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Organization of Knowledge and Advanced Technologies (OCTA) and the Contribution of ISKO-Maghreb Society on: "Digital Sciences: impacts and challenges on Knowledge Organization".

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Editorial for special issue:

"From Data and Information Processing to Knowledge Organization: Architectures, Models and Systems".

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Abstract

In this "special issue" on the topic "From Data and Information Processing to Knowledge Organization: Architectures, Models and Systems", seven (07) selected communications have been reviewed by peers in the OCTA Multi-Conference (unifying 4 scientific projects: SIIE, ISKO-Maghreb, CITED and TBMS) in program committees. We consider that this set of proposals, enriched in circumstance of this special issue by its authors at our request, are an excellent engine of current scientific ideas and challenges in the domain concerned in ISKO-Maghreb Society.

Keywords: data (internet traces), information processing, knowledge organisation, architecture (intelligent agent), model (pattern learning, NLP), system (intelligent system).

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1. Special issue focus and presentation

The OCTA international Multi-Conference on "Organization of Knowledge and Advanced Technologies" is a large-scale scientific event to bring together researchers and R&D professionals on ideas and common actions in the organization of knowledge while defining collaborative strategies using advanced technologies in multiple fields of research and application for society and its cultural, education, economic and industrial developments.

Also, to initiate future projects in innovation in order to bring public and private institutions closer to tomorrow's technological challenges.

In Feb. 2020, the scientific projects involved in the OCTA Multi-Conference edition, are:

1- **SIIE** (https://siie2019.loria.fr/ & www.siie.fr) on « Information Systems and Economic Intelligence ». The SIIE international conference aims to promote dialogue between experts and researchers from both the public and private sectors, on fundamental and experimental knowledge of Information Systems and Economic Intelligence (SIIE). This is to upgrade in a risk environment the technologies related to economic intelligence (IE). The dynamics of EI (ie. Competitive Intelligence) depend on mastering the knowledge and skills needed to design the best strategies and to ensure that decision-makers make the right decisions.

2- **ISKO-Maghreb** (https://isko-maghreb2019.loria.fr/ & www.isko-maghreb.org) on « Digital Sciences: impacts and challenges on Knowledge Organization ». The ISKO international scholarly society devoted to the theory and practice of organization: the objective of the ISKO-Maghreb, the ISKO chapter in Maghreb countries, continues to contribute to understanding the factors that organize knowledge and the phenomena that affect the information society. The actions to be undertaken by the scholarly society ISKO-Maghreb will have to take into account socio-cultural, cognitive and economic aspects in the strategic management of knowledge. Towards the knowledge society, knowledge must be seen in its dynamics, content and scientific and technological interactions with academics, business and politics (actors and institutions).

3- **CITED** (https://cited2019.loria.fr/) on « Advanced Technologies, Renewable Energies and Economic Development ». The international symposium CITED aims to bring together the work on concerted and reflective research on the establishment of sustainable economic development based on technological advances, the optimal use of means and resources, and on renewable energies. Joseph Aloïs *Schumpeter* (1912), highlighted the relationship between the innovation factor and economic conjuncture; pattern of economic transition; i.e, theory of economic evolution. Analyzed in the context of economic cycles, the horizons of 2020-2030, appear according to the cycles of Kondratiev 1926, as the beginning of the transition to a new era of production, industrialization and means, which can now be explained by the rise of the green economy theme.

4- **TBMS** (https://tbms2019.loria.fr/) on « Big-Data-Analytics Technologies for Strategic Management: innovation and competitiveness ». The International Symposium TBMS explores the practical implications of Big Data and how it reconfigures relationships, expertise, methods, concepts and academic knowledge in all sectors: social, professional and economic. Today, we have more data than ever before in human history. Data volumes multiplied by 100 between 1987 and 2007, then doubled on average every year. An increase infinitely greater than that caused by the invention of printing (J.

Gutenberg), which had resulted in a doubling of data over 50 years. In a transdisciplinary enthusiasm, Big Data allows us to no longer bend reality to categories a priori and now to let the data give us themselves the categories which contain while faithfully reflecting the reality.

In a transdisciplinary, OCTA acts with the following state of mind:

- How to strengthen alliances between multi-disciplinary and trans-disciplinary?
- How to multiply skills on common study objects?
- How to innovate in the solutions to found and to propose in society in respect of the sustainable development?

