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Student Performance Prediction & Smart Study Recommendation System



Introduction

- This AI/ML project aims to solve problems by leveraging machine learning algorithms to analyze data. The goal is to build an efficient model that can [predict/classify/automate] with high accuracy, thereby improving [relevant outcome or process]. This project will explore various ML techniques and evaluate their performance to determine the best approach for the task. Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think and learn like humans.
- Lack of awareness leads to last-minute preparation and low grades.



- This project uses Machine Learning to predict student performance in advance.
- The system also provides personalized study recommendations
- AI systems are capable of performing tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and language translation.
- Many students struggle to track their academic performance early.

AI vs ML vs Data Science

- Creating intelligent systems that mimic human cognition
- Teaching computers to learn from data without explicit programming
- Extracting insights and knowledge from data
- Broadest – encompasses all intelligent behavior
- Subset of AI focused on learning algorithms
- Entire data lifecycle: collection, analysis, visualization
- Automate decision-making and replicate human intelligence
- Build predictive models that improve with data | Generate actionable insights for business decisions
- Neural networks, NLP, computer vision, robotics
- Regression, classification, clustering, deep learning
- Statistical analysis, data mining, visualization, modeling
- | Siri, Alexa, self-driving cars, chatbots
- Netflix recommendations, spam filters, fraud detection |
- Business analytics, customer segmentation, trend forecasting
- TensorFlow, PyTorch, OpenAI | Scikit-Learn, XGBoost, Keras
- Python, R, Tableau, SQL, Pandas |
- Relationship Parent field



BACKGROUND AND MOTIVATION

Rapid growth of AI in the education sector.

Data-driven academic guidance helps students improve.

Predictive systems assist teachers, counselling centres & e - learning platforms

Theoretical AI that can perform any intellectual task that a human can.



PROBLEM STATEMENT

Rapid growth of AI in the education sector.

Data-driven academic guidance helps students improve.

