

# Decision-Making Systems Based on Semantic Image Analysis

Natallia Iskra <sup>1</sup>,

Vitali Iskra (Foreign) <sup>2</sup>,

Marina Lukashevich <sup>3</sup>

<sup>1, 3</sup> Belarusian State University of Informatics and Radioelectronics, P. Brovka 6, 220013, Minsk, Belarus

<sup>2</sup> Foreign (Omnigon Communications LLC, New York, USA)

**Keywords:** Decision-making, Video surveillance, Neural networks, Semantic analysis, Image captioning.

**Abstract:** The paper presents the implementation of an intelligent decision support system (IDSS) to solve a real manufacturing problem at JSC “Savushkin Product”. The proposed system is intended to control the quality of product labeling, based on neuro-symbolic artificial intelligence, namely integrating deep neural networks and semantic models. The system perform localization and recognition of images from a high-speed video stream and is based on several deep neural networks. Semantic networks fulfill intelligent processing of recognition results in order to generate final decision as regards the state of the production conveyor. We demonstrate the performance of the proposed technique in the real production process. The main

contribution of this paper is a novel view at the creation of a real intelligent decision support system, which combines bio inspired approach, namely neural networks and conventional technique, based on a knowledge base.

**This article published in:** Iskra, N. Decision-Making Systems Based on Semantic Image Analysis / N. Iskra, V. Iskra, M. Lukashevich // Open Semantic Technologies for Intelligent System. OSTIS 2020. Communications in Computer and Information Science. – Vol. 1282. – Springer, Cham. – P. 102-120. – [https://doi.org/10.1007/978-3-030-60447-9\\_6](https://doi.org/10.1007/978-3-030-60447-9_6).

**Internet link to this article:**

[https://link.springer.com/chapter/10.1007%2F978-3-030-60447-9\\_7](https://link.springer.com/chapter/10.1007%2F978-3-030-60447-9_7).