Thus, comprehensive data set analysis linked to information processing and projected in applications to understanding the factors that organize knowledge, can change our view of the world. The contribution of Big Data remains a project that insinuates reason and rationality in our complex world. If the scientific method is based on the premise that one can derive from abstract theories concrete assumptions about reality. The assumptions themselves can be tested using the data collected for this purpose. In this reasoning, "Big" Data linked to information and projected in knowledge, will profoundly alter these two rational foundations, not to challenge scientific rationality, but to move it to a higher stage: for a more complex, broader and more exact interpretation of reality. This new paradigm involving architectures, models and systems will ultimately be scalable and in synergies.

In this "special issue" form OCTA on the topic "From Data and Information Processing to Knowledge Organization: Architectures, Models and Systems", we have selected for you 7 papers. These papers have been reviewed by peers in the OCTA (& SIIE, ISKO-Maghreb, CITED and TBMS) program committees, at the both on the written submission and on its presentation during the organization of the multi-conference. We consider that this set of papers, enriched in circumstance by its authors at our request, an excellent engine of current scientific ideas and challenges.

2. Selected papers' communications as chapters to this Special Issue

Chapter 1: Classification of Hate Speech Using Deep Neural Networks.
By Ashwin Geet D'Sa, Irina Illina, and Dominique Fohr. (*University of Lorraine, LORIA & INRIA Grand-Est Lab., France*).

Authors argue that in the Internet age where the information flow has grown rapidly, there is an increase in digital communication. The spread of hatred that was previously limited to verbal communications has quickly moved over the Internet. Social media and community forums that allow people to discuss and express their opinions are becoming platforms for the dissemination of hate messages. Many countries have developed laws to prevent online hate speech. They hold the companies that run the social media responsible for their failure to remove hate speech. However, manual analysis of hate speech on online platforms is infeasible due to the huge amount of data as it is expensive and time consuming. Thus, it is important to automatically process the online user contents to detect and remove hate speech from online media. Through this work, we propose some solutions for the problem of automatic detection of hate messages. Authors perform hate speech classification using embedding representations of words and Deep Neural Networks (DNN). Authors compare

fastText and BERT (Bidirectional Encoder Representations from Transformers) embedding representations of words. Furthermore, we perform classification using two approaches: (a) using word embeddings as input to Support Vector Machines (SVM) and DNN-based classifiers; (b) fine-tuning of a BERT model for classification using a task-specific corpus. Among the DNN-based classifiers, we compare Convolutional Neural Networks (CNN), Bi-Directional Long Short Term Memory (Bi-LSTM) and Convolutional Recurrent Neural Network (CRNN). The classification was performed on a Twitter dataset using three classes: hate, offensive and neither classes. Compared to the feature-based approaches, the BERT fine-tuning approach obtained a relative improvement of 16% in terms of macro-average F1-measure and 5.3% in terms of weighted F1-measure.

Chapter 2: Optimized Sentiments analysis Approach based on Aspects, Attention and Subjectivity notions For Textual Business Intelligence.

By Hammou FADILI. (*CNAM Paris, Pôle Recherche & Prospective/FMSH, France*).

Author presents the results obtained in applying an innovative and optimized approach to textual semantic analysis in the service of decision-making. Significant improvements have been made in the existing procedures of sentiment and recommendation analysis, and in opinions mining, to enable better-motivated decisions and benefit from big data. These improvements concerned, especially, the support of the notions of aspects, attention and subjectivity to lighten the treatments, well adapted in the context of big data. The results obtained show the interesting contribution of the approach to the specific field of business intelligence (BI) relative to user behaviors analysis.

Chapter 3: Meta-heuristic algorithms for the multi-item transshipment problem.

Noomen Selmi, Mohamed Hmiden, and Lamjed Ben Said. (*ISG University of Tunis, SMART Lab., Tunisia*).