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OBJECTIVES

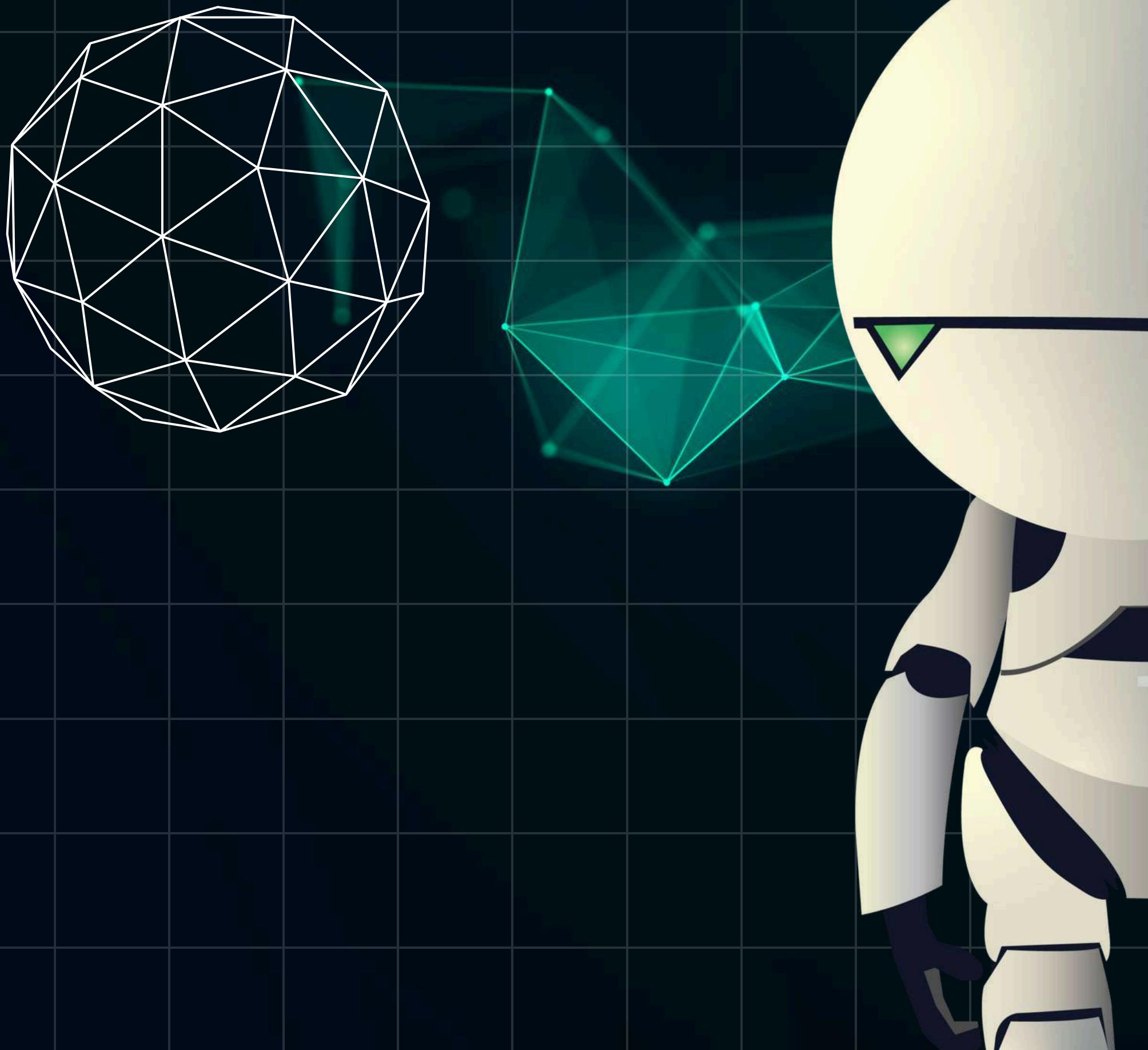
AI is transforming various sectors by improving efficiency and enabling new capabilities.

Predict student performance using ML.

Identify important factors affecting academic results.

Recommend personalised study patterns

Reduce academic stress and improve learning outcomes



Dataset Description

Dataset includes attributes such as:

- Study Hours
- Attendance
- Sleep Habits
- Previous exam scores
- Extra activities
- Parental education
- Final exam score



