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PhD Thesis Review Report

Review report for the PhD thesis submitted by **Tokhtakhunov Il'murat**, from the International Information Technology University, Kazakhstan, for the degree of Doctor of Philosophy (PhD) within the doctoral educational program **8D06105 – Data Science**.

The thesis proposes deep learning models for identifying look-alike audiences in targeted advertising using representation learning. The work tackles a practically important problem in customer similarity modelling and data-driven marketing analytics. It includes a thorough literature review covering machine learning methods for tabular data, dimensionality reduction, and deep neural network architectures for similarity search and user profiling, with a focus on autoencoder-based embeddings and Siamese networks for modelling behavioural similarity at scale.

The research is conducted on an extensive real-world telecommunications dataset. The data preparation pipeline — preprocessing, feature engineering, transformation, and normalization — is clearly described. Statistical and visualization techniques are applied for exploratory analysis, giving good insight into the data structure. Several machine learning and deep learning approaches are then implemented, compared using appropriate metrics, and validated experimentally. The results confirm the effectiveness of representation learning for similarity modelling and its practical value in targeted advertising.

The document is well-structured and clearly written. The research problem is well motivated, the methodology is sound, and the experimental results are presented logically. The work shows sufficient analytical depth and reflects the candidate's ability to bridge theory and practice. The main contributions — notably an embedding-based framework for scalable similarity search in high-dimensional tabular data, validated on real industry data — are clearly articulated.

The candidate has published several papers in peer-reviewed international journals indexed in Scopus, including Q1 and Q2 quartile venues.

Given the above, I consider the thesis to have scientific merit in terms of novelty, methodological rigor, and practical relevance. The work is ready for defense, and the candidate deserves the degree of Doctor of Philosophy (PhD) in the program 8D06105 – Data Science.

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