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UNIVERSITI MALAYSIA SABAH

FINAL REPORT

MoHE/UMS/ERG0046-ICT-1/2013

Potential of Incorporating Evolutionary based Network Coding for Information Scavenging in Intelligent Public Transportation

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ABSTRACT

Intelligent transportation systems use wireless technology as a communication backbone for disseminating vital traffic information. In conventional store-and-forward of a wireless ad hoc network, data packets disseminated separately and independently with different transmission flows limit the overall network performances. Network coding is implemented to combine several packets from different sources and broadcast the combined packet to respective destinations in single transmission flow. Genetic algorithm (GA) is introduced to further optimise the resources for network coding by searching optimum transmission route. The simulation results show the GA can adapt to various topologies with a better throughput and energy consumption of 22.27 % fewer than store-and-forward and 16.33 % fewer than code based forwarding structure (COPE).

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Sistem pengangkutan pintar menggunakan teknologi tanpa wayar sebagai tulang belakang komunikasi untuk menyebarkan maklumat trafik penting. Konvensional "store-and-forward" dalam rangkaian ad hoc tanpa wayar menyebarkan paket data secara berasingan dan bebas melalui aliran penghantaran yang berbeza akan menghadkan persembahan rangkaian keseluruhan. "Network coding" telah dilaksanakan untuk menggabungkan beberapa paket daripada pelbagai sumber dan menyiarkan paket gabungan ke destinasi masing-masing dalam satu aliran penghantaran. Algoritma genetik (GA) yang diperkenalkan mengoptimumkan sumber untuk "network coding" selanjutnya melalui pencarian laluan penghantaran optimum. Keputusan simulasi menunjukkan GA boleh menyesuaikan diri dengan pelbagai topologi serta mencapai daya pemprosesan dan penggunaan tenaga sebanyak 22.27 % lebih baik daripada cara "store-and-forward" dan 16.33 % lebih baik daripada "code based forwarding structure" (COPE).