

ABSTRAK

Wireless Multimedia Sensor Networks (WMSNs) memiliki karakteristik yang dapat mempengaruhi keputusan *routing*, seperti sumber daya energi, kapasitas penyimpanan dan komputasi yang terbatas. *Node-node* sering mengalami masalah kehabisan energi dan tidak bisa berfungsi di lingkungan WMSN. Jika masalah kehabisan energi dari *node-node* atau *dead node* terjadi di banyak lokasi dari WMSN maka secara langsung menimbulkan partisi jaringan dan kegagalan *network lifetime* dari WMSN tersebut. Protokol-protokol *routing* konvensional di jaringan *wireless* belum tentu sesuai untuk diterapkan di WMSN. Karena protokol-protokol tersebut hanya fokus pada rute terpendek sehingga *network lifetime* tidak menjadi pertimbangan untuk keputusan *routing*. Algoritma *Energy-Efficient Dynamic Programming* diusulkan untuk modifikasi protokol *routing* di WMSN. Algoritma baru tersebut dirancang dengan fokus pada metrik *energy threshold*, *maximum energy* dan *link cost* dari *node-node*. Modifikasi protokol *routing* berbasis ketiga metrik *routing* tersebut merupakan suatu solusi yang diperlukan untuk mencegah *node-node* kehabisan energi dan tidak bisa berfungsi, meningkatkan *network lifetime* dan mencegah munculnya masalah *network lifetime* di WMSN. Algoritma *Energy-Efficient Dynamic Programming* ini menyebabkan *residual energy* dari *node-node* lebih terjaga dari penggunaan secara terus menerus. Pada akhirnya *network lifetime* dapat berlangsung dan bertahan lebih lama hingga *iterasi* terakhir di WMSN. Algoritma *Energy-Efficient Dynamic Programming* juga memiliki kesetimbangan paling baik di dalam hal *network lifetime*, *delay* rata-rata dan total energi rata-rata dibandingkan algoritma *Bellman-Ford* dan *Ant Colony Optimization*.

Kata kunci: *Wireless Multimedia Sensor Networks*, *network lifetime*, *routing*, *Energy-Efficient Dynamic Programming*

ABSTRACT

Wireless Multimedia Sensor Networks (WMSNs) have characteristics that can influence routing decisions, such as limited energy resources, storage and computing capacity. Nodes often run into problems of energy depletion and can not work in a WMSN environment. If the problem runs out of energy from nodes or dead nodes occur in many locations of WMSN then directly cause network partition and network lifetime failure of the WMSN. Conventional routing protocols in wireless networks are not necessarily applicable to WMSN. Because the protocols only focus on the shortest route so that network lifetime is not a consideration for routing decisions. The Energy-Efficient Dynamic Programming algorithm is proposed for modification of routing protocols in WMSN. The new algorithm is designed with a focus on the energy threshold, maximum energy and link cost metrics of the nodes. Modified routing protocols based on these three routing metrics are a necessary solution to prevent nodes from running out of energy and not working, increasing network lifetime and preventing the emergence of network lifetime problems in WMSN. The Energy-Efficient Dynamic Programming algorithm causes residual energy from the nodes to be maintained from continuous use. In the end the network lifetime can last and last longer until the last iteration in WMSN. The Energy-Efficient Dynamic Programming algorithm also has the best equilibrium in terms of network lifetime, average delay and average total energy over the Bellman-Ford algorithm and Ant Colony Optimization

Keywords: *Wireless Multimedia Sensor Networks, network lifetime, routing, Energy-Efficient Dynamic Programming*