



REVIEW OF DISSERTATION THESIS

Thesis title: A Cross-Layer Modification to the AODV Routing Protocol in Wireless Mesh Networks

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Study program: Applied Informatics

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Reviewer: doc. Ing. Vladimír Soběslav, Ph.D.

Overall evaluation of doctoral thesis:

The main goal of the presented thesis was to introduce a highly efficient routing protocol for wireless mesh networks by integrating the AODV protocol with the Fuzzy logic approach, leading to the Fuzzy Control Energy Efficient (FCEE) Routing Protocol. This approach is currently being widely used in mobile networks and Wi-Fi based standards. There are many open research questions and challenges such as metric definition, the network convergence and stability, specifics of used technologies, IoT/OT integration and many others which were mentioned in this work. This topic is therefore very actual and suitable for research.

The content of doctoral thesis is divided in several parts. Firstly, the theoretical background which is represented by the first chapter - State of The Art and the third chapter - An In-Depth Analysis and Discussion on the Extension of AODV Protocol. The author has clearly stated its motivation, declared the sub-goals and decomposed the main topic into the partial areas. From a methodological perspective, I appreciate the use of the PRISMA framework for systematic review approach. From the review of dissertation treatise, we can see the major improvements in the structure of the thesis and the scientific presentation. The thesis is very well structured, problems are clearly defined and linked with the other scientific resources. The State of the Art presents an overview of current problems and solutions in the world of WMN - Wireless Mesh Networks, including the routing protocols, where the traditional OSPF protocol sticks out a little bit in MANET protocol family. Furthermore, the detailed analysis of AODV protocols



and their possible extensions are systematically presenting the current state of the research in this area.

The last three chapters represents the author's contribution to this scientific area. Mainly the proposal of Fuzzy Logic Enhancement for AODV protocols and the simulation. From the scientific perspective, the fuzzy Proposed Fuzzy Logic Enhancement for AODV protocols is very promising, according to the presented results and simulations. The author could discuss the use of other simulation tools because these tools may influence the results. The question is, whether it would be possible to test the proposed protocols in the real world and not just in a simulator. It could bring more interesting results.

Despite my remarks, the author fully accomplished the defined goals, and the overall quality of the dissertation is of a high standard and demonstrates the author's knowledge and experience in this field.

The author has published or is a co-author of 7 journal papers, 7 conference papers and 2 book chapters, majority is in association with doctoral thesis. Some of the outputs have Scopus/WoS SJR/JCR rankings, which proves the recognition by the scientific community.

I consider the results to be adequate and recommend this thesis to be accepted for defense to achieve a Ph.D. title.

Questions for discussion:

- 1) Would it be possible to use other simulation tools, can you briefly discuss the possibilities, pros and cons?
- 2) Do you plan to implement the proposed solution in some real-world scenarios?

Hradec Kralove 8 January 2024

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doc. Ing. Vladimír Sobeslav, Ph.D.