

BULGARIAN ACADEMY OF SCIENCES
INSTITUTE OF INFORMATION AND COMMUNICATION TECHNOLOGIES

OPINION

From

of the dissertation on the topic

INNOVATIVE METHODS TO SUPPORT DECISION-MAKING IN
FOREST FIRE OR FLOOD

at the Assoc. prof. IVAN DRAGOV TRENCHEV

for obtaining the educational and scientific degree "Doctor"

field of higher education 4 Natural sciences, mathematics and
informatics, professional field 4.6 Informatics and computer sciences,
scientific specialty "Informatics"

I. General characteristics of the dissertation:

The exposition of the dissertation is presented in a volume of 122 pages, of which the main text is 93 pages. It is structured in an introduction, four chapters, scientific and applied contributions, bibliography and appendices. The bibliography lists 107 sources, of which sources in Bulgarian, English and Internet addresses. The research is illustrated with 57 figures - images in the context of the exhibition, which are supplemented by 6 appendices, systematized to the four chapters on the structure of the dissertation.

II. Relevance and significance of the problem developed in the dissertation.

Because the presented dissertation is interdisciplinary. I will present the topicality of the topic from an information point of view.

Related they climate events such as floods, storms, heat waves, snow and drought account for nearly ninety percent of all major disasters over the past two decades. Climate change is expected to increase the frequency and intensity of weather-related threats. This, in turn, would have a significant impact on

economic and social development, with an inevitable cascading effect on poverty, food and water supply, urban systems, the spread of disease, human migration and human conflict.

Therefore, reducing human exposure and vulnerability to weather-related threats is a common critical priority for both adapting to climate change and reducing disaster risk .

Risk management, rather than disaster management as indicators of unmanaged risk, should become an inherent element of development processes. It should be not just a gadget, but a set of specific practices that are embedded in the foundations of development processes. The management of risks inherent in social and economic activities requires a combination of three approaches: forward risk management, in order to avoid the accumulation of new risks; corrective risk management, in order to limit existing risks, and compensatory risk management, in order to support the resilience of individuals and communities in conditions of residual risks that could not actually be reduced. .

III. Brief analytical characteristics of the content. Purpose, object, subject and methodology of the research.

The introduction clarifies the relevance of the problem and presents the methodological parameters of the dissertation, structure, object, subject, goals and objectives. The first chapter provides a theoretical analysis of the concepts included in the dissertation research: forest fires, floods, Geographic Information System, European Forest Fire Information System (EFFIS), Advanced Fire Information System (AFIS) and European Flood Information System (EFAS) .

The second chapter presents a methodology for developing an information system to support decision-making in forest fires or floods.

The third chapter presents the architecture and software implementation of a Web GIS application, which is part of the IS supporting decision-making in forest fires or floods. The last chapter presents an information system to support decision making.

The object of the dissertation work are innovative methods for creating Web GIS applications for forest fires and floods.

The subject of research are open source software and software tools for the development of IS information system to support decision making in case of forest fires or floods.

Due to the complexity of the dissertation, different methods and approaches have been used, such as heuristic and combinatorial algorithms, different software approaches - brute force method, artificial intelligence, etc.

V. Evaluation of the abstract.

The presented abstract reflects synthesized, clearly and accurately the content of the dissertation and gives an objective idea of the dissertation research.

VI. Publications on the topic and citations

The main results obtained in the development of the dissertation are reported in four publications at specialized international conferences .

The research in the dissertation is part of the results of two international research projects .

VIII. Conclusion.

The evaluation of the performed research, reflected in the dissertation work, is positive: an in-depth research work has been performed, as a large volume of relevant sources has been studied, systematized and evaluated.

I congratulate the author for daring to dive into such a difficult matter. This is a difficult and topical topic, which requires a lot of experience, knowledge and practice .

Considering the topicality of the issues developed in the dissertation, the achieved scientific results and contributions, I confidently give my positive assessment and propose to the scientific jury to award the educational and scientific degree "Doctor" of STEFAN KOSTADINOV STEFANOV , in professional field 4.6. Informatics and computer science .

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/ Assoc. prof . Ivan Trenchev /

July 28 , 2021

Sofia