

十一、研究計畫中英文摘要：請就本計畫要點作一概述，並依本計畫性質自訂關鍵詞。

(二) 計畫英文摘要。(五百字以內)

Wireless sensor networks (WSNs) can generally be classified into two categories: *time-driven* and *event-driven*. In an event-driven WSN, sensors report their readings only when they detect events. In such behavior, sensors in the event area may suffer from higher contention. In this proposal, we solve this problem by jointly considering two subissues. One is exploiting the spatial correlation of data reported by sensors in the event area and the other is designing a specific MAC protocol. This proposal proposes a novel hybrid TDMA/CSMA protocol with the following interesting features that differentiate itself from conventional TDMA-based protocols. First, the TDMA part is based on very loose time synchronization and is triggered by the appearance of events. On the other hand, the CSMA part is adopted in the non-event area to achieve low latency transmission. Second, the slot assignment strategy associated with the TDMA part takes the spatial correlation of sensing data into consideration and thus allows less strict slot allocation than conventional TDMA schemes. Interestingly, by intentionally allowing one-hop neighbors to share the same time slot, the number of slots required is significantly reduced. Third, by intentionally enlarging the slot size, our scheme enforces packets, after leaving the event area, to form a pipeline in such a way that packets flow like streams, each of which is separated sufficiently in distance to avoid interference. In addition, by exploiting TDMA's features and the spatial correlation of sensing data, we show how to reduce redundant reports. We also discuss how to combine our protocol with the LPL (Low Power Listening) technique to achieve energy efficiency. In this project, we intend to implement the proposed protocol on real WSN platform.

Keywords: wireless sensor network, medium access control, MAC, TDMA, CSMA, spatial correlation, TinyOS