Multi-Robot Task Scheduling and Routing Using Neuro-Fuzzy Control

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Abstract:

Multi-robot systems have been widely used in intelligent environments such as modern flexible manufacturing systems. Task planning is the most important issue to specify how to use mobile robots and other resource efficiently. It is not an easy task to achieve effective cooperation between these robots in such a dynamic environment. An efficient scheduling methodology together with intelligent real-time control is necessary for a multi-robot system. This paper presents the analysis of a real-time fuzzy-based task scheduler and routing to deal with an intelligent framework has four programmable CNC machine, three mobile robots and other recourses. A neurofuzzy controller has been used to guide the mobile robot from the source point to its destination with real-time obstacle avoidance. The simulated results and real experiments on group of three mobile robots show that the multi-robot system can deal with the proposed scheduling methodology to achieve the required operation.

Keywords—neurofuzzy control; multi-robot system; task allocation and scheduling; mobile robot; obstacle avoidance.