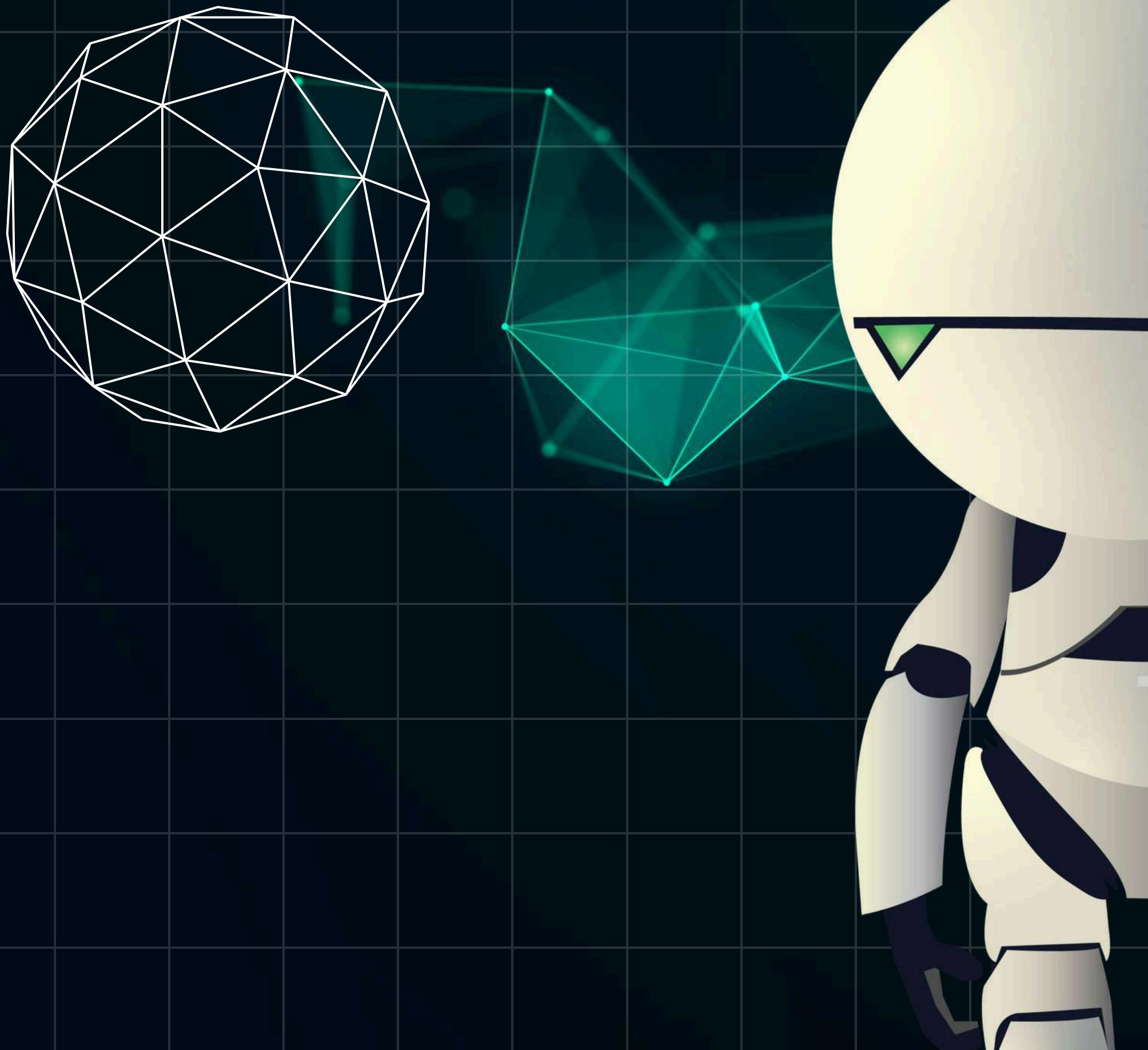
Scope of the Project

Works for school and college students.

Can be used by teachers and academic counsellors.

