

CERTIFICATE

No: 20984/TELKOMNIKA/A/20/2022

TELKOMNIKA Telecommunication Computing Electronics and Control

is hereby awarding this certificate to

Imad S. Alshawi, Zainab Ali Abbood, Asaad A. Alhijaj

in recognition of his/her contribution as Author in this scientific journal for paper entitled
**Extending lifetime of heterogeneous wireless sensor networks using spider
monkey optimization routing protocol**

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