中文摘要

在不同的應用情境下，必須根據需求將無線感測網路節點的功能做不同的修改，其中省電與效率是最為關鍵的問題。本研究針對無線感測網路的特定節點提出一項可增加網路生命週期的軟體更新機制。首先，在興趣封包中加入更新節點的清單，使得節點可被告知為更新的對象，以實現特定節點更新的功能。其次在路徑的選擇方面，本研究結合 MTPR 與 MMBCR 兩種方式，一方面找出最短路徑增加更新效率，另一方面加入節點電量判斷機制避開過度使用的節點延長無線感測網路生命週期。最後將更新的程式碼皆分割為核心程式模組與應用程式模組以減少資料的傳輸，在進行程式碼更新時，本研究採用 SPIN 方法以確保封包不會遺失。

本研究與無線感測網路的程式碼散佈工具－Deluge 之各項實驗數據顯示：(1)在 5*5 的網路拓撲以及傳輸 12 Pages 的資料時，本研究之方法在傳輸時間方面只需要 Deluge 的 67%，(2)封包數量為 Deluge 的 41%，而電量則可節省 67%，(3) 12 Pages 資料量的更新工作也可較 Deluge 多進行 1.79 倍，(4)在 5*1 的直線拓撲下，啟動程式碼切割機制後，在傳輸時間只需要 Deluge 的 14%，電量則可節省 87%。

Abstract

The functions of the wireless sensor network (WSN) node need to be modified in different requirements in order to fulfill different applications. The power saving and performance are key issues have to be conquered. In this research, we propose a mechanism to increase the lifetime for the specific node's update in the wireless sensor network. Firstly, we modify the interest packet of directed diffusion method to determine sink nodes. Secondly, this study combined MTPR with MMBCR to determine the update path. This combined method can not only find the shortest path for increasing the efficiency, but also provide a good power saving for extending the network life cycle. Thirdly, we divide program codes into core modules and application modules. It can reduce the data amount when WSN nodes are updating. These data is transmitted by SPIN method to secure packet lossless.

In comparing our study and Deluge, the experimental results show that (1) the transmission time can be reduced to 67% when send 12 pages in 5*5 network topology. (2) The transmission packet can be reduced to 41% and power consumption can be saved to 67% when send 12 pages in 5*5 network topology. (3) The 12 pages updating task in 5*5 network topology can be executed more than 1.79 times than Deluge. (4) In reducing code image size, the transmission time can be reduced to 14% and the power consumption can be saved to 87% in 5*1 network topology.