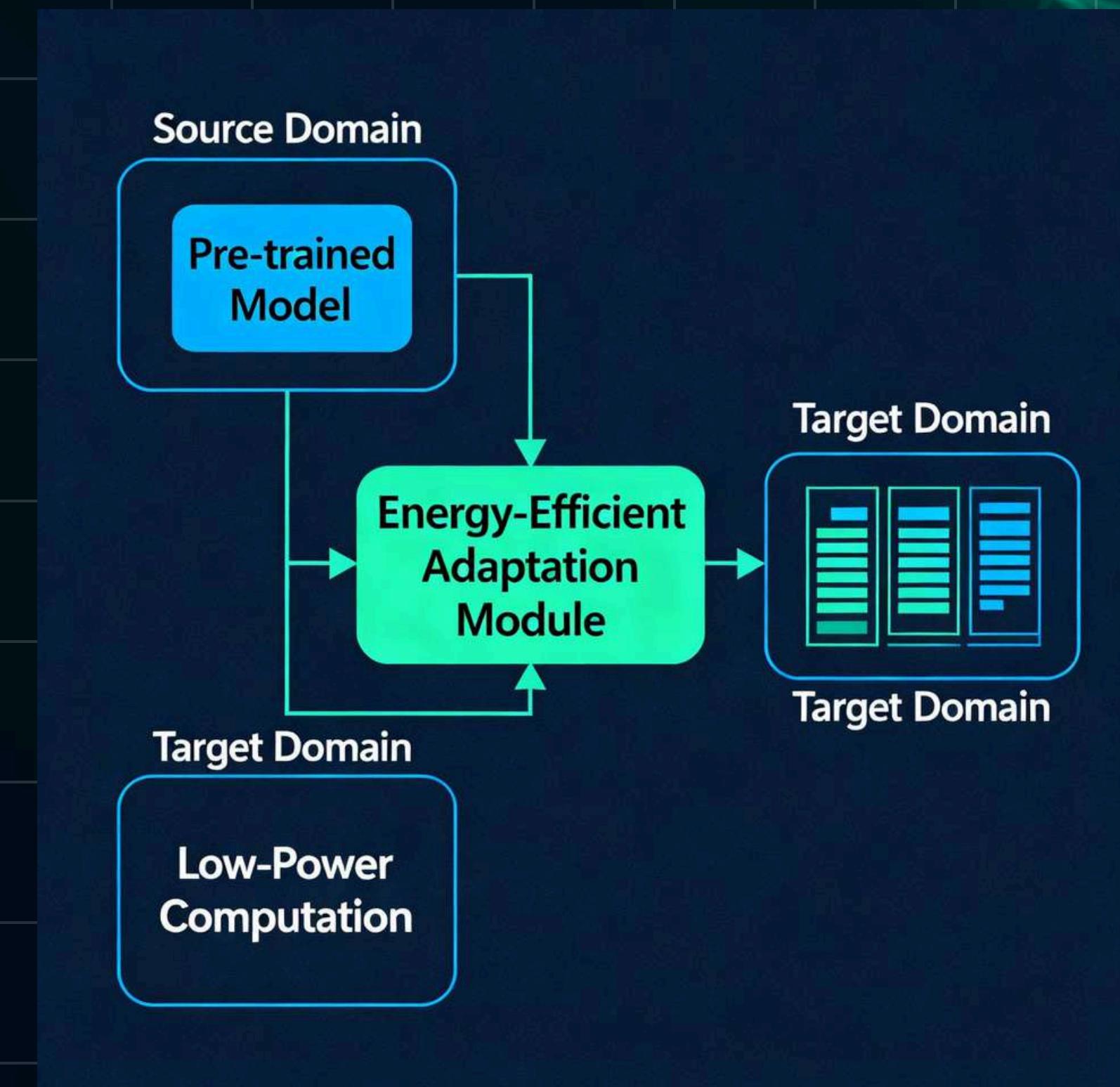
Supports e-learning and self - learning platforms.

