OPINION

On the dissertation work of **Aleksandar Ognyanov Marazov**,

Topic: "DEEP NEURAL NETWORKS FOR MEDICAL DIAGNOSTICS" for obtaining the educational and scientific degree "Doctor"

Professional field: 4.6 "Informatics and Computer Science"

Doctoral program: "Informatics", Prepared by: Prof. Sotir Sotirov, PhD

University "Prof. Dr. Asen Zlatarov" - Burgas

1. General characteristics of the dissertation work

The dissertation submitted by Aleksandar Ognyanov Marazov is devoted to the development and research of deep neural networks for medical diagnostics, which is a highly relevant and innovative topic. The work is structured into an introduction, five main chapters, a conclusion summarizing the obtained results, and an extensive bibliography. The dissertation is a total of 162 pages and includes 146 references.

2. Importance of the research problem

The dissertation addresses the significant problem of improving the accuracy and efficiency of medical diagnostics through the application of deep learning methods. The topic is of great importance due to the increasing need for reliable and automated diagnostic tools in medicine, particularly for diseases like Alzheimer's, where early detection is critical.

3. Knowledge of the problem

The candidate has demonstrated a profound understanding of the problem. The dissertation provides a thorough analysis of existing methods and technologies in the field of medical diagnostics, identifying their limitations and proposing innovative solutions through the use of deep neural networks.

4. Research methodology

The research methodology is well-founded and appropriate for the objectives of the study. The candidate has successfully developed and implemented a modular deep neural network architecture that addresses the specific challenges of medical image analysis. The dissertation includes a detailed description of the network design, training processes, and validation on real medical datasets.

5. Contributions of the dissertation

The contributions of the dissertation are both theoretical and practical. The candidate has proposed new approaches to the design of deep neural networks tailored to the needs of medical diagnostics, particularly for the classification and detection of diseases from medical images. The dissertation also includes the development of a software system that integrates these neural network models, demonstrating their effectiveness in a practical setting.

6. Publications and recognition of the work

The results of the dissertation have been published in several high-impact international journals and conference proceedings, which speaks to the quality and recognition of the candidate's work in the scientific community.

7. Critical notes

While the dissertation is comprehensive and well-executed, some minor improvements could be made in the explanation of certain technical details and the presentation of results. These do not, however, diminish the overall quality and significance of the work.

Conclusion:

The dissertation work of Aleksandar Ognyanov Marazov is an original and substantial contribution to the field of informatics and computer science, with a specific focus on medical diagnostics using deep neural networks. The candidate has demonstrated the ability to conduct independent research at a high level, and the work meets all the requirements for obtaining the educational and scientific degree "Doctor."

I fully support the awarding of the doctoral degree to Aleksandar Ognyanov Marazov.

Date21.08.2024

Signature:

Prof. Sotir Sotirov, PhD

University "Prof. Dr. Asen Zlatarov" - Burgas