



REVIEW

By Prof. Eng. Grigor Yordanov Mihaylov, PhD

University : University of Telecommunications and Post

Doctoral Program: "Theoretical foundations of communication technology"

Field of higher education : 5. Technical sciences

Professional field: 5.3. "Communication and computer technology"

Subject: Dissertation for awarding the ESD "Doctor" in the professional field 5.3. "Communication and computer technology ", Department of "Telecommunications", UTP.

Author of the dissertation : M.Eng. Kaloyan Varlyakov

Dissertation topic: Automated eye screening through integration of machine learning and telemedicine verification.

Reason for submitting the review : Order №. 3-UPA-158/27.10.25 of the Vice-Rector of the UTP.





1. Brief information about the doctoral student

Master Eng. Kaloyan Varlyakov has been enrolled in part-time doctoral studies in the doctoral program: "Theoretical Foundations of Communication Technology" in the Department of Telecommunications with Order No. 3-65/08.03.2023 with scientific supervisors Prof. Eng. Dimitar Radev, DSc and Assoc. Prof. Eng. Ognyan FetfovPhD.

He has fulfilled the requirements of his individual curriculum and has been discharged with the right to protection by Order No. 3-UPA-156/15.09.2025.

2. General characteristics of the presented dissertation work

The dissertation has a total volume of 142 pages. It includes an introduction, four chapters to solve the formulated main tasks, a conclusion, a list of abbreviations used, and three appendices.

A total of 170 literary sources are cited, all in English. The work includes a total of 34 figures and 41 tables.

3. Relevance of the dissertation work and degree of knowledge of research by the doctoral student on the scientific problem

The problems of increasing the efficiency and quality of modern telemedicine services, and in particular eye screening, with the use of artificial intelligence tools, are increasingly widespread and in demand.

Starting from such a position in evaluating the dissertation, I definitely assume that the subject of research and the related topic are relevant and directly related to the needs of contemporary society.

In this sense, it can be unconditionally assumed that the dissertation





examines current problems related to the development and application of the fundamental theory and practice of communication systems.

I accept the justification for relevance provided by the doctoral student and believe that the considerations presented are correct and well-founded.

4. Evaluation of scientific and applied scientific contributions

In the process of work and in the preparation of the dissertation, a number of contributions have been achieved, which can be qualified as:

I. Scientific contributions:

1. A technology has been developed for the comprehensive assessment of communication, collection and processing of confidential patient health information, which for the first time integrates hardware, software and artificial intelligence into a common standardized process for ophthalmological health screening.
2. A comprehensive management of a modular methodology for eye screening has been created, which is implemented using an artificial intelligence and automation module, through which incoming information from two separate systems is analyzed - vision parameters and the diagnostic platform.
3. telemedical vision screening with artificial intelligence is proposed, which provides a standardized, objective and reproducible diagnostic methodology for: selection and comparison of machine learning algorithms; structure and preparation of the test data set; methodology of internal and external validation; integration of the





system in a real mobile environment; diagnostic efficiency; accuracy not less than 90%.

4. A methodology has been developed for complex processing of structured information from the main visual indicators in telemedical visual screening, which offers pre-processing of the data before their introduction into machine learning algorithms, guaranteeing the quality, reliability and analytical value of the input variables.

II. Contributions of a scientific and applied nature:

1. An architectural scheme with a high degree of autonomy has been developed, which, thanks to its compact size and optimized architecture, makes it suitable for application in mobile screening campaigns and remote regions.
2. A methodology is proposed for determining effective metrics for training the selected optimal model by training a machine learning algorithm on structured tabular data and continuously monitoring the dynamics of efficiency.
3. A methodology has been developed for the application of an AI-based ophthalmic screening system in real-world conditions, covering four geographically socially significant regions in Bulgaria and Albania.

III. Contributions of an applied nature:

1. An architectural scheme with a high degree of autonomy has been developed, making it suitable for application in mobile screening campaigns and remote regions.





2. A methodology for a comprehensive assessment of communication has been defined, which for the first time uses a comprehensive methodology for assessing quantitative measures and qualitative assessments of visual parameters.

5. Evaluation of dissertation publications

Judging by the publications, it is clear that the doctoral student is working hard on this topic and I can conclude that the results of the development have been tested widely enough in authoritative forums and are available to the scientific community in the field of telemedicine and the implementation of artificial intelligence systems.

I believe that the doctoral student's publications on the dissertation contain the main contributions he claims. This complies with the requirements of the Academic Staff Development Act and the Regulations for its implementation for publishing the most essential parts of the dissertation work.

6. Evaluation of the abstract of the dissertation

The abstract of the dissertation meets the requirements for content and length. The abstract of the dissertation presents the main points of the scientific research conducted by the doctoral student and accurately reflects the content of the dissertation work and the results obtained.

7. Critical notes, recommendations and questions

As for certain weaknesses and critical remarks, they can be pointed out. But before that, I would like to share the following: Even when the first edition of the





author's dissertation was presented, a number of recommendations and remarks were indicated. I confidently confirm that in the latest edition, the majority of these weaknesses have been eliminated.

I would like to recommend that the candidate make fuller use of his professional qualifications and publish articles in specialized international journals with an impact factor, which will expand his contacts with the international scientific community.

These notes do not diminish the value of the dissertation.

8. Conclusion

The scientific, scientific-applied and applied contributions presented in the dissertation logically lead to the conclusion that the dissertation work meets the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for the Implementation of the ADASRB.

In view of this, I propose that the educational and scientific degree "Doctor" be acquired by Master Eng. Kaloyan Ivanov Varlyakov
in the field of higher education - 5 Technical Sciences,
professional field - 5.3 Communication and computer technology,
doctoral program - Theoretical foundations of communication technology.

14.11.2025

Sofia

