

DEVELOPMENT OF A MOBILE-BASED STUDENT PERFORMANCE PREDICTIVE SYSTEM USING DEEP LEARNING

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INTRODUCTION

Deep learning techniques have made it possible to understand various predictors of academic performance in students (Smith *et al.*, 2021). In the past few years, the proliferation of mobile applications has taken place, enabling access to performance data anytime and anywhere, thereby allowing students and educators to track and improve learning experiences without restrictions (Johnson & Lee, 2020).

The premise of this work is the strength between mobile devices and predictive analytics technology aimed at helping teachers with students who are possibly at risk of poor performance (Clark & Wright, 2019).

STATEMENT OF PROBLEM

Despite the advances in educational technology, there remains a challenge in identifying students who require early intervention in their academic difficulties. Traditional performance-tracking methods often lack the precision and adaptability required to analyze complex patterns in real-time, particularly in a mobile environment. As a result, many students may experience a deterioration in performance without sufficient support or proactive measures from educational institutions (Perez & Thomas, 2019).

AIM AND OBJECTIVES

AIM



This study aims to develop a mobile based system using deep learning to predict students academic performance

1. To design a deep learning model for the proposed study using hybridized LSTM and MobileBERT.
2. To implement the system framework.
3. To evaluate the model performance on its prediction accuracy.
4. To design a mobile-friendly interface that allows students and educators to view predictive performance data.
5. To compare with state-of-the-art systems of similar study.



OBJECTIVES

LITERATURE REVIEW 1

s/n	AUTHORS	TITLE OF PAPER	METHODOLOGY	CONTRIBUTION	LIMITATION
1	Fagbola, Obe, Adeyanju, Olaniyan,..., Egbetola (2018).	Development of Mobile-Interfaced Machine Learning-Based Predictive Models for Improving Students' Performance in Programming Courses	Data was gathered, and normalized. Machine learning models, specifically M5P decision trees and linear regression classifiers, were trained using the normalized data.	Developed a variable-based Linear Regression Classifier (LRC) model that can provide baseline information about students' performance. This model includes factors such as Lecturers' Teaching Style (LTS), Health (OH), Electricity (OE), Parental Education (FPE), Student Fear and Perception (SF), and Tutorials and Extra Classes (ST), which are often overlooked in other studies.	Limited data used for validation, the results of validation test cannot be exclusively used to justify the correctness of the developed models but rather by some standard evaluation measures.
2	Bayan, Mohammed, Madini (2024).	The power of deep learning techniques for predicting student performance in virtual learning environments	The methodology is based on a systematic literature review, which includes formulating research questions, developing a search string. The review examines studies that implemented various Deep Learning (DL) techniques, including DNNs, CNNs, RNNs, LSTMs, and	The study notes that while many studies have used machine learning (ML) techniques, few have explored the contribution of hybrid techniques in improving prediction accuracy. In this respect, the current review focuses on articles that have applied one or more DL techniques or combined DL with ML techniques to predict student	The review focused on articles published in peer-review journals which may have excluded valuable research published in other venues. The review also only considered studies that presented specific information, such as the type of model, dataset, features and evaluation measurement

