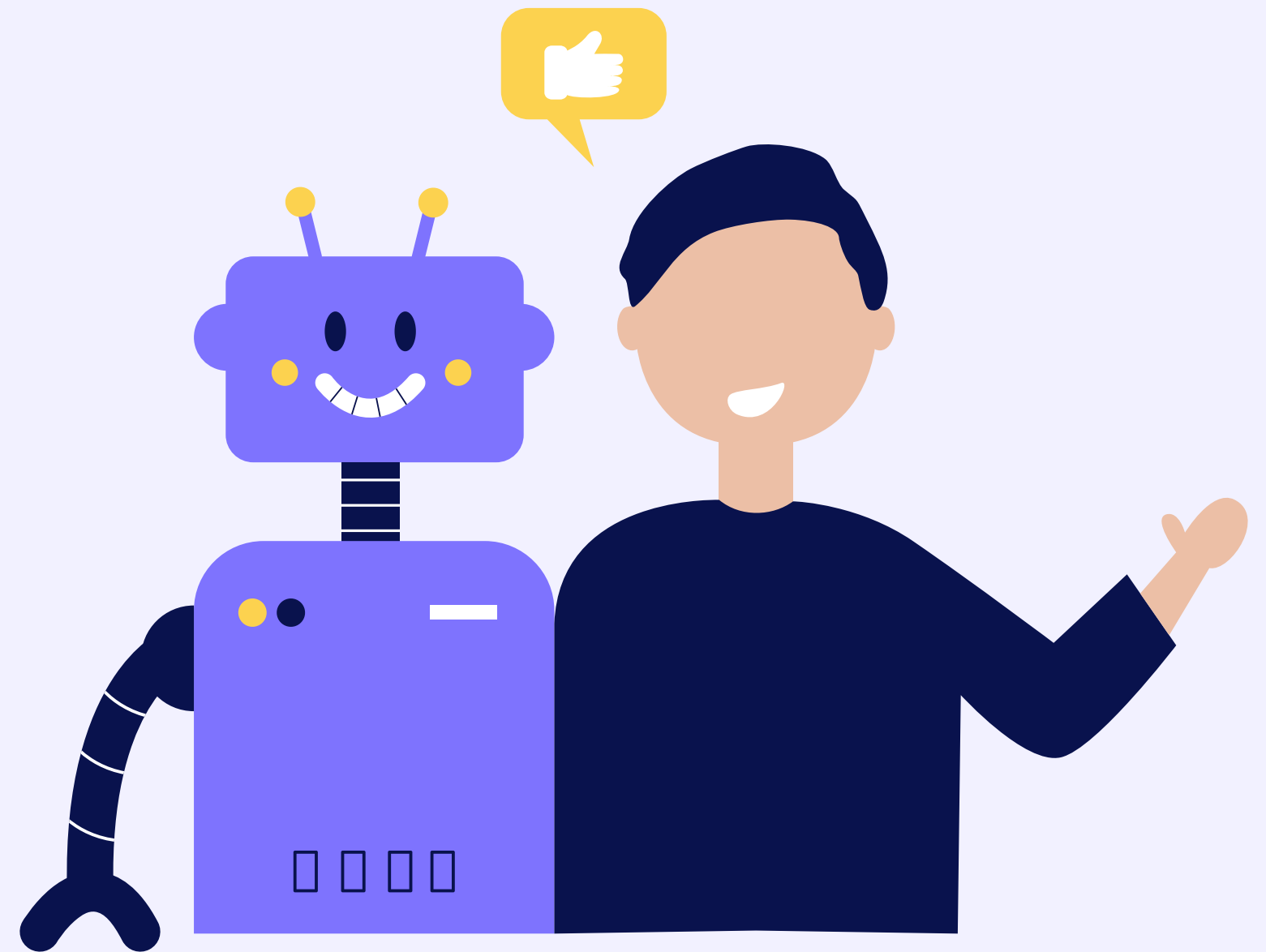


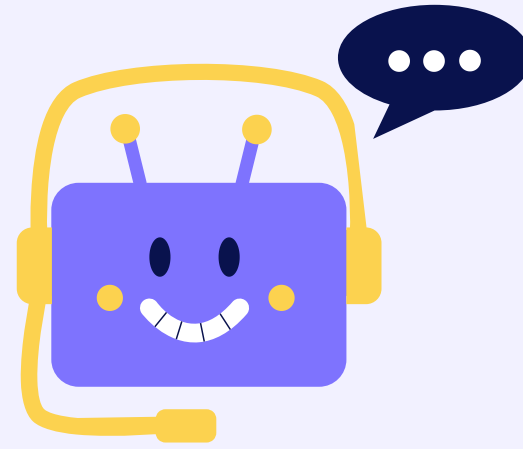
AI-Powered Learning Assistant

Janhavi Revdekar - 47

Naina Sachdev - 48

Pratham Matkar - 66





Objective

Predict difficulty level ,detects stress level, and. tutor for answer questions, explain concepts, and generate quizzes.



