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Review article

A Comprehensive Review of Automated Essay Scoring (AES) Research and Development

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ABSTRACT

Automated Essay Scoring (AES) is a service or software that can predictively grade essay based on a pre-trained computational model. It has gained a lot of research interest in educational institutions as it expedites the process and reduces the effort of human raters in grading the essays as close to humans' decisions. Despite the strong appeal, its implementation varies widely according to researchers' preferences. This critical review examines various AES development milestones specifically on different methodologies and attributes used in deriving essay scores. To generalize existing AES systems according to their constructs, we attempted to fit all of them into three frameworks which are content similarity, machine learning and hybrid. In addition, we presented and compared various common evaluation metrics in measuring the efficiency of AES and proposed Quadratic Weighted Kappa (QWK) as standard evaluation metric since it corrects the agreement purely by chance when estimate the degree of agreement between two raters. In conclusion, the paper proposes hybrid framework standard as the potential upcoming AES framework as it capable to aggregate both style and content to predict essay grades Thus, the main objective of this study is to discuss various critical issues pertaining to the current development of AES which yielded our recommendations on the future AES development.

Keywords: Attributes, automatic essay scoring, evaluation metrics, framework, human raters, recommendation

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