


Chapter 9

Machine Learning With Avatar–Based Management of Sleptsov Net–Processor Platform to Improve Cyber Security

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ABSTRACT

The literature review of known sources forming the theoretical basis of calculations on Sleptsova networks and on the basis of authors' developments in machine learning with avatar-based management established the basis for the future solutions to hyper-computations to support cyber security applications. The chapter established that the petri net performed exponentially slower and is a special case of the Sleptsov network. The universal network of Sleptsov is a prototype of the Sleptsov network processor. The authors conclude that machine learning with avatar-based management at the platform of the Sleptsov net-processor is the future solution for cyber security applications in Russia.

INTRODUCTION

Information and Communication Technology is acknowledged as crucial part of our current society, accessing within every level of our social environment. Along with the implementation of Information and Communication Technology, comes an important part of securing it. Their evolution and development has brought many benefits and have also given rise to cybercrime actors, serious cyber-attacks that had been demonstrated over the past few years. Cyber security has become an important subject of national, international, economic, and societal importance that affects multiple nations (Walker, 2012). Many countries have come to understand that this is an issue and has developed policies to handle this in an effort to mitigate the threats (Dawson, Omar, & Abramson, 2015). To address the issue of cyber security, various frameworks and models have been developed. Traditional approaches to managing security breaches is proving to be less effective as the growth of security breaches are growing in volume, variation and velocity (Bhatti & Sami, 2015). The purpose of this chapter is to show what future cyber security as engineering science and technology expects. In addition, the authors propose future solutions for the use of computer with a Sleptsov net processor when it will be actually created and practically implemented. The authors of the chapter did not consider the credibility issues of Sleptsov nets computing but completely trusted the creator of Sleptsov net as a processor, based on open sources, in particular on publications and webinars of IGI Global (Zaitsev, 2016; Zaitsev, et al., 2016; Zaitsev, 2018). Based solely on these publications in recent years in IGI Global and own experience, the authors research the emerging trends and perspectives of digital transformation of the economy using machine learning with avatar-based management at the platform of Sleptsov net processor and propose further prospects for development of hyper-computation.

BACKGROUND

Many researchers compare machine learning solutions for cyber security by considering one specific application (e.g., Buczak and Guven, 2016; Blanzieri and Bryl, 2008; Gardiner and Nagaraja, 2016) and are typically oriented to Artificial Intelligence experts.

The term “cyber security” refers to three things:

1. A set of activities and other measures, technical and non-technical, intended to protect computers, computer networks, related hardware devices and software, and the information they contain and communicate, including software and data, as well as other elements of cyberspace, from all threats, including threats to national security;
2. The degree of protection resulting from the application of these activities and measures;
3. The associated field of professional endeavor, including research and analysis, aimed at implementing those activities and improving their quality (Jenab, et al., 2018).

At the same time, our previous research of the problem of cyber security showed that cyber security is a section of information security, within the framework of which the processes of formation, functioning and evolution of cyber objects are studied. It is necessary to identify sources of cyber-danger formed while determining their characteristics, as well as their classification and formation of regulatory documents, implementation of security systems in future. However, working on the application of the

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