scalabale to include emotional ans behaviour analysis in the future



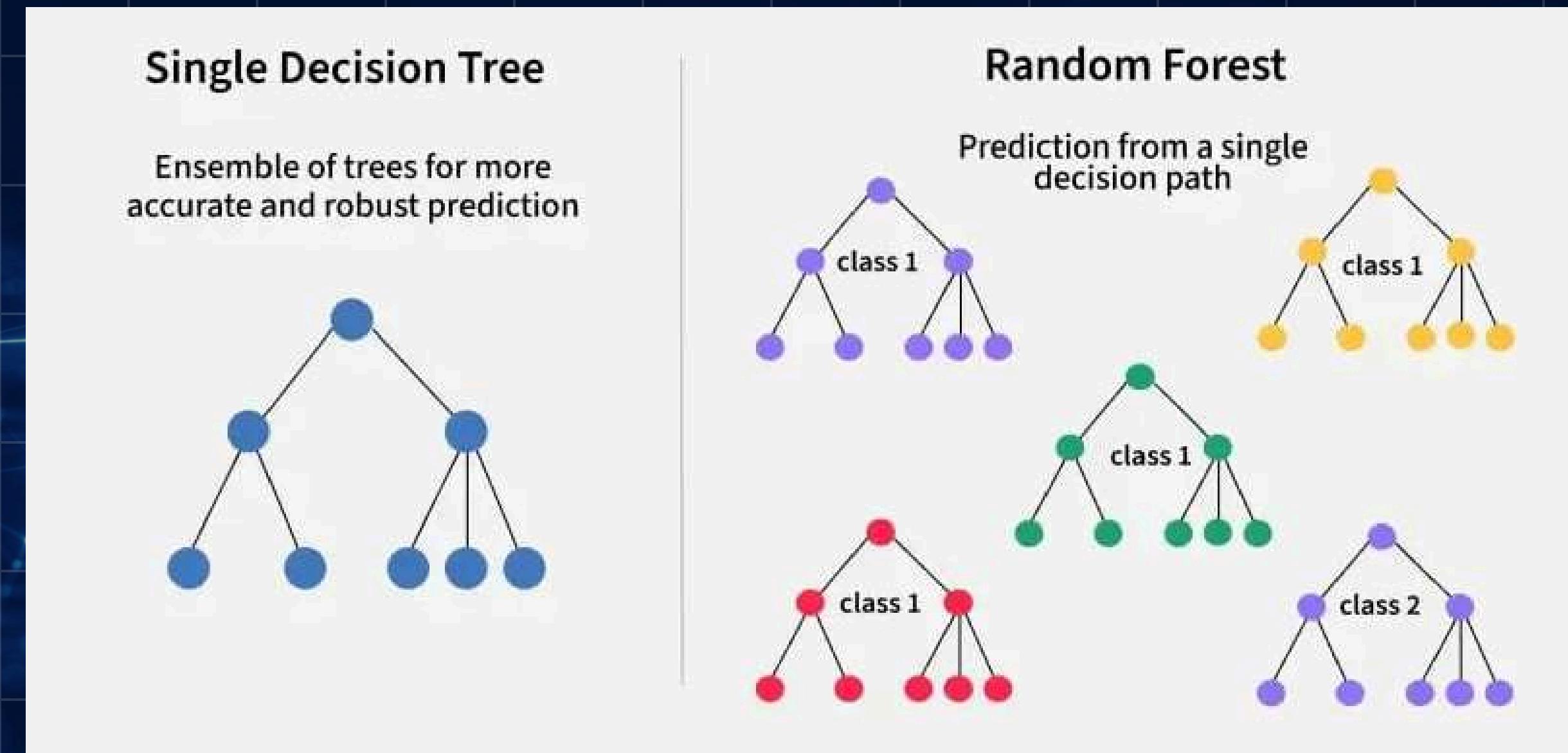
System Architecture

User → Input Student Data → ML Model → Score Prediction → Recommendation Engine → Output Study Plan



