PROPOSALS FOR ROUTE PLANNING AND FLIGHT CONTROL OF UNMANNED AERIAL VEHICLES TO IMPROVE FLIGHT SAFETY IN URBAN AREAS BASED ON MACHINE LEARNING TECHNOLOGIES

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The development prospects of unmanned aerial vehicles (UAVs) are associated with their group use, with the creation of large groups of diverse information-related vehicles acting together in the interests of a common task. UAVs have a wide range of applications in the urban environment and can improve the efficiency and safety of many aspects of city life.

In order to successfully plan routes and manage UAV flights in urban areas, it is important to follow all relevant rules and restrictions to ensure safety, efficiency and successful completion of the tasks.

The task of routing a UAV is to determine a set of points in space that would correspond to its flight path and be identified on a map.

The following factors influence the choice of route: limited flight time, flight safety, and multiple routes. The specifics of the UAV group management task is the sequence of decision-making tasks and, to a lesser extent, dynamic tasks for implementing these decisions.

The aim of the report is to improve the safety of UAV flights in urban areas based on machine and deep learning technologies.

The report presents the results of the study of graph search methods and multi-agent algorithms: ant algorithm and "query-response-agreement" algorithm. The integration of graph search and multiagent search, which work in parallel, is proposed.

The formalisation of multifunctional UAVs for group performance of one or more tasks (influence functions) is carried out.

The problem of group behaviour of UAVs for the application of artificial intelligence (machine learning) technologies and trends in the creation of algorithms that can learn are presented. The main elements of the system of relations and conditions for the effectiveness of performing tasks during the control of a UAV group and actions in the group are formulated.

References

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