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USING AI TEXT MODELS TO RANK ALTERNATIVES IN MULTI-CRITERIA DECISION ANALYSIS: A MICROSERVICES CASE

The relevance of the study is determined by the need for quick and informed decision-making in Microservice architectures, where many variable performance indicators are taken into account simultaneously. In such conditions, traditional Multi-Criteria Decision Making (MCDM) expert methods become slow, and the scale of the systems requires automated tools. The use of Large Language Models (LLM) makes it possible to form judgments about the significance of criteria without manual pairwise comparisons, but the issue of consistency between models and stability of estimates requires a special approach. Previous studies demonstrate the potential of using LLM in MCDM, but are limited to single-agent schemes and therefore do not provide cognitive diversity [1]. Other researchers emphasize the growing role of automated assessments in the context of generative AI, but point to the need for precise control over the interpretation of judgments [2]. Works with hybrid MCDM methods confirm the potential of AI, but remain partially expert-driven, which motivates the development of fully AI-driven procedures [3].

The object of the study is multi-criteria decision evaluation in microservice systems. The subject of the study is the use of LLM sets for ranking criteria in natural language. The goal of the study is to show that consistent, aggregated rankings can be obtained through multi-agent query processing. Fig. 1 shows the proposed procedure.

The study used top models from the open LLM ranking – Claude-Sonnet-4.5, Gemini-3-Pro, Kimi-K2-Thinking, and GPT-5.1 [4]. The models were given identical requests to evaluate the significance of typical microservice criteria, including latency, cost, execution success, deployment time, and resource usage.

After collecting the rankings, the weights were calculated using the Rank Sum (RS), Rank Reciprocal (RR), and Rank Order Centroid (ROC) methods. In the study, individual ranks obtained from each LLM were aggregated using the geometric mean and normalized to form consistent weight coefficients.

The results shown in Fig. 2 demonstrate consistency between the methods and a clear dominance of criteria related to latency and success rate, while deployment time and data transfer received lower scores. This indicates a natural consistency in the judgments of independent AI agents.

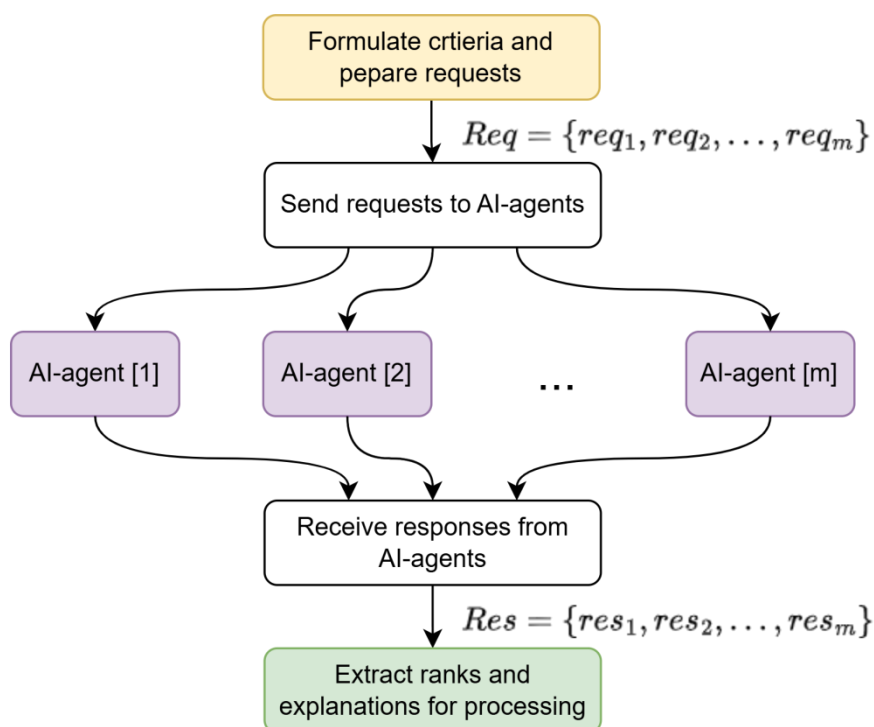


Figure 1. General approach schema

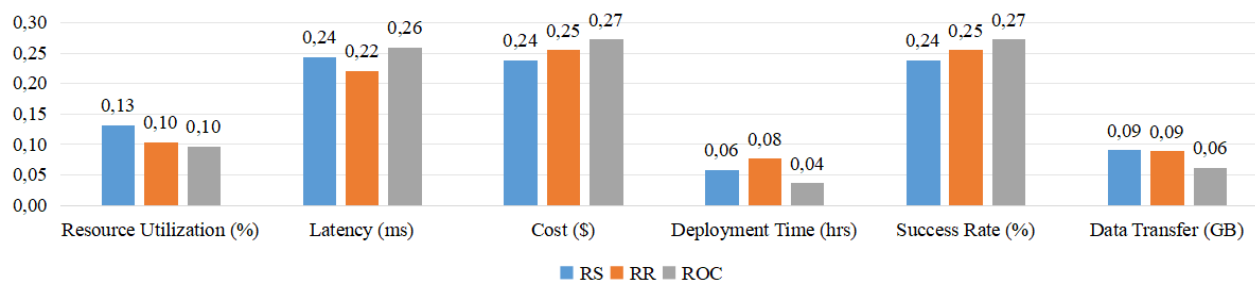


Figure 2. Aggregated rank-based weighting results

Therefore, a multi-agent, AI-based ranking of MCDM criteria is suitable for use without the involvement of expert groups. This approach can be integrated into DevOps processes to support automated decision-making.

References

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