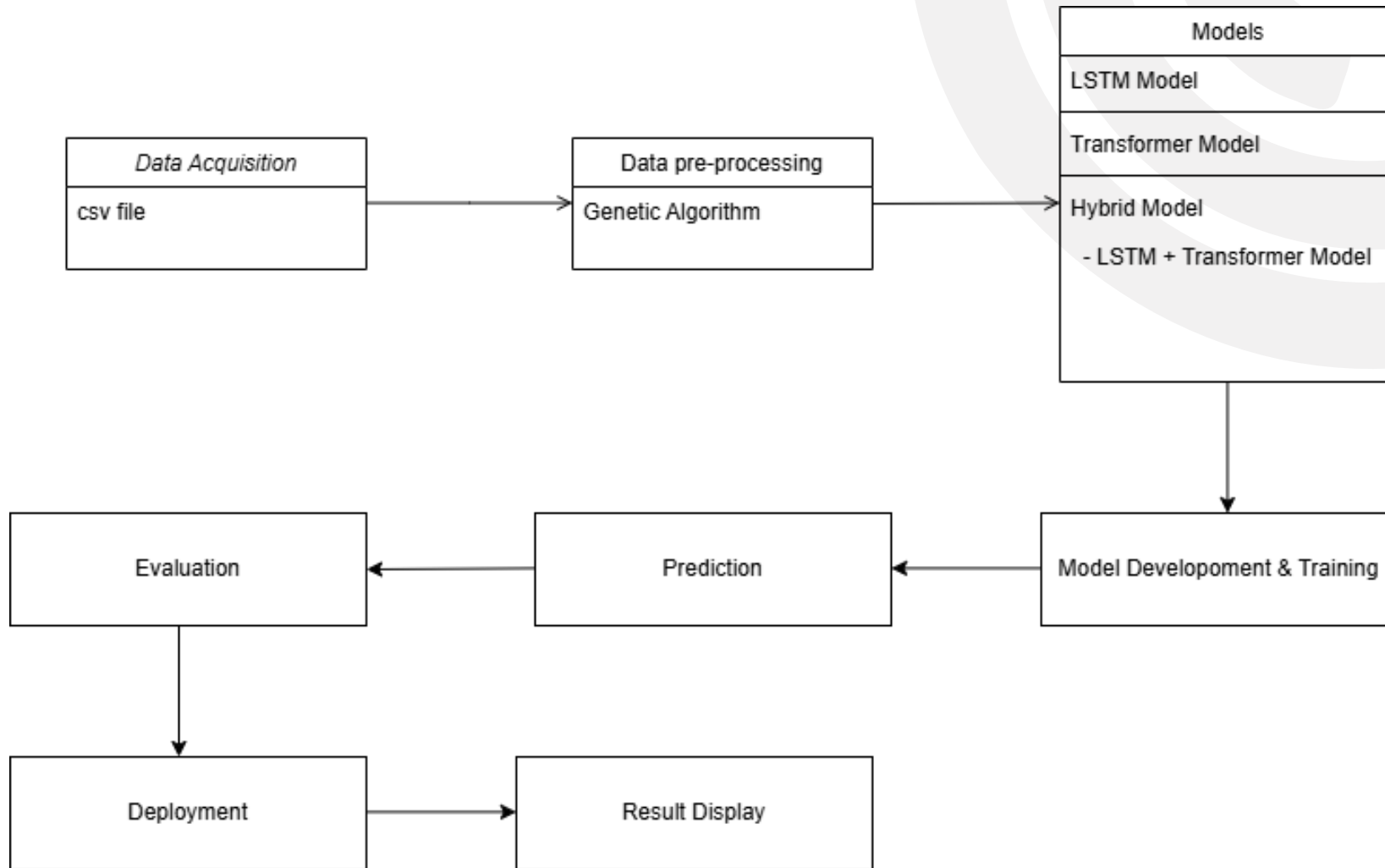


LITERATURE REVIEW 2

s/n	AUTHOR(S)	TITLE OF PAPER	METHODOLOGY	CONTRIBUTION	LIMITATION
3	Paulo, Alice (2021).	Using data mining to predict secondary school student performance	The researchers collected real-world data from school reports and questionnaires. Data mining models were tested: Decision Trees, Random Forest, Neural Networks, and Support Vector Machines, with three input selections, including with and without previous grades	The paper tests different DM models, including Decision Trees (DT), Random Forest (RF), Neural Networks (NN), and Support Vector Machines (SVM).The results indicate that tree-based models (DT and RF) generally outperform nonlinear function methods (NN and SVM) in this context. The tree-based models are also more easily interpreted	The study relies on offline learning, meaning data was collected before applying DM techniques. An online system could gather more features and incorporate feedback.
4	Shah, Muhamma d (2024).	Student-Performulator: Predicting students' academic performance at secondary school and intermediate level using machine learning	The methodology used in the study involves several steps, including data acquisition using questioners, development of the predictive models, model validation, mobile application development	The development of a variable-based Linear Regression Classifier (LRC) model that provides baseline information about students' performance. The model is an extension of other models by including salient factors like Lecturers' Teaching Style (LTS), Health (OH), Electricity (OE), Parental Education (FPE), Student Fear and Perception (SF), and Tutorials and Extra Classes (ST), which were not considered in previous works.	The algorithm used may not be suitable for larger data sets. The author states that to get reliable prediction outcomes it is essential to choose students from the same academic group because intermediate and secondary grade students do not have the same conduct while



PROPOSED METHODOLOGY



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- The proposed methodology to be used in this project includes the creation of a mobile-based system that will predict student performance with the help of a hybrid deep learning method.
- The Genetic algorithm is used for data pre-processing and feature selection to ensure only the most important of the predictors are selected.
- The long-term memory and MobileBERT make the neural network hyperparameters the best of the deep learning models with the help of Genetic Algorithm innovation, which also makes them perform better and more efficiently.
- The two models are mixed to fully use their strengths and to create an ensemble that can both capture temporal patterns and semantics. This solution is portable and can be run on smartphones, thus, it has high accessibility and easy deployment.

EXPECTED RESULT

- The anticipated outcome of this project will be a highly accurate mobile-based system for predicting student performance that uses a hybrid deep learning model of LSTM and MobileBERT.
- It will also be flexible and scalable across a range of educational systems and datasets. Widespread adoption and ease of use are guaranteed by an intuitive user interface. The project's overall goal is to use cutting-edge, easily accessible, and effective predictive technologies to transform educational analytics.



CONCLUSION

The resulting system demonstrates significant potential to improve the accuracy and efficiency of student performance predictions while remaining computationally feasible for mobile platforms.

Moreover, the scalability and adaptability of this approach make it applicable to diverse educational contexts.



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**Artificial
Intelligence (AI)**

**Machine
Learning (ML)**

**Deep
Learning
(DL)**



THANK YOU



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