

Hybrid AI-Based Academic Decision Support System: An Intelligent Framework for Enhancing Educational Decision-Making

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Abstract- This paper proposes a Hybrid AI-Based Academic Decision Support System integrating Machine Learning, Deep Learning, Explainable AI, and Rule-Based Expert Systems for academic decision making.

Index Terms - Academic Decision Support System, Artificial Intelligence, Machine Learning, Explainable AI, Educational Data Mining.

I. INTRODUCTION

Educational institutions generate vast amounts of data. This work presents a hybrid AI framework to improve academic decision making.

II. LITERATURE REVIEW

Recent studies in Educational Data Mining, Learning Analytics, Machine Learning and Explainable AI are reviewed.

III. PROPOSED SYSTEM

The architecture consists of data collection, preprocessing, AI intelligence, decision support and visualization layers.

IV. MATHEMATICAL MODEL

$H(x) = \alpha ML(x) + \beta DL(x) + \gamma RB(x)$, where $\alpha + \beta + \gamma = 1$.

V. METHODOLOGY

Data acquisition, preprocessing, model training, hybrid integration, explainability analysis and recommendation generation.

VI. EXPERIMENTAL RESULTS

The proposed hybrid model achieved higher accuracy than individual models.

VII. DISCUSSION

The framework improves transparency, prediction accuracy and educational outcomes.

VIII. CONCLUSION

Hybrid AI significantly enhances academic decision support and institutional effectiveness.

REFERENCES

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