

基於紅外線感測器之清潔機器人導航設計

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摘要

導航策略與控制架構是智慧型機器人自主式運動的重要設計項目。近幾年來，清潔機器人的導航系統與控制架構的研究逐漸受到重視，如何提供清潔機器人適當的導航策略與控制架構，進而有效率的整體清潔完整地面區域是此研究領域的重點。本論文發展出運用紅外線感測裝置，在面臨牆壁時能自我修正方向，輔助機器人做左右來回移動的機制，並且在房間內使用紅外線發射器做標記，運用數位編碼訊號，引導機器人記憶移動過後的區域，幫助機器人在室內環境有效率移動，進而達成全區域之清潔任務。

Navigation Design of a Cleaning Robot

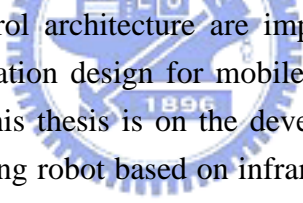
Using Infrared Sensors

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ABSTRACT

The logo of National Chiao Tung University is a circular emblem. It features a gear-like outer border. Inside the circle, there is a stylized representation of a building or a flag on the left, and the letters 'E', 'S', and 'A' stacked vertically in the center. Below these letters, the year '1896' is inscribed. The entire logo is rendered in a blue color.

Navigation strategy and control architecture are important for autonomous mobile robots. In recent years, navigation design for mobile robots has been an interesting research area. The focus of this thesis is on the development of navigation strategy and control system of a cleaning robot based on infrared sensors. This thesis presents a method of path planning and control of a cleaning robot. An infrared sensor system has been designed and constructed for navigation experiments. When the robot executes back and forth cleaning task for a complete coverage cleaning, the infrared sensors can help robot align with walls and help the robot stay in the designed path. Moreover, a landmark has been designed using two- directional infrared signals. Each of them has a unique digital code to facilitate the robot memorize the cleaned area. Thus the robot can complete the cleaning task efficiently in an environment with obstacles.