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Objective evaluation of performances in case of Students based on similarity analyses and Moodle-logs

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## Abstract

The increasing adoption of e-learning platforms has revolutionized educational practices and generated rich log data that can be harnessed to evaluate student performance objectively. This study proposes a comprehensive model that leverages 29 distinct attributes extracted from Moodle (e-learning platform) log data to provide a multifaceted/objective evaluation of student performance.

These attributes, which capture aspects such as diligence (e.g., posting frequency, active days, etc.), understanding (e.g., topic relevance, citation usage), and interaction dynamics (e.g., reply-time, response length), are organized into an Object Attribute Matrix (OAM), where each attribute's type and direction (e.g. the less is the reply-time, the better is the performance, etc.) are defined.

To quantify topic alignment, the all-MiniLM-L6-v2 model is used to generate sentence embeddings, measuring semantic coherence between student responses and instructor posts via cosine similarity. Suspected AI-generated content is identified using the roberta-base-openai-detector, which assigns a 1–10 score (10 indicating high probability). The framework utilizes the COCO Y0 engine (<https://miau.my-x.hu/myx-free/index_en.php3>) — a computational analysis tool — to assess attribute impacts and rank students based on composite performance metrics.

This data-driven approach offers educators an objective framework for assessing student performance while delivering personalized feedback to enhance learning outcomes. Future research will validate the model's objectivity and effectiveness across diverse educational contexts.

More details: <https://miau.my-x.hu/miau/315/moodle/>, <https://miau.my-x.hu/miau/320/moodle_cubes_logic/>, <https://miau.my-x.hu/miau/320>