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Hybrid Control Mode Based on Multi-Sensor Information by Fuzzy Approach for Navigation Task of Autonomous Mobile Robot

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Abstract : This paper addresses the issue of the autonomous mobile robot (AMR) navigation task based on the hybrid control modes. The novel hybrid control mode, based on multi-sensors information by using the fuzzy approach, has been presented in this research. The system operates in real time, is robust, enables the robot to operate with imprecise knowledge, and takes into account the physical limitations of the environment in which the robot moves, obtaining satisfactory responses for a large number of different situations. An experiment is simulated and carried out with a pioneer mobile robot. From the experimental results, the effectiveness and usefulness of the proposed AMR obstacle avoidance and navigation scheme are confirmed. The experimental results show the feasibility, and the control system has improved the navigation accuracy. The implementation of the controller is robust, has a low execution time, and allows an easy design and tuning of the fuzzy knowledge base.

Keywords : autonomous mobile robot, obstacle avoidance, MEMS, hybrid control mode, navigation control
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