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Providing Integrity, Awareness, and Consciousness in Distributed Dynamic Systems

(Contents of the new book)

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Анотація. Робота зосереджена на прогресивній організації та управлінні великими розподіленими динамічними системами, які можуть мати як земну, так і небесну природу. В її основі знаходяться зовсім інші організаційні філософії, моделі і технології, які забезпечують високоінтегровані рішення шляхом динамічного охоплення й узгодження розподілених середовищ за допомогою активного саморозповсюдженого рекурсивного коду, а не розгляд і управління системами та рішеннями у них як елементами, які обмінюються повідомленнями. Книга пояснює, як ця парадигма може ефективно забезпечити розподілену та глобальну обізнаність і навіть моделювати свого роду глобальну свідомість у багатьох важливих галузях, що можуть включати такі сфери, як економіка, екологія, клімат, психологія, міжнародні відносини, завоювання космосу, безпека та оборона. Виражений Мовою просторового захоплення (МПЗ) код супервірусного сценарію, що самозростає, самовідтворюється та самовідновлюється, здатний ефективно контролювати розподілені системи за будь-яких обставин і з елементами, кількість яких швидко змінюється. Що стосується ідей свідомості, буде показано спосіб представлення мозкових хвиль, ходу думок, потоку свідомості, просторової свідомості, свідомості поза тілом, штучної свідомості тощо. Книга також міститиме приклади вираження законів теорії гештальту, які у повністю розподілених системах спершу охоплюють ціле, а потім визначають деталі, пов'язуючи особливості гештальту зі свідомістю. Ідеї, що обговорюються, супроводжуються розподіленими рішеннями, схожими на патерни і виражені у МПЗ, які є набагато простішими, ніж в інших моделях і мовах. Окремий розділ присвячено патернам як універсальній теорії, яка часто протиставляється аналізу думки з точки зору логіки. Попередні версії технології були у пробному режимі впроваджені в різних країнах, а останню з них також можна оперативно впровадити на будь-якій платформі. Посилання: "Spatial Grasp" в Google (www.google.com).

Abstract. This work is focused on the advanced organization and management of large distributed dynamic systems which may have both terrestrial and celestial nature. It is based on quite different organizational philosophies, models, and technologies providing highly integral solutions by dynamic coverage and matching of distributed environments by active self-spreading recursive code, rather than treating and managing systems and solutions in them as parts exchanging messages. It will be explained how this paradigm can effectively provide distributed and global awareness and even simulate a sort of global consciousness in many important areas, which may include economy, ecology, climate, psychology, international relations, space conquest, security, and defense. The self-growing, self-replicating, and self-recovering super-virus scenario code in Spatial Grasp Language (SGL) can effectively supervise distributed systems under any circumstances and with a rapidly changing number of elements. Concerning the ideas of consciousness, it will be shown how to express brainwaves, train of thought, stream of consciousness, spatial consciousness, consciousness outside the body, artificial consciousness, etc. The book will also contain examples of expressing gestalt theory laws grasping the whole first with defining details afterwards in fully distributed systems, linking gestalt features with consciousness. The discussed ideas are accompanied by distributed pattern-like solutions in SGL being much simpler than with other models and languages. A special chapter is devoted to patterns as a universal theory often standing in opposition to the analysis of thought in terms of logic. The previous technology versions had trial implementations in

different countries, and the latest one can be quickly implemented on any platform, too. Refs: "Spatial Grasp" on Google (www.google.com).

Chapter 1: Introduction

The main goal of this book is to enrich large distributed systems having important applications and their management and control technologies with some higher-level organizational features which can improve their performance in complex situations. The chapter will include a summary of the following chapters together with general references to existing publications in the similar fields.

Chapter 2: The world as a complex dynamic system that needs high-level management

The whole world will be considered an extremely complex, heterogeneous, distributed and dynamic system, namely as a spatial organism with both body and mentality. The main problems of its well-being and even existence as they are seen today will be summarized. These include climate change, pollution, epidemics, poverty, ethnic and religious conflicts, wars, local and global security, nuclear threat, etc. To improve its overall prosperity, stability, and direct evolution in the most progressive way, some higher levels of self-comprehension, self-analysis, and self-management should be introduced, especially those providing such features as integrity, global awareness, and even spatial consciousness.

Chapter 3: Spatial Grasp Model (SGM) and technology

Having wave-like self-controlled, recursive, and super-virus nature, which is autonomously self-evolving, self-modifying, self-migrating, and self-matching distributed environments, this paradigm will be briefed in sufficient detail, including its tested applications in different areas. It can dynamically establish and keep superior vision and power over any centralized or distributed systems (including creating them from scratch), also capable of being fully independent of the already existing organizations and their structures, but supervising and modifying them if needed. The related technology details with its basic Spatial Grasp Language (SGL) implementation possibilities will be explained.

