Journal of Computer Science and Educational Technology
2019 VOL.9 No.1

生活助理機器人之設計

The Design of the Assistant Robot

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摘要

本研究以設計具有人工智慧之居家服務型機器人為目標，使其能協助主人達成輔助生活機能之功能。機器人的硬體有雷射測距儀、Kinect、電腦、平板、Arduino 開發板、馬達、重量感測器等設備。為了使機器人能流暢移動，由直流馬達以及控制板組合成的移動系統，構成下半身的輪型平臺。上半身則由伺服馬達組成之雙手臂，搭配手爪，可夾取物品。機器人身體配置物平臺內嵌重量感測器與無線控制晶片，讓機器人能具有取物、置物、紀錄物件重量的功能。機器人以雷射測距儀建立室內環境地圖，讓機器人可以進行定位，也使得人可以了解機器人之位置。Kinect 為機器人之視覺系統，透過深度學習，使得機器人具有物件辨識之能力。置物平臺中重量感測結合物聯網系統，可以記錄主人用餐量與時間，達成生活助理機器人之目標。

關鍵詞：智慧型機器人、定位系統、影像辨識、深度學習、物聯網

Abstract

The main purpose of the study is to design Artificial intelligence (AI) service robot to assist human beings with their daily lives. The body of the robot has a laser range finder, Kinect, computer, tablet, weighing sensor, and motors. To ensure the smooth and flexible movements of the robot, the movement system consists of wheels, DC motors and a control board. The bottom part is the wheel- shaped platform, whereas the upper part are the two arms consist of servo motors accompanied with additional grippers. The body of the robot has a platform and weighing sensor for putting objects, enabling the robots with the ability of taking and putting objects, as well as recording the weight of the objects. The robot uses laser range finder to build the map of the

indoor environment. Kinect serves as its vision system, enabling the object identification of the robot, at the same time integrate with the map through wheel-shaped moving platform. Using Kinect skeleton tracker, the robot can track its user or interact with the user. The weighing platform integrates Internet of things system, which can record the amount of food consumed and time taken for each meal by the owners, to achieve its ultimate goal of being daily life assistant robot.

Keywords: AI robot, position system, image recognition, deep learning, Internet of things

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