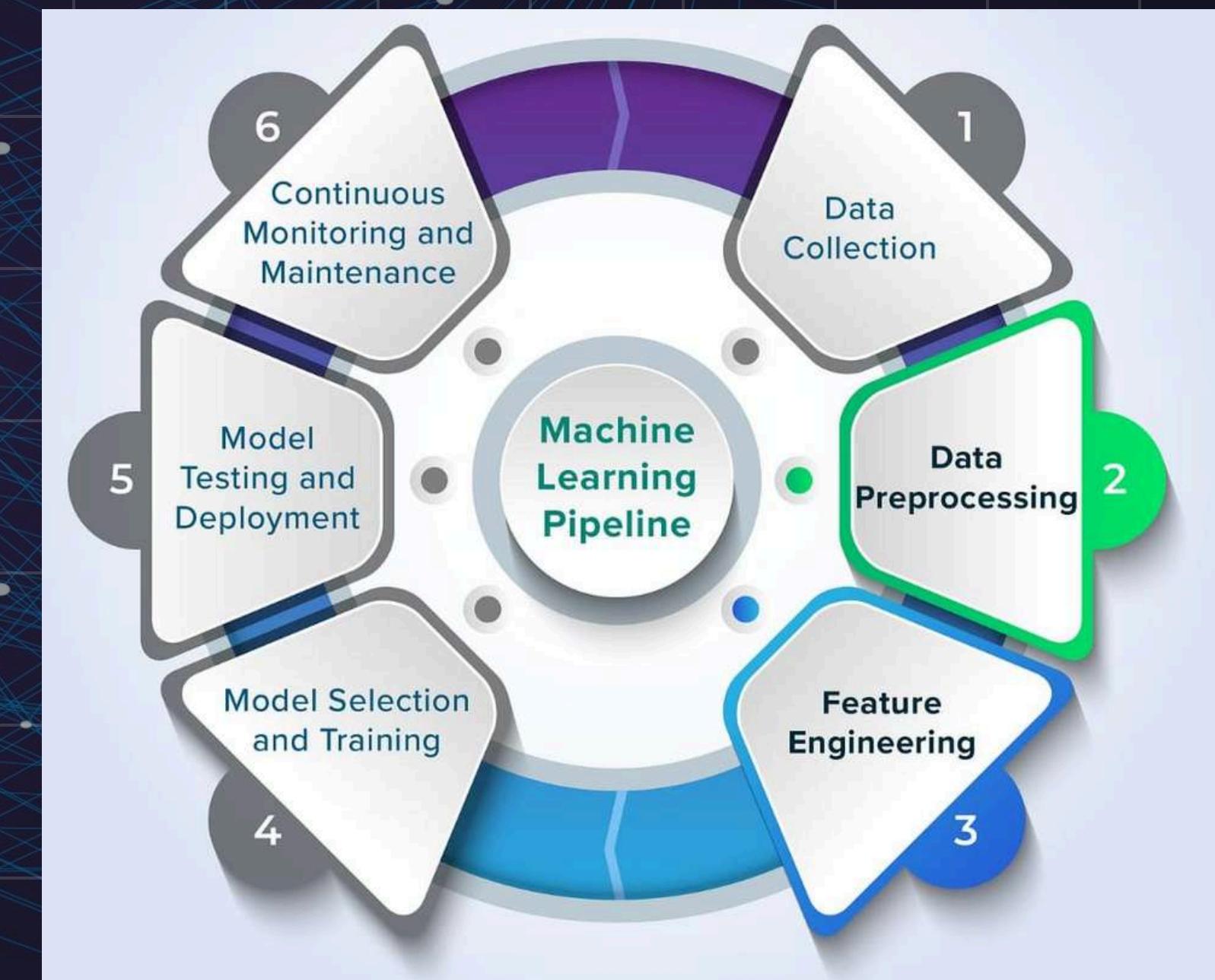
Machine Learning Algorithms Used:

- Linear Regression / Logistic Regression
- Random Forest Classifier
- Hyperparameter Tuning (GridSearchCV)
- Evaluation metrics:
- MSE / RMSE / MAE
- Accuracy
- Confusion Matrix



Functional Requirement

- Student data input.
- Data preprocessing and analysis.
- Performance
- Study recommendations
- Result dashboard



Non-functional Requirement

- High accuracy
- Security of student data
- Low system response time
- User friendly design
- Scalability for future features

Non-functional requirements help to describe:



Clockwise Software

Results

Model successfully predicts performance with high accuracy.

Helps students plan and improve learning strategies.

Supports teachers in academic monitoring and guidance

KEY BENEFITS & APPLICATIONS



Enhancing Learning Outcomes for All

Applications

- Schools and colleges.
- Coaching and training courses.
- Online learning platforms.
- Student counselling departments.



Future Enhancement

Sentiment analysis for

student motivation

Face emotion detection for

stress analysis

Reinforcement learning-

based personalized timetable

Mobile application support



Conclusion

AI-based prediction helps students know their strengths and weaknesses early.