Difficulty Level Prediction

Predict Difficulty Level

time spent

10

retry attempts

6

videos watched

10

articles read

8

quizzes attempted

7

interactive exercises

6

subject

History

Predict

Predicted Difficulty Level: Strong (Easy to Understand)



User Inputs

Features Used:
time_spent, retry_attempts, videos_watched, articles_read, quizzes_attempted, interactive_exercises, subject

ML Models Used

- Random Forest Classifier
- Target: difficulty_level (0 = Strong, 1 = Weak)
- Preprocessing:
 - Label Encoding for categorical features
 - StandardScaler for numeric features
 - Parameters: class_weight='balanced', random_state=42
- Accuracy: 97% Cross Validation: 96.8%



Stress Level Prediction

Predict Stress Level

Time Spent (hours)

10

Retry Attempts

3

Subject

History

Avg Past Quiz Score

20

Predict Stress

Moderate



Inputs

time_spent, retry_attempts, past_quiz_score

ML Models Used

- Gradient boosting regressor
- Target: stress_level (0 = Low, 1 = Moderate, 2 = High)
- Preprocessing:
 - Rule-based labeling for stress level
 - Label Encoding for subject
- Parameters: n_estimators=100, random_state=42
- MAE:0.0041 RMSE: 0.011
- Evaluation: confusion matrix used



Study Tutor

AI Tutor Assistant

Select a Topic

Topic:

Machine learning

Set Topic

Introduction

I'll be your tutor for Machine learning. Here's a brief overview: Machine learning (ML) is a field of study in artificial intelligence concerned with the development and study of statistical algorithms that can learn from data and generalize to unseen data, and thus perform tasks without explicit instructions. Within a subdiscipline in machine learning, advances in... You can ask me specific questions about this topic now.

Ask Question

Explain Concept

Take Quiz

Difficulty Level:

Beginner

Ask a Question

Type your question here...

Ask



Objective

Use ML models to dynamically explain concepts, answer questions, and generate quizzes based on a user-defined topic

ML MODELS USED

Concept Summarization:

- Model: t5-small
- Task: Summarize topic content retrieved from Wikipedia
- Purpose: Create concise, readable explanations

Question Answering (QA):

- Model: distilbert-base-uncased-distilled-squad
- Task: Extractive QA from summarized concept text
- Purpose: Generate direct answers to user queries

Study Tutor

Ask a Question

Ask

Response

For example, in a classification algorithm that filters emails, the input is an incoming email, and the output is the folder in which to file the email. In contrast, regression is used for tasks such as predicting a person's height based on factors like age and genetics or forecasting future temperatures based on historical data. Similarity learning is an area of supervised machine learning closely related to regression and classification, but the goal is to learn from examples using a similarity function that measures how similar or related two objects are.

Explain a Concept

Explain

Response

Classification algorithms are used when the outputs are restricted to a limited set of values, while regression algorithms are used when the outputs can take any numerical value within a range. Types of supervised-learning algorithms include active l...

Model

Semantic Search / Matching:

- Model: sentence-transformers/all-MiniLM-L6-v2
- Task: Embed questions and text for similarity search
- Purpose: Identify relevant content for QA input

Quiz Generation:


- Logic: Rule-based templates on top of summarized content
- Potential upgrade: Fine-tune generative model in future

Pipeline Flow:


- User Sets Topic →
- Wikipedia Article Retrieved →
- Summarized using T5 →
- QA and Quiz Generated using extractive + semantic ML



Final Outputs

SKILLMENTOR


HomePredictTutorDifficultyPredictorStressPrediction

Welcome to SkillMentor


Your smart study companion. Level up your learning journey with ease.

Get Started


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Track Progress


Visualize your growth and stay motivated every day.

Smart Recommendations

Personalized learning paths tailored for your success.

Skill Mastery

Sharpen your skills and unlock your potential.

SKILLMENTOR

HomePredictTutorDifficultyPredictorStressPrediction

Predict Stress Level

Time Spent (hours)

10

Retry Attempts

3

Subject

History

Avg Past Quiz Score

20

Predict Stress


Moderate

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SKILLMENTOR

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AI Tutor Assistant

Select a Topic

Topic:

Deep learning

Set Topic

Introduction

I'll be your tutor for Deep learning. Here's a brief overview: Deep learning is a subset of machine learning that focuses on utilizing neural networks to perform tasks such as classification, regression, and representation learning. The field takes inspiration from biological neuroscience and is centered around stacking artificial neurons into layers and "train... You can ask me specific questions about this topic now.

Ask Question

Explain Concept

Take Quiz


Difficulty Level:

Beginner

Ask a Question

Type your question here...

Ask

SKILLMENTOR

HomePredictTutorDifficultyPredictorStressPrediction

Predict Difficulty Level

time spent

10

retry attempts

6

videos watched

10

articles read

8

quizzes attempted

7

interactive exercises

6

subject

History

Predict

Predicted Difficulty Level: Strong (Easy to Understand)

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TechStack and Evaluation

Tech Stack:

- Backend: Flask (API)
- Frontend: React + Vite
- ML Frameworks: Scikit-learn, HuggingFace Transformers

STRESS LEVEL MODEL

Rounded Classification Report:				
	precision	recall	f1-score	support
0	1.00	1.00	1.00	173
1	1.00	1.00	1.00	21
2	1.00	1.00	1.00	6
accuracy			1.00	200
macro avg	1.00	1.00	1.00	200
weighted avg	1.00	1.00	1.00	200

DIFFICULTY LEVEL MODEL

Model: Random Forest (Balanced)				
Accuracy: 0.97				
	precision	recall	f1-score	support
0	0.98	0.99	0.98	168
1	0.93	0.88	0.90	32
accuracy			0.97	200
macro avg	0.95	0.93	0.94	200
weighted avg	0.97	0.97	0.97	200
Cross-validation Accuracy: 0.968				

Confusion Matrix (Rounded):			
[[173 0 0]			
[0 21 0]			
[0 0 6]]			