B. Sc. Thesis Review Form

BME Department of Networked Systems and Services

Name and Neptune code of the candidate: Shoaib Areeba Tabassum (EZXFWK)

Title of the thesis: Minimizing Power Consumption of MIMO Network Using a Novel Quantum Genetic Algorithm

Name of the supervisor: Sara El Gaily

Name of the reviewer: Almansoori Mahmood Kadhim Mohammed

1. The general technical quality of presenting and addressing the problem, the proportion of analyses and independent thoughts reported in the thesis.

   The candidate presented and addressed the problem in accordance with the high professional standards of a B.Sc. degree, and the independent thoughts meet every expectations.

2. Quality of data collection and processing

   The thesis reviews the related scientific work in a complete and up-to-date manner.

3. Addressing the problem, conclusions and suggestions

   The candidate addressed the tasks in a technically sound manner, the conclusions are appropriate, and excellent additional suggestions are provided.

4. Lessons learned and comments on future work

   The lessons learned are presented in a high quality, and the presentation itself is clear and easy to understand. All relevant technical phenomena are recognized by the thesis, and their evaluation meets every expectations.

5. Support of the scientific literature, up-to-dateness, the proportion of older and newer technologies

   The results presented in the thesis meet most of the requirements set by the state-of-the-art scientific literature, and while certain choices of the candidate are suboptimal (i.e., the candidate chose outdated, older technologies), they are well justified and account for every relevant aspect.

6. Presentation quality

   The presentation quality of the thesis is excellent, and there is a clear connection between the presentation and the appropriate communication of the contents of the thesis.

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Summary of the written assessment

The student addresses the challenge of minimizing power consumption in MIMO (Multiple-Input Multiple-Output) networks by applying a quantum algorithm called an Unconstrained Quantum Genetic Algorithm (UQGA).

The student starts the thesis by providing the necessary tools and backgrounds that constitute a base for the thesis research problem (overview of quantum computing, MIMO systems, blind quantum computing, genetic algorithm, etc). Next, the student introduces a novel quantum optimization algorithm that can find the extreme value in a vast and unsorted database that surpasses the capacities of existing classical and quantum computers. Then, the student applied the UQGA to minimize the power consumption of the MIMO system. Finally, simulation results were conducted to show the efficiency of the UQGA.

In general, the paper effectively introduces a significant research subject, and, despite some minor errors in grammar and language, it is well-crafted. The dissertation is well written. The literature review is appropriate, and the writing quality is perfect.

Questions to be answered by the candidate during the defense (suggestions for the exam committee)

1. What is the difference between the Grover algorithm and the UQGA.

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Based on the above the cumulative mark is (5, Five):

I agree to make my review public via the Thesis Portal of the BME VIK.

Date: 22.06.2023

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Reviewer

Personal details of the Reviewer

Name: Almansoori Mahmood Kadhim Mohammed

Completed level of education: MSc

Year of getting the degree: 2016

Affiliation: Department of Networked Systems and Services, BME

Position: PhD Researcher at BME

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