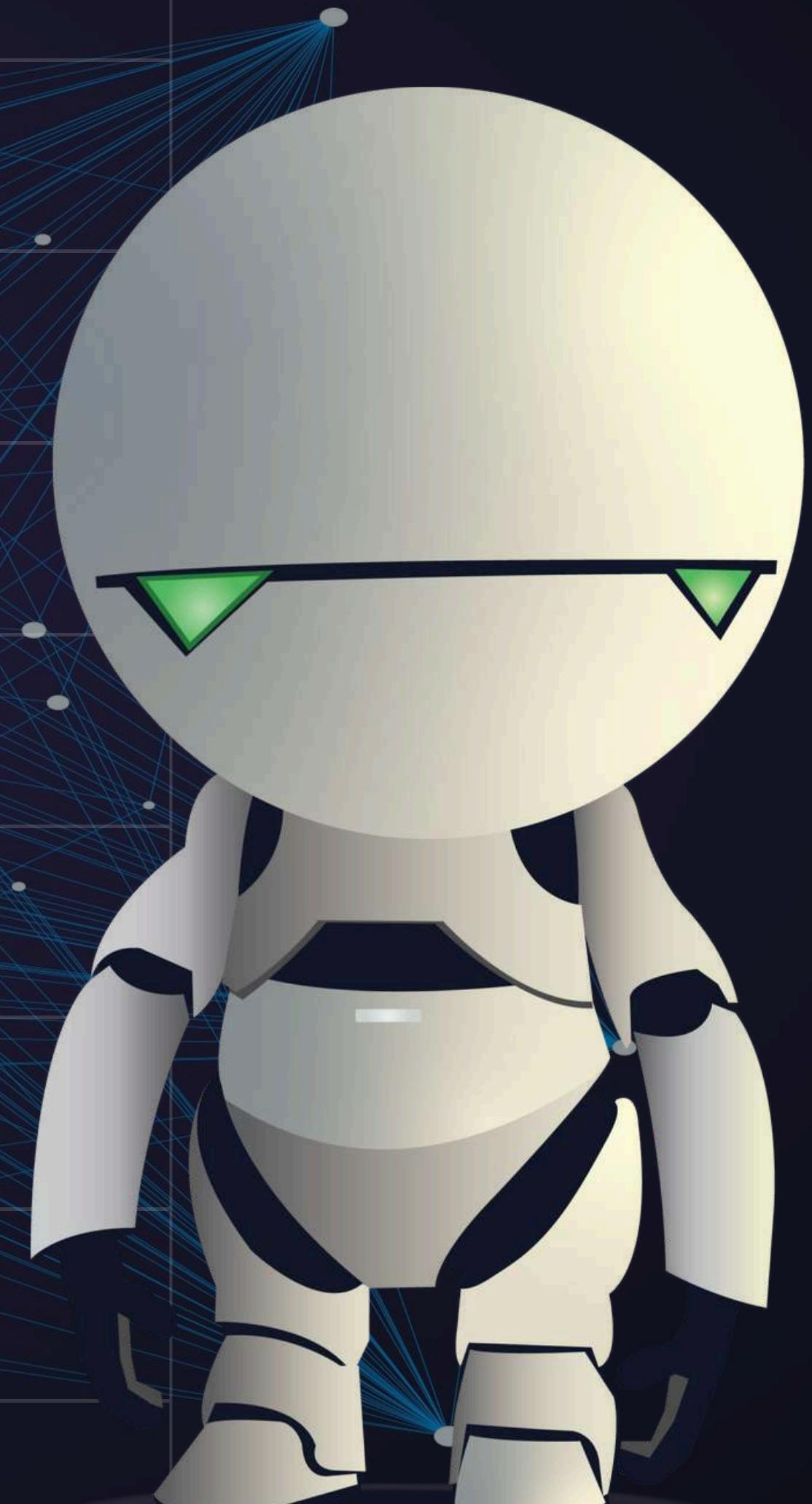
Study recommendation system improves performance and reduces stress.

This project demonstrates the positive role of ML in the education system.



References

- Kaggle dataset – Student Performance
- Machine Learning research papers
- Python scikit- learn documentation
- Google scholar and educational AI articles



thank
you

