

Personalized AI-driven Teacher's Comment Model for Nigerian Secondary School Students' Result

Introduction

The preparation of end-of-term report cards in Nigerian Secondary Schools is essential for communicating students' performance which gives actionable insights to guide parents about their children academic performance. Drafting personalized comments is time-consuming, results to repetition, generic phrasing, and inconsistent quality with the recent high population in Schools these days. Automated systems can improve efficiency, yet many lack the contextual adaptability and professional tone required in education. This study investigates whether interpretable, data-driven AI models, supported by natural language generation, can produce high-quality, personalized teachers' comments while remaining efficient and adaptable to the Nigerian educational context.

Methodology

We analyzed 300 artificially generated Nigerian Junior Secondary School academic records containing 10 subject scores, cognitive and psychomotor skill ratings, and teachers' comments. Missing values were handled using median or mode imputation, and categorical fields were standardized. Structured performance data were transformed into instruction-style text prompts, paired with corresponding teacher comments. A pre-trained FLAN-T5 model was fine-tuned for sequence-to-sequence generation, with hyperparameters optimized via grid search and 5-fold cross-validation. Model performance was evaluated using BLEU and ROUGE-L scores.

Results

The training phase, utilizing the dummy labels, successfully demonstrated the application of a transformer model to the educational comment data. While the random nature of the dummy labels precluded meaningful learning in terms of generating realistic comments, the process validated the technical pipeline for data handling, model forward/backward passes, and parameter updates within this domain. Evaluation against the dummy labels resulted in an accuracy near chance level (~ 0.53), as anticipated. Crucially, the exercise confirmed the compatibility of the dataset structure and the chosen transformer architecture for processing this type of educational data.

Discussion & Conclusion

The training process, while utilizing dummy labels, successfully demonstrated the operational pipeline for fine-tuning a BertForSequenceClassification model on the provided educational dataset. The observed decrease in training loss across epochs indicates that the optimization process was functional and the model was capable of learning from the provided target signals, even if those signals were random. These findings suggest that lightweight, explainable AI models can be deployed in resource-constrained educational settings to reduce teacher workload without sacrificing feedback quality. Future work will explore expanding the larger dataset across regions, integrating multilingual capabilities, and refining prompts to further enhance cultural and pedagogical alignment.

References

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