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Abstract
This thesis proposes design concepts on the self-protection functions of an intelligent shopping assistant robot. The system is designed to provide the robot several functions such as the estimation of battery residual capacity, orientating navigation controls and fast charging strategies. During the robot is carrying out a task, it should inspect its battery residual capacity for sufficiency all the while. If the power of the robot is near and/or below a warning level, a self orientating navigation mechanism will start to lead the robot return the charging area. In which, the navigation mechanism consists of a wall-following controller, a collision-free controller and an orientating controller. They are all designed in the integrated fuzzy logic control frame and implemented by MSP430 and DSPC55X chips. Besides, is thesis designs a fast charging strategy for the robotic power supply. After the charge, the robot only needs moving back to leave the charging set-position for the next task. From the simulations and experimental results, one can see that the proposed system really could realize the self-protection functions for the intelligent shopping assistant robot or other types of robots.
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