

基于分层传感器信息融合的智能车辆导航 Navigation Study for Intelligent Vehicle Based on Layered Sensor Information Fusion

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摘要: 针对智能车辆导航中传感器信息的不确定性, 结合BP神经网络和模糊神经网络分别对传感器信息进行了数据层与决策层的两层融合。采用BP神经网络对多超声波传感器信息进行数据层融合, 以减少超声波测距传感器信息的不确定性, 提高对障碍物距离探测的准确率; 采用模糊神经网络融合障碍物距离信息和车体与标志线间偏差信息, 实现智能车辆的导航决策控制, 使之更适合系统的跟踪避障要求。该方法使智能车辆在跟踪与避障中具有较好的灵活性和鲁棒性。仿真和实车试验验证了方法的有效性。To solve the uncertainty of sensor information for intelligent vehicle navigation, a 2-level sensor information fusion method based on both BP neural network and fuzzy neural network was presented. A BP neural network was used to fuse information from multi-ultrasonic sensors so that the uncertainty of the sensors' information can be decreased and high accuracy of obstacle distance can be obtained. In order to realize preferable decision control of navigation, a fuzzy neural network controller was employed for tracking obstacle avoidance to fuse the obstacle distance and the error information between the vehicle and the marked line. High performance of robustness and flexibility for intelligent vehicle navigation can be achieved with the 2-level information fusion method. Simulation and experiment results verified the effectiveness of the proposed approach.

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