

USING NLP MODELS IN A RECOMMENDATION CHATBOT FOR SELECTING A THESIS SUPERVISOR

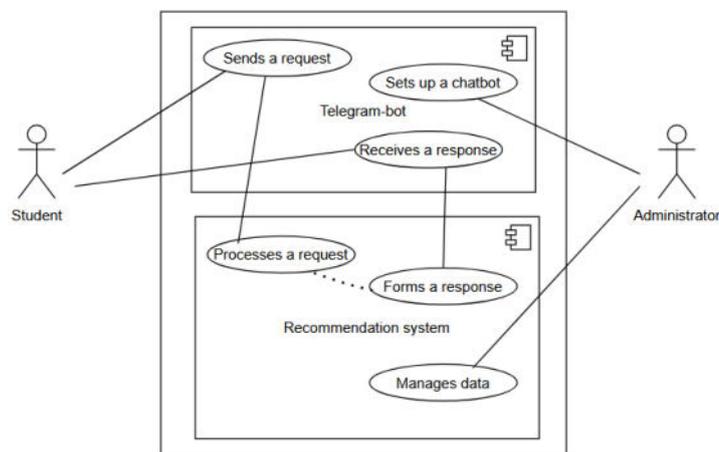
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The use of intelligent systems in education opens up new approaches to automating processes such as the student's choice of a thesis supervisor. As part of this bachelor's project, a Telegram chatbot [1] with an integrated recommendation system was developed, capable of analyzing students' queries in natural language and comparing them with the research profiles of the department's lecturers.

Three main approaches to query analysis were considered: (1) statistical methods (keywords, TF-IDF + cosine similarity) - simple to implement, but with low sensitivity to synonyms, word order and context; (2) Word Embeddings (Word2Vec, FastText) - models that capture semantic similarity between words, but are limited in understanding the full context of the sentence; (3) Sentence Transformers [2] - modern multilingual models that efficiently process short queries, preserving semantics at the sentence level, which is crucial for high-quality semantic matching.

After comparative analysis and testing, it was decided to use one of the multilingual models from the Sentence Transformers family, which supports the Ukrainian language and provides high-quality results without requiring additional training data. The system works by converting both student queries and teacher profiles into vector embeddings and calculating the cosine similarity between them.

The Use Case diagram (Fig. 1) shows the main scenarios of user interaction with the Telegram chatbot.



Picture 1 – Use case diagram of interaction with the Telegram chatbot for supervisor selection.

The use case diagram illustrates how the chatbot supports students in choosing a thesis supervisor by automating query analysis and the recommendation process – a practical application of NLP for personalized academic assistance.

References:

1. Telegram Bot API. (n.d.). // <https://core.telegram.org/bots/api>, 15.04.2025
2. Reimers, N., & Gurevych, I. (2019). Sentence-BERT: Sentence Embeddings using Siamese BERT-Networks. Conference on Empirical Methods in Natural Language Processing. <https://arxiv.org/abs/1908.10084>