The Two-Stage Cognitive System for Teaching Robots

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Development of robotic technologies is important aspect of industry and society in order to simplify our lives and make them safer and more comfortable in the future. Therefore, it is highly significant to create an effective, accurate method for teaching robots that requires only the human-machine interaction, excluding excess programming. The core question of the project is the development of learning algorithms by using artificial neural networks, involving robotic systems with functions of automatic control, associative perception, and accumulation of information. The human-machine interaction was provided by the implementation of the gestural control system using the informatics glove, as interface. The creation of the computer cluster enabled us to modulate neural networks, in order to establish the process of contemplation. When the basic database consisted of the object coordinates, data from sensors, etc. was formed, the robotics system was able to decide independently, where and when these learned skills should be applied. As a result, this project demonstrated that robotics systems could be successfully taught to perform precise actions involving physical activity, by conducting conjoint manipulations with a human in real time. Developed methods and algorithms allowed possibility to teach robots without programming them. They also could be implemented in medical and production spheres, though the most foreground field remains to be social robotics.