Authors argue that differential Evolution (DE) and the Particle Swarm Optimization (PSO) are two evolutionary algorithms that confirmed their efficiency in resolving complex problems. In this chapter, authors intend to adopt these algorithms to resolve a complex inventory management problem, known in the literature by the transshipment problem. This problem concerns network of collaborative retailers selling items and they collaborate by exchanging items between them. The transshipment problem consists in deriving the optimal replenishment quantity, for each retailer, while a transshipment policy is adopted. A huge body of literature works has addressed this problem where several configurations are investigated. A few of them has addressed the multi-item and the multi-location configuration because of its complexity. Authors focus on this complex configuration and resolve it by the PSO and DE algorithms. Secondly, authors compare between the performances of these algorithms according to a set of criteria. Thirdly, authors analyze the impact of the studied transshipment parameters on the inventory system performance measures.

Chapter 4: Cartographic Visualization of personalized Scientific Alerts.

Nedra Ibrahim, Anja Habacha Chaibi, and Henda Ben Ghézala. (*ENSI University of Manouba, RIADI Lab., Tunisia*).

Authors present different diffusion tools within collaborative networks provide to researchers more and recent information. In this chapter, authors focus on the scientific quality of diffused information and discuss the implications of this tendency for scientific performance. Authors propose a qualitative scientific watch system enriched by an alerts' personalization and cartographic visualization tools. The proposed watch system

is based on scientific quality evaluation in its different parts. Scientific quality evaluation is made by the mean of scientometric indicators to select qualitative new publications to diffuse to the researchers. The integration of personalization tool helps researchers on identifying qualitative information which corresponds to their needs. Moreover, the cartographic visualization provides to the researchers the possibility of analyzing and choosing more quickly interesting and useful alerts.

Chapter 5: The dominant interest of structuring environmental scanning systems: mapping of 20 years of research in Tunisia

Souad KAMOUN CHOUK, and Maroua HAMMAMI. (*ESCT University of Manouba, LIGUE Lab., Tunisia*).

Based on a study, authors propose an overview of two decades of research on Strategic Environmental Scanning (ESS) and competitive intelligence (CI) in Tunisia. A particular attention is given to Scientific and Technical Scanning (STS) as part of SES practices and as a strong support to R&D activity and trigger of innovation. The objective of this work is to fill a gap faced by academic researchers interested in issues related to this field of research. The scarcity of meta-analyses within the literature review and retrospective studies could be an obstacle to the cumulative nature of the research and the capitalization of actionable knowledge from the various investigations.

Chapter 6: MAMCTA Multi-Agent Model for Counter Terrorism Actions.

Oussama Kebir, Issam Nouaouri, Mouna Belhaj, Lamjed Ben Said and Kamel Akrout. (*University of Tunis & University of Artois, SMART Lab.& Génie Informatique et d'Automatique de l'Artois Lab., Tunisia & France*).

Authors argue that, today, the world is affected by a new concept of war called terrorism. As plans to face conventional enemies have become unusual against terrorism, there are a necessity for innovative concepts and technologies. In order to support units, authors aim to upgrade the capability of leaders structuring their choices. In this chapter, authors offer a multi-agent architecture for the planning of actions against terrorist attacks. It is distinguished by decisive policy responses and methodical procedures for managing the situation, as well as by the flexibility to adapt a contingency scenario. Authors describe the relationship between actors during a terrorist attack in order to establish the best possible distribution of units to neutralize the enemy.

Chapter 7: Genesis of a «Diophantine equation» in Arabic mathematics.

Khaled Kchir, Saif-Eddin Toumi, and Foued Nafti. (*9 April & ENIT University of Tunis, AIME & LAMSI Labs., Tunisia*).

In this last chapter, authors intend to outline one part of the number theory genesis relatively to the equation: a square plus/minus a number equals a square focusing on the Arabic mathematicians' works, like, for example, those of al-Khazin, Ibn al-Laith, al-Karaji, al-Baghdadi and al-Khallat. Authors describe the occidental tradition relative to his subject threw the works of Fibonacci, Fermat, Frenecle, Euler, and others.

Authors argue that numbers theories represent a crucial subject in mathematics. Researches on this topic are undertaken now with the help of new technologies. However, the beginnings were nor easy neither evident. Arabic mathematicians had well participated in the development of such a tradition. Actually, taking advantage of the translations of the Latin scientific legacy, the Successors of al-Ḫwārizmī, who has the merit to establish a new discipline: algebra, revisit the Euclid's *Elements* and the *Arithmetica* of Diophantus using al-Ḫwārizmī's lexicon and methods.

Reference

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