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Data Science, Ai, Pattern Recognition And Human Centric Smart Intelligent Computing

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ABSTRACT: *Computational Intelligence in Pattern Recognition and Data Science, AI and Human Centric Smart Intelligent computing have been dealt with in this paper. Hyper Connectivity is also discussed. Intelligent Algorithms for Pattern Recognition, Application of Computational Intelligence and Advance Computing has been treated in this paper. The Data Science Techniques and Applications, Data Warehousing and Data Mining, Rough Set and Fuzzy Set Theory, Hybrid and Distributed Algorithms, Parallel Computing, Genetic Algorithm, Swarm Intelligence, Evolutionary Strategies, Artificial Immune Systems, Multi-Agent Systems, Uncertainty Analysis and Optical Networks is also, being extremely important, appreciated for computational intelligence in pattern recognition. Computational Intelligence finding applications in shape analysis, agricultural informatics, medical informatics, disaster management, social network analysis, text along with audiovisual data analysis, bio informatics, robotics and automation, cloud configuration, remote sensing, GIS and GPS, mobile computing and IoT, green computing and ICT, control systems and automation, E-commerce, power control, motion planning, decision-making, business analysis, process industry, safety management, image and signal processing and handling COVID-19 type pandemic has been briefly discussed. The Advance Computing like data mining in dynamic environment, hybrid computing, big data analysis, deep learning neural computing, fog computing, immunological computing, nature inspired computing techniques, randomized algorithms, stochastic optimizations, information and network security and IoT driven computing are also falling in the ambit of this paper.*

KEYWORDS: *Data Science, AI, Pattern Recognition, Human Centric Smart Computing, Computational Intelligence, Advance Computing, Hyper Connectivity*

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I. INTRODUCTION

Data science techniques widespread, across all fields, can also be applied to the wealth of information derived from interactions. Use of data science techniques can greatly improve evidence-based decisions. This can increase confidence regarding the use of formal education, greatly raising the attractiveness. Data science techniques on data analytics and learning analytics determine: (1) the purposes for which data science has been applied in learning analytics data, (2) which algorithms or analysis techniques are commonly used, (3) which stakeholders have been chosen to benefit from this information and (4) which results and conclusions have been drawn from these applications. Based on the categories established after the mapping and the findings of the review, the limitations of the studies are to be analyzed and recommendations for future research in the field are to be proposed. One application of Data Science is Structural Health Monitoring (SHM) which is a multi-discipline field that involves the automatic sensing of structural loads and response by means of a large number of sensors and instruments, followed by a diagnosis of the structural health based on the collected data. A SHM system implemented into a structure automatically senses, evaluates, and warns about structural conditions in real time. Massive data are a significant feature of SHM. The techniques related to massive data are referred to as data science and engineering, and include acquisition techniques, transition techniques, management techniques and processing and mining algorithms for massive data. This paper provides a brief review of the state of the art of data science and engineering in SHM. This covers the compressive sampling-based data-acquisition algorithm, the anomaly data diagnosis approach using a deep learning algorithm, crack identification approaches using computer vision techniques, and condition assessment approaches that bridge by using machine learning algorithms. Future trends are as follows: A Comprehensive Sampling (CS)-based data-acquisition algorithm is able to randomly sample dynamic signals and reduce the volume of the dynamic signal (e.g., the acceleration, dynamic strain, displacement, etc.) because the dynamic signal in civil structures is sparse in the frequency domain and in the frequency-time domain. Machine Learning (ML), Deep Learning (DL), and Computer Vision (CV) techniques provide efficient algorithms to automatically diagnose data anomaly and perform crack identification and condition assessment using big data from monitoring; they can be extensively applied in SHM. The concepts of the ‘‘automatic AI scientist” and the ‘‘automatic AI engineer” are gaining considerable scholarly interest in the field of AI, as they can learn and create theorems, theories, and designs. AI, virtual realization or augmented realization, wearable devices, crowd smart-sensing technology, and their combinations will make it possible to collect more data and information at a low cost, and will lead to novel theories on structural health diagnosis and prognosis by overcoming many challenging issues in traditional damage detection, model updating, safety evaluation, and reliability analysis. These technologies will help us identify a new intrinsic evolution in the long-term performance of full-scale structures in real operational surroundings and under real loads.