Chapter 4: Providing distributed system integrity under SGM

There will be demonstrated how to organize distributed systems in such a way that they can self-recover in any circumstances and after any damages, by supplying their nodes with a sort of genetic-like capabilities by which any repairs can be self-organized. This works from the recovery of missing only neighboring nodes and links to the rebuilding of the entire distributed topologies after arbitrary damages, which cannot be destroyed even in the most severe conditions (when only a single node remains alive). It will be explained with practical examples how such features can be particularly useful after IT network damages, environmental and industrial disasters, for crisis management, and on battlefields.

Chapter 5: Supporting global awareness under SGM

Examples will be provided in SGL for distributed networked systems of how in any node any information about other nodes and links, including the whole system, can be easily obtained using network requesting patterns based on recursive SGL scenarios combining forward and backward network matching and coverage. The returned results may also be automatically organized in networked patterns which may subsequently be applied to the distributed system again. A higher awareness about the system as a whole can also be organized by additional information levels over the networked environment to be directly accessible in different nodes. It will be explained

how such features can be used for collective awareness of robotic swarms, security, and battlefield operations.

Chapter 6: Simulating distributed consciousness with SGM

It will be shown how to organize higher-level models of distributed systems containing purposes of their existence and expected types of behaviour, as well as vision and interaction with the external world. And how to use such models in the models of higher behavioural levels which can be effectively organized by recursive self-covering SGL code. Such models can be embedded in a limited way into interacting networked nodes, or in a more flexible and independent way can freely migrate throughout the whole distributed system always supporting its awareness and consciousness under any circumstances. Examples are provided for using such features in complex industrial and military situations that follow dynamic plans in changeable environments, fulfill objectives, and defeat adversaries.

Chapter 7: From gestalt patterns to miracles of consciousness

It will show an expression of some laws of gestalt psychology and theory in SGL allowing us to grasp the whole of images and concepts first with the defining details afterwards, which under the SGM can be used in a parallel and fully distributed mode. This will include using the law of proximity and the law of good gestalt to evaluate the compactness of images, figure/ground expression, and some others. Gestalt features based on spatial patterns rather than logic allow us to grasp the sense of images, concepts, and events and quickly change attention, thus contributing much to the phenomenon of consciousness. Application examples include comprehension of weather images, forest fires, and conflict situations by communicating low orbit satellites.

Chapter 8: Effective expression of patterns theory by SGM

The universal theory will be briefed, where patterns can represent regularity in the world, human-made design, abstract idea, combination of qualities, acts, tendencies, etc. Such wordings are popular as a pattern language, pattern-based thinking, the patternist philosophy of mind, consciousness as pattern recognition, gestalt pattern matching, etc. The examples will include techniques for pattern recognition and matching in distributed systems where space-covering SGL scenarios and templates can be effectively used, contributing to the previous material on awareness and consciousness. The SGM philosophy with its universal spatial matching principles can also be considered as representing pattern theory in general.

Chapter 9: Conclusions

The book material confirms the possibility and efficiency of integrating advanced distributed systems management and control in important areas with the ongoing extensive research on mental and philosophical principles like awareness and consciousness. Such symbiosis may improve the efficiency, performance, and security of practical systems and can also be useful for providing additional ground and practical examples for these higher-level theories, on which common opinions have not been reached yet due to their enormous diversity and complexity.

REFERENCES

Other books analyzed, compared, and used for this book project

1. Sapaty P.S. Managing Distributed Dynamic Systems with Spatial Grasp Technology (Studies in Computational Intelligence, 690). Springer, 2017. February 22.

It describes a novel ideology and technology for holistic management and control of distributed dynamic systems. The new book may be considered as its sequel providing further technology improvements and

the ability to implement and model much higher organizational levels covering global integrity, awareness, and even consciousness, with important applications of the enriched systems in civil, security, and defense areas.

2. Gennaro R.J. *The Routledge Handbook of Consciousness* (Routledge Handbooks in Philosophy). Routledge, 2018. March 26.

It describes the explosion of work on consciousness with the need of bringing together experts on fundamental and cutting-edge topics. The new book will express and explain different consciousness ideas in a clear and simple way (including its brain-embedded, wave-like, migrating, and even outside body variants) using recursive Spatial Grasp Language having efficient implementation in distributed systems.

3. Maheshwari A.K. *Consciousness-Based Leadership and Management, Vol. 2: Organizational and Cultural Approaches to Oneness and Flourishing* (Palgrave Studies in Workplace Spirituality and Fulfillment). Palgrave Macmillan, 2023. May 30.

It examines the need for a consciousness-based view of leadership with a sustainable competitive advantage. The new book will show possibilities of consciousness-based leadership in both centralized and distributed ways using Spatial Grasp Language, including reinvention, meaning-making, capabilities flow, etc. The offered model and technology can be practically used for solving very complex management problems.

