I. Overall Evaluation

The thesis of the Ph.D. candidate Mr. Lukáš Vojáček, entitled *Neural Networks In High Performance Computing Environment*, deserves the Ph.D. degree in Computer Science. The work, which addresses an important concept in Computer Engineering, is certainly of great interest and is very relevant to today’s computing world.

The technical contribution of the author lies in suggesting a successful solution to the problem of data dimensionality. He has proposed an original contribution to knowledge by combining the concept of Growing Neural Gas and Self-Organizing Map for the reduction of data dimensionality. In addition to this new type of hierarchical neural network, the author has put high creative efforts in the contribution to the progress and development of High Performance Computing Environment. The thesis contents are written and introduced according to the known to me scientific world standard and meets the academic standard requirements.

II. Student's Scientific Contribution – Publications and Activities

The PhD student has had many awards, professional certificates, grant and project participations. His publications as an international journal paper with impact factor, a book chapter and eight local and international conference proceedings papers. Those, to which I had an access, have shown the author had presented his work functionally proving the high efficiency of his thesis and the approaches he succeeded in working them out. The Author has worked out six algorithms and implemented them with examples of demonstration.
III. Comments on the Manuscript

Here I would provide some specific comments about the thesis. This will contain the good and bad sides from my own point of view. My comments will concern technical sound, readability of the thesis and then some queries, to which I would expect the PhD student to answer and explain at the oral examination (PhD dissertation defense).

A. Technical Sound and Thesis Clarity

The author has introduced a good engineering work in presenting the problem – figures, tables, examples, mathematical equations, all are necessary in the regard of understanding the problem and are very well illustrated. The thesis is very well organized and presented. The structure of the manuscript is very clear, the subjects are discussed in detail. The author uses an interesting and practical methodology with a novelty lying in developing the way of data dimensionality reduction using combination of Growing Neural Gas and Self-Organizing Map for the.

The content is properly structured and explained, the supporting material is indeed very well introduced: figures, tables, mathematical equations, cited references on relevant literature, … all are given with complete explanation. The edition of the manuscript was prepared carefully leading to a good and easy to read book.

B. Queries

Despite the fact that the author has invested great efforts to clearly present the problem and his solution approach to it, there still are some minor issues that might not have been introduced in the proper way. However, they can completely be ignored as they represent only the reviewer’s point of view and has no effect on the very good presentation of the manuscript. I suppose they can be useful for future author’s works.

- Algorithms are well written, but could be supported by more mathematical analysis.
- Figure 3, 5 and 6, 9 in chapter 4 should be improved for a better reading and understanding.
- In State of the Art part, the Author did not give the research gap.
- There is no requirement to specify the notation part in state of art.
- Algorithms 1 and 2 written in chapter 3 are very good, but is not very clear whether they were proposed by the candidate or taken from references.
- Table 15 in chapter 6 is not clearly visible.

IV. Concluding Remarks

On the basis of the high level of Computer Engineering knowledge the Ph.D. candidate Mr. Lukáš Vojáček, has shown in his dissertation *Neural Networks In High Performance Computing Environment*, the number and the quality of his publications within a short period of time and the new scientific achievements and results in the area of Computer Science he achieved, I conclude that his work and academic credit are sufficient for a PhD degree.

Khalid Saeed