Scientific supervisor's review
for a bachelor's final qualifying work
Kalitin Aleksandr Olegovich on the topic
«Strategy design for robofootball using reinforcement learning»

The topic of A.O. Kalitin work belongs to the branch of machine learning called reinforcement learning. Unlike standard approaches to machine learning, such as supervised learning or unsupervised learning, in reinforcement learning, instead of working with a static dataset, there is some environment and an agent that can perform a given set of actions in that environment. Depending on the action performed, the agent's state and the amount of his reward change. The goal is to develop a strategy that maximizes rewards. This statement of the problem fits well with the task of developing a strategy for playing football for robots from the SSL RoboCup league. The student was asked to implement the basic component of the strategy: breaking a goal from the foul line in the absence of interference.

In the course of the work, Aleksandr Kalitin studied the methods and approaches used in the field of reinforcement learning. Deep Q-Learning was chosen as an approach for solving the problem. While implementing this approach, the architecture of the neural network and its hyperparameters were selected, at which a satisfactory quality of training was achieved, a number of optimizations were proposed and implemented that accelerated the convergence time of the model and made it possible to increase the quality of the system. The developed program code can be used as a basis for solving more complex problems for robots football strategy design.

During the work of A.O. Kalitin he proved to be a capable student, demonstrated good research problem solving skills, and showed that he had mastered the basic courses of the educational program.

The work deserves an "excellent" mark.

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docent of SPbU,
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