4. Endsley M.R. *Designing for Situation Awareness: An Approach to User-Centered Design*. CRC Press, 2011. December 19.

It describes the need for effective interfaces for the management of diverse information and understanding of what is currently happening and what will be next. The new book will offer a practical distributed technology allowing for high-level situational awareness in military command and control, intelligence operations, emergency management, air traffic control, business management, space exploration, etc.

5. Gertz M., Guldentops E., Strous L.A.M. *Integrity, Internal Control and Security in Information Systems: Connecting Governance and Technology* (IFIP Advances in Information and Communication Technology Book 83). Springer, 2013. November 11.

It explores how information integrity contributes to the overall control and governance frameworks that enterprises need to deliver. The new book will offer a very practical model and technology that can provide high integrity of control and security for many industries with enterprise survival as a hot-button issue. It will also be shown how to organize distributed systems capable of self-recovery under any circumstances.

6. Gillespie S. *Climate Crisis and Consciousness: Re-imagining Our World and Ourselves*. Routledge, 2019. October 10.

It is devoted to the challenges of dealing with climate and ecological crises and the importance of the consciousness idea for this. The new book will offer a practical model and technology effectively supporting collective climate awareness and consciousness, also organizing rapid actions reducing climate crises and their consequences on a worldwide scale, with crisis management examples explained in Spatial Grasp Language.

7. Haikonen P.O.A. *Consciousness And Robot Sentience (Second Edition): 2nd Edition* (Series On Machine Consciousness Book 4). World Scientific, 2019. May 23.

It provides insights into artificial intelligence and machine consciousness, with the artificial creation of consciousness by associative neural networks. The new book will show how such ideas can be simulated by the developed spatial grasp model and technology including the creation of distributed associative networks. It also will provide examples of spatial consciousness for robotic collectives with very practical applications.

8. Taylor J.G. *Solving the Mind-Body Problem by the CODAM Neural Model of Consciousness?* (Springer Series in Cognitive and Neural Systems Book 9). Springer, 2013. December 5.

It tries to bridge the gap between the philosophers of mind and the neuroscience community by describing the neural consciousness model. The new book will show how to use Spatial Grasp Language to express the mind-body problem and neural networks supporting consciousness, as well as to simulate other consciousness ideas, even fantastic, like its migration or even existence outside the body, which may be efficient for practical systems.

9. Ciampa M. *Awareness: Applying Practical Security in Your World*, Course Technology, 2016. January 7.

It provides information needed to protect computers and networks from sophisticated attacks, with computer security posing daunting challenges. The new book will show some practical examples for fighting computer viruses, including tracing and discovering their sources, by engaging Spatial Grasp Technology based on super-virus principles and used in the past within an intelligent network management project in Germany.

10. O'Shaughnessy B. *Consciousness and the World*. OUP Oxford, 2000. July 13.

It puts forward a bold theory of consciousness with the philosophical elucidation of its nature, as well as a concrete interaction between consciousness and the world. The new book also links these two concepts but in an opposite and practical way, where enriching management and control of business, security, and defense organizations with consciousness features can improve their overall performance and the world as a whole.

This book is a sequel to the following books

1. Sapaty P.S. *Mobile Processing in Distributed and Open Environments*. New York: John Wiley & Sons, 1999.
2. Sapaty P.S. *Ruling Distributed Dynamic Worlds*. New York: John Wiley & Sons, 2005.
3. Sapaty P.S. *Managing Distributed Dynamic Systems with Spatial Grasp Technology*. Springer, 2017.
4. Sapaty P.S. *Holistic Analysis and Management of Distributed Social Systems*. Springer, 2018.
5. Sapaty P.S. *Complexity in International Security: A Holistic Spatial Approach*. Emerald Publishing, 2019.
6. Sapaty P.S. *Symbiosis of Real and Simulated Worlds under Spatial Grasp Technology*. Springer, 2021.
7. Sapaty P.S. *Spatial Grasp as a Model for Space-based Control and Management Systems*. CRC Press, 2022.
8. Sapaty P.S. *The Spatial Grasp Model: Applications and Investigations of Distributed Dynamic Worlds*. Emerald Publishing, 2023.

The latest journal papers which relate to this new book

1. Sapaty P.S. Relation of Spatial Grasp Paradigm to Higher Psychological and Mental Concepts. *Acta scientific computer sciences*. 2022. Vol. 4, Issue 12, November 16.
2. Sapaty P.S. Seeing and Managing Distributed Worlds with Spatial Grasp Paradigm. *Acta scientific computer sciences*. 2022. Vol. 4, Issue 12, November 30.
3. Sapaty P.S. Distributed Control Technology for Air and Missile Defence Operations. *International relations and diplomacy*. 2022. Vol. 10, N 4. July-August.