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A Multi-Criteria Qualitative Model for AI-Driven Pedagogical Recommendations within the Zone of Proximal Development

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Abstract

Collaborative filtering-based recommendation systems have proven to be an effective method within online learning platforms, aiming to provide learners with educational resources tailored to their specific needs (1). However, their traditional operation relies on similarity measures whose relevance is confined to the subjective evaluations assigned by learners to learning objects, thereby grouping individuals into virtual communities of convergent interests, to the detriment of a truly didactic logic.

The present contribution aims to enrich these conventional metrics by integrating pedagogical criteria inherent to learning objects, with the goal of generating the qualitative recommendations (2). To achieve this, we develop an original methodological approach that mobilizes the concept of Shannon entropy (3), associating heuristic weightings of multi-criteria pedagogical measures with classical similarity measures. This innovative approach evaluates recommendations based on both their subjective quality and their objective usefulness in maintaining the learner within their Zone of Proximal Development (4), thus ensuring that each pedagogical suggestion actively supports the progression of the cognitive learning process.

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