



2023

**III INTERNATIONAL SCIENTIFIC
SYMPOSIUM
"INTELLIGENT SOLUTIONS"
(SATELLITE)**



**XI International school-seminar
"Decision Making Theory"**



**VII International conference
"Computational Intelligence"**



ISBN 978-966-801-916-6

September 28, 2023
Ukraine, Kyiv-Uzhorod/online

International Scientific Symposium « INTELLIGENT SOLUTIONS-S»

Computational Intelligence (Results, Problems and Perspectives)

Decision Making Theory

VII-th International Conference
XI-th International School-Seminar

Ukraine, September 28, 2023

Proceedings

Ministry of Education and Science of Ukraine

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UDC 004.9

O26

Volume editor: Vitaliy Ye. Snytyuk, Dr.Sc., Prof.

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Intelligent Solutions-S: Proceedings of the International Symposium, September 28, 2023, Kyiv-Uzhorod, Ukraine / Ministry of Education and Science of Ukraine, Taras Shevchenko National University of Kyiv and [etc]; Vitaliy Ye. Snytyuk (Editor). Kyiv: Publishing House «Caravela», 2023. 132 p.

This book includes abstracts of the 7th International Conference "Computational Intelligence (Results, Problems and Perspectives) – 2023" and 11th International School-Seminar "Decision Making Theory – 2023". Philosophical, theoretical and applied aspects which describe the results, problems and prospects of the creation and use of intelligent computational, decision making methods and creating of information systems and technologies on their basis are reviewing.

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DEFINED AI SEMANTIC NETWORKING IN CYBERSECURITY

Study research introduces an innovative approach to linguistic and semantic analysis, leveraging advanced AI techniques to uncover intricate connections within user-defined textual data. Presented a comprehensive methodology that combines the power of AI language models, and sophisticated Natural Language Processing (NLP) to construct structured causal networks [1]. This approach provides in-depth insights into complex topics, where the subject of study is data leakage in information systems.

Demonstrated methodology leverages state-of-the-art AI language models, including GPT and BERT, for Named Entity Recognition (NER). In addition, it employs advanced NLP techniques such as dependency parsing and semantic role labeling to identify and analyze relationships between semantic entities. Developed "SemantiCore" program automates the process of constructing these causal networks [2]. Furthermore, we employ visualization tools like GraphViz lib to enhance the interpretation of our findings. The resulting visualizations are converted into Scalable Vector Graphics (SVG) format for seamless integration into web documents, complete with embedded hyperlinks for quick access to related resources.

The AI-driven analysis yields comprehensive and structured causal networks, illuminating intricate "cause-and-effect", "is-a", "part-of", and "works-for" relationships among semantic entities. This approach allows us to establish meaningful connections between various aspects that related to the data leakage processes, such as its ties to malware infection, rogue employees, vulnerabilities, and social engineering techniques. This newfound understanding opens doors to further analyses, enabling us to explore hierarchies and delve into the layers of semantic relationships within the data.

Research highlights AI's transformative potential in semantic analysis. Acknowledging the difficulties in extracting entities from generative systems, the

"SemantiCore" tool, developed for this purpose, adeptly tackles issues of accessibility and usability. It underscores the ongoing significance of human supervision to guarantee the reliability and meaningful interpretation of the acquired insights.

Looking ahead, the proposed methodology promises to significantly benefit various professions, including intelligence, investigation, journalism, and scientific research, by enabling more informed decision-making in navigating complex data landscapes. It stands as a testament to the power of AI-driven semantic analysis in unlocking hidden knowledge within textual data.

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