Enhancing Educational Assessment: An Automated System Leveraging NLP and Deep Learning

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Abstract: *Subjective answer evaluation functions as an essential aspect of educational assessment because it reveals the reasoning thought processes and understanding levels together with students' writing abilities. Traditional manual evaluation requires too much time while being inconsistent and difficult to expand both in digital learning and remote settings. The presented system provides a hybrid automated assessment methodology which unites NLP and ML in addition to transformer-based deep learning strategies for achieving accurate and fair answers evaluation. The system performs linguistic normalization in its initial step before semantic vectorization with TF-IDF and Word2Vec methods then uses a fine-tuned BERT model to generate answer scores. The platform maintains two distinct sections for student work submission and evaluator review functionality which supports downtime scoring together with explanation systems and model update features. The educational system provides clustering and analytical tools which help instructors recognize students' learning patterns and discover instructional weakness areas. Experimental tests indicate that the system matches human evaluator scores effectively at the same time it promotes transparent assessment of various subject topics. The developed system brings reliable pedagogically appropriate assessment technology that shows potential to improve educational outcomes while simplifying evaluation processes.*

Keywords: Subjective answer evaluation, NLP, Machine Learning, BERT, automated assessment, educational technology, semantic analysis