II. ARTIFICIAL INTELLIGENCE

There is enormous progress in machine learning. But artificial neural networks still lag behind brains in their ability to generalize to new situations. Given identical training data, differences in generalization are caused by many defining features of a learning algorithm, such as network architecture and learning rule. Inductive Bias determines how well any learning algorithm or brain generalizes. Robust generalization needs good inductive biases. Artificial networks use rather nonspecific biases and often latch onto patterns. These are only informative about the statistics of the training data but may not generalize to different scenarios. Brains, on the other hand, generalize across comparatively drastic changes in the sensory input all the time. Some shortcomings of state-of-the-art learning algorithms compared to biological brains incite several ideas about how neuroscience can guide the quest for better inductive biases by providing useful constraints on representations and network architecture.

III. HUMAN CENTRIC SMART INTELLIGENT LEARNING

The notion of “Human Centric AI” increasingly dominates the science and engineering. AI is beneficial to humans on both individual and societal level characterized by a focus on supporting and empowering humans as well as incorporating by design adherence to appropriate ethical standards and values such as privacy protection, autonomy and non-discrimination. The techniques vary from smart loudspeakers through recommender systems, intelligent search engines and personalized news services to professional assistance systems like industrial applications. Thus, the ability to learn from as little data as possible, just as humans do, is a core fundamental research question of ML. It is also an essential component of the vision of Human Centric AI. Similar is the problem of distributed, collaborative learning that does not require centralized collection of large amounts of possibly sensitive data.

IV. HYPER CONNECTIVITY

Internet of Things (IoT) adoption is a differentiating factor in the hospitality industry which facilitates the integration of the digital and real world. Hospitality is one of the leading industries that has adopted IoT to create innovative services, But this has not been investigated deeply. A comprehensive study is needed to give guidance to decision makers that would help to design better services by presenting practical and potential benefits. The IoT will usher in great opportunities in hospitality by enabling novel applications for customization and personalization of the services. Operational processes will be redefined for efficiency and speed. A holistic approach is to be used instead of focusing on a single sector which enables the consideration of all aspects of the topic. Theoretical support in addition to technical aspects, challenges and concerns are is required.

V. MORE OF DATA SCIENCE

Computational Intelligence in Pattern Recognition, Application of Computational Intelligence and Advance Computing are important.. The Data Science Techniques and Applications, Data Warehousing and Data Mining, Rough Set and Fuzzy Set Theory, Hybrid and Distributed Algorithms, Parallel Computing, Genetic Algorithm, Swarm Intelligence, Evolutionary Strategies, Artificial Immune Systems, Multi-Agent Systems, Uncertainty Analysis and Optical Networks is also, being extremely important, appreciated for computational intelligence in pattern recognition. Computational Intelligence find applications in shape analysis, agricultural informatics, medical informatics, disaster management, social network analysis, text along with audiovisual data analysis, bio informatics, robotics and automation, cloud configuration, remote sensing, GIS and GPS, mobile computing and IoT, green computing and ICT, control systems and automation, E-commerce, power control, motion planning, decision-making, business analysis, process industry, safety management, image and signal processing and handling COVID-19 type pandemic. The Advance Computing like data mining in dynamic environment, hybrid computing, big data analysis, deep learning neural computing, fog computing, immunological computing, nature inspired computing techniques, randomized algorithms, stochastic optimizations, information and network security and IoT driven computing are also the integral components of Data Science.

VI. CONCLUSION

Data Science refers to Big Data involving large and disparate volumes of data generated by people, applications and machines. It is gaining increasing attention from a variety of domains, including education. There are the challenges of engaging with Big Data research. The issues identified include diversity in the conception and meaning of Big Data e.g. ontological, epistemological disparity, technical challenges, ethics and privacy, digital divide and digital dividend, lack of expertise and academic development opportunities to prepare educational researchers to leverage opportunities afforded by Big Data. There is to be rising of awareness on these issues and initiate a dialogue. More experience researching into Big Data is required.

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