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Application
Group

獵能器供電之無線感測節點應用於老人照護物聯網系統 Energy Harvester Powered Wireless Sensor Endnodes for Application of Elder-Caring Based on Internet of Things

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作品摘要

獵能器供電之感測節點應用於老人照護物聯網系統，計畫將每日人體活動逸散之能量，以壓電獵能方式有效收集儲存再利用，環保且減少生活中越來越多因充電需求所造成的不便，並提升老人生活與照護之品質。本企劃提出新穎之獵能技術，符合綠色環保之永續能源，將會是未來電子商品或穿戴裝置之重要供電方向。最困難的挑戰有兩項，其一為低能密輸出，第二是將習知連續式獵能（特定低頻振能）改進為高效率之瞬時突發式獵能技術，且能在不同之低、重按壓下仍能運作，且不破壞壓電材料和獵能機構。本企劃具有高度整合之特色，自材料、機械、電路設計、微波天線，甚至封裝為微型裝置，乃至後端的應用系統都已有進行跨領域技術之整合。電線能照護鞋實際運用於健康照護之隨身可穿戴裝置，具體項目包括活動量記錄與分析、攜帶型足部電刺激、電子產品充電等。

扣件發電器可依需求而有彈性之多重組合，所使用之基本尺寸為 $1.0 \times 2.5 \times 0.02 \text{ cm}^3$ ，其發電之功率密度為 125 mW/cm^3 ；在 30 毫秒鐘內可平均產出超過 20 mW 之功率輸出。單次單一模組快速敲擊下產生 670 微焦耳之能量。進而推動後端電路如攜帶式足部電刺激、六軸加速規活動監測、ZigBee 無線連網功能。



圖 1. 獵能器供電之感測節點應用於老人照護系統

Abstract

The techniques of energy harvesting are currently used for collection energy which is escaped all around the environment. The collected energy is able to transform to usable energy after that. Not only can this result achieve the goal of environmental protection, but also can solve the problem which is annoying for people who carry the electronic products with charging inconvenience. It is obvious the fact that energy harvest technique, the mainstream power supply way for the future electronic products, will progress rapidly to make up the insufficiency of the existing power supply technology.

Furthermore, the technology of the industry and commerce have made enormous progress; however, the potential of lacking energy crisis is also an incoming problem.

As a result, it is more important to find the substitution energy. Since all industries' efforts to reduce their roaring energy use as well as to rein in the pollution emission have been drawing more attention, the developing of the green energy is a significant issue.

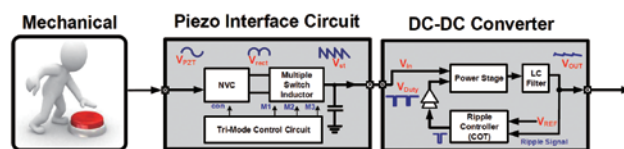


圖 2. 壓電獵能供電系統

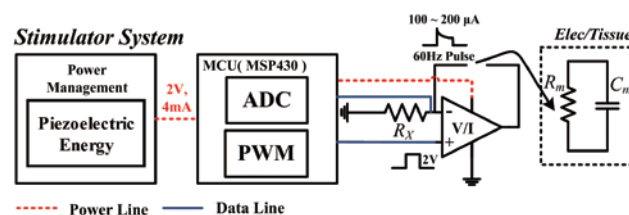


圖 3. 壓電發電器堆動電刺激系統圖