MOBILE BASE STATION FOR WIRELESS SENSOR NETWORKS USING GENETIC ALGORITHMS

IDRUS SALIMI BIN ISMAIL

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Main Supervisor : Nurul Adilah binti Abdul Latiff, Ph.D

School/Institute/Centre : School of Ocean Engineering

A sensor node in the network should operate with minimum energy as possible to reduce the overall energy dissipated by the sensor nodes in the network so it can increase the lifetime of wireless sensor network (WSN). The positioning of mobile base station is one of the methods to improve the overall performance of WSN. However, the locations for mobile base station should be at total communication cost of sensor nodes and total energy dissipated by sensor nodes is minimized. In addition, total sensor nodes per cluster also should be similar for each cluster to minimize total communication traffic between sensor nodes and the base station. An energy efficient protocol for mobile base station problem using GA was proposed. The mobile base station problem was transformed into an optimization problem, and the algorithm was employed to search for optimal locations of data gathering points. MATLAB software was used to design and simulate the proposed protocol. Performance evaluation of the proposed protocol was made in terms of network lifetime, data delivery, and energy efficiency for different network field size, number of base station locations, and base stations predetermined location patterns. The simulation results were shown that the performances of the proposed protocol were significantly improved compared to LEACH and direct method. The experimental result used first order energy model shown network lifetime for proposed protocol

was increased 32.52 percent and 80.38 percent compared to LEACH and direct method protocol, respectively. While the proposed protocol used MICA2 Power Transmission as Energy Model, network lifetime for proposed protocol shown was increased 430.73 percent and 83.30 percent compared to LEACH and direct method protocol, respectively. Furthermore, the performances of the proposed protocol for different base station patterns have shown that the normalized lifetime grid predetermined location pattern was higher compared to random and spiral predetermined location patterns.

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STESEN PANGKALAN MUDAH ALIH BAGI RANGKAIAN SENSOR TANPA WAYAR MENGGUNAKAN ALGORITMA GENETIC

IDRUS SALIMI BIN ISMAIL

Oktober 2016

Penyelia Utama : Nurul Adilah binti Abdul Latiff, Ph.D

Pusat Pengajian/Institusi/Pusat : Pusat Pengajian Kejuruteraan Kelautan

Nod sensor dalam rangkaian haruslah beroperasi dengan tenaga yang sederhana bagi mengurangkan tenaga yang digunakan oleh nod sensor dalam rangkaian supaya ianya dapat meningkatkan jangka hayat WSN. Kedudukan stesen pangkalan mudah alih adalah salah satu kaedah untuk meningkatkan prestasi keseluruhan rangkaian sensor tanpa wayar (WSN). Lokasi bagi stesen pangkalan mudah alih hendaklah dapat mengurangkan jumlah kos komunikasi nod sensor dan tenaga yang digunakan oleh nod sensor. Jumlah nod sensor setiap kelompok juga perlulah sama bagi setiap kluster bagi mengurangkan jumlah trafik komunikasi antara nod sensor dan stesen pangkalan. Protokol cekap tenaga untuk masalah stesen pangkalan mudah alih menggunakan GA telah dicadangkan. Masalah stesen pangkalan mudah alih telah diubah menjadi masalah pengoptimuman, dan algoritma telah digunakan untuk mencari lokasi yang optimum terhadap lokasi pengumpulan data. Perisian MATLAB digunakan untuk mereka bentuk dan simulasi protokol yang dicadangkan. Penilaian prestasi protokol yang dicadangkan dilakukan dari segi jangka hayat rangkaian, penghantaran data, dan kecekapan tenaga untuk berbeza saiz bidang rangkaian, beberapa lokasi stesen pangkalan, dan stesen pangkalan corak mobiliti. Keputusan simulasi yang dilampirkan menunjukan prestasi protokol yang dicadangkan yang amat baik berbanding LEACH. Hasil eksperimen menggunakan model tenaga kelas

pertama ditunjukkan jangka hayat untuk protokol dicadangkan meningkat sebanyak 32.52 peratus dan 80.38 peratus bagi LEACH dan kaedah langsung protokol. Manakala protokol yang dicadangkan menggunakan MICA2 Power Transmission sebagai Energy Model, jangka hayat rangkaian untuk protokol dicadangkan ditunjukkan peningkatan sebanyak 430.73 peratus dan 83.30 peratus berbanding LEACH dan kaedah langsung protokol. Tambahan pula, prestasi protokol yang dicadangkan untuk corak stesen pangkalan yang berbeza menunjukkan bahawa jangka hayat normal bagi corak mobiliti grid adalah lebih tinggi berbanding corak pergerakan rawak dan lingkaran.