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## Neural Network System for Ground Robot Path Planning and Obstacle Avoidance

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The article considers the movement of a ground robot in the environment with fixed obstacles. The obstacle positions before the beginning of robot functioning are unknown. The obstacles are detected using lidar. It is proposed to use neural networks as planners of direction of avoiding the detected obstacle. The neural network consisting of two cascades is proposed. The first cascade classifies the current situation into two classes. Class 1 is the situation that does not require maneuvering, whether class 2 is the situation that requires maneuvering. The second cascade for situations that require maneuvering chooses the direction of obstacle avoidance. The results of neural network training (the deep learning neural network is used) are presented, as well as results of numerical simulation and natural experiments. The advantages of cascade network are shown, compared to the network that classifies the situation into three classes: no maneuver is required, right maneuver is required, left maneuver is required.

### Biography

Mikhail Medvedev is a Professor of South Federal University. He Works on development control systems of vehicles and robots. Development of adaptive and robust control methods for nonlinear systems, works at the Research and Development Institute of Robotics and Control System.

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