

**Second Afro-European Workshop on 9th February, 2015**  
Faculty of Electrical Engineering and Computer Science in (VŠB-TUO)  
The Technical University of Ostrava, The Czech Republic

**Workshop Programme**

Time	Speakers & Presenters	Titles & Abstracts
8.30 -9.30	Adel M. Alimi, ReGim Lab.	<p style="text-align: center;"><b>Hybrid Intelligent Systems &amp; Big Data Streams Analytics.</b></p> <p><b>Abstract:</b> Big Data are typically produced in different sectors of the above organizations, often geographically distributed throughout the world, and are characterized by a large size and variety. Big Data is not just about storage of and access to data. Therefore, there is a strong need for such Big Data streams analytics.</p> <p>Big Data analytics is considered as an imperative aspect to be further improved in order to increase the operating margin of both public and private enterprises, and represents the next frontier for their innovation, competition, and productivity.</p> <p>Analytics play a big role in making sense of that data and exploiting its value. But learning from big data has become a significant challenge and requires development of new types of algorithms. Most machine learning algorithms can't easily scale up to big data. Plus there are challenges of high-dimensionality, velocity and variety.</p>
9.30 -9.50	Tomas Jezowicz, VŠB-TUO.	<p style="text-align: center;"><b>GPU Classification - Parallel Evolutionary Based Document Classification Algorithms</b></p> <p><b>Abstract:</b> The document classification problem is an instance of supervised learning that tries to assign the best category to given unknown documents. Most developed algorithms are very time consuming even for relatively small datasets. One of the successful but time-demanding approach is based on the evolutionary algorithms. In this paper we describe a parallel version of the five different evolutionary approaches evaluated on the collections of millions of documents. The classifiers are able to deal with these collections in the matter of seconds and they reach the same precision as non-parallel version.</p>
9.50 -10.05	- - - COFFEE BREAK - - -	
10:05 -10.25	Mohamed Mostafa Fouad, VŠB-TUO.	<p style="text-align: center;"><b>A Pairwise Key Security Scheme Suit Topology Control Protocol</b></p> <p><b>Abstract:</b> In recent years, thanks to technology advances in low-power wirelessly networked systems and, we have witnessed the emergence of Wireless Sensor Networks (WSNs) and embedded computing technologies in many fields of our life; which range from military to medical applications and from industry to home appliances. Although most of researchers focus on designing protocols that maximizes both the processing capabilities and energy reserves, many of these protocols pay little attention to securing this WSNs. Nowadays, security goal is vital for ensuring the performance and the acceptance of the wireless sensor networks in many recent applications. This goal is still a challenge on account of the constraint resources of these wireless sensor nodes. The talk proposes a scheme that uses prior deployment knowledge in terms of the energy level carried by each node for modifying the polynomial pool based key pre-distribution scheme. The talk will show that the node energy level observation can be used to control the creation and the selection of security keys hold by this node.</p>

		The experiments intended to evaluate the polynomial pool based key pre-distribution scheme on a specific type of protocols designed for WSNs; the topology control protocols.
10.25 -11.25	Chaouki Aouiti, ReGim Lab.	<p><b>Delayed Hopfield Neural Networks with Impulses: Stability Analysis via Inequality Techniques</b></p> <p><b>Abstract:</b> the problem of stability for a class of time-delay Hopfield neural networks with impulsive perturbation is investigated. The existence of a unique equilibrium point is proved by using the Arzelà-Ascoli's theorem and Rolle's theorem. Some sufficient stability criteria have proved that the uniform stability, the uniform asymptotic stability, the global asymptotic stability and the global exponential stability of the system, are derived from using the Lyapunov functional method and the linear matrix inequality approach by estimating the upper bound of the derivative of Lyapunov functional. The exponential convergence rate of the equilibrium point is also estimated. Finally, we analyse and interpret some numerical examples showing the efficiency of our theoretical results.</p>
11.25 -11.30		--- Q & A ---
11.30 -12.30		--- LUNCH BREAK ---
12.30 -12.50	Nour E. Oweis, VŠB-TUO.	<p><b>The Internet of Thing and Big Data</b></p> <p><b>Abstract:</b> The Internet of Things (IoT) is considered the most important source of Big Data. Nowadays, the IoT is growing fast. It has impacted the Big Data due to the extensive use of smart and sensing devices and consequent data generation and gathering during communication between IoT and Big Data. The challenges in this communication process lies in the necessity to handle this huge amount of data that it can serve its purpose in various fields, such as, medical, social, commercial, industrial and scientific fields.</p> <p>This study aims to present and analyze the most significant Internet of Things techniques and sources impact Big Data. This paper is divided into three main parts: First, IoT Hardware including Wireless Sensor Network (WSN), Near Field Communication (NFC), Cloud Computing, and many more, second, the IoT Software including operating system, new protocols and platforms, and third, challenges and future expectation.</p>
12.50 -13.50	Nizar Rokbani, ReGim Lab.	<p><b>Computational Intelligence Techniques for Inverse Kinematics.</b></p> <p><b>Abstract:</b> Inverse kinematics is a key issue in robotics; for problems such as path planning, motion generation or trajectories optimization, they are classically involved. In the specific case of articulated robotics, inverse kinematics is needed to generate the joint motions, correspondent to a known target position. Articulated systems are very important in industrial and humanoid robotics. In industrial robotics and especially in handling and processing robotic arms are widely used and they are typically an articulated mechanism.</p> <p>Solving inverse kinematics could done effectively using computational intelligence techniques such as PSO, particle swarm optimization, or FA Firefly Algorithm. IK-PSO and IK-FA are respectively inverse kinematics solvers based on PSO and FA, in this work will detail how to implement such a Ik Solver and in what the parameters of PSO or FA could affect the results. A comparison of IK-FA and IK-PSO to classical solver such J transpose and the well known heuristic solver CCD are also presented.</p>
13.50 -14.10	Michal Prilepok, VŠB-TUO.	<b>Classification of EEG Signals</b>

		<p><b>Abstract:</b> The Electroencephalography (EEG) is the recording of electrical activity along the scalp. This recorded data are very complex. EEG has a big role in several applications such as in the diagnosis of human brain diseases and also, we can use the EEG signals to control an external device via Brain Computer Interface (BCI) by our mind. There are many algorithms to analyze the recorded EEG data, but it still remains one of the big challenges in the world. This will be focused how to recognize same EEG signals inspired by data compression and other methods.</p>
14.10 -14.25		- - - COFFEE BREAK - - -
14.25 -15.25	Habib M. Kammoun, ReGim Lab.	<p><b>Hybrid MultiAgent Road Traffic Management System: Assets of Ant-Hierarchical Fuzzy Behavior in System Adaptivity</b></p> <p><b>Abstract:</b> Usually, road networks are characterized by their great dynamics including different entities in interactions. This leads to more complex road traffic management. This work proposes an adaptive multiagent system based on the ant colony behavior and the hierarchical fuzzy model. It allows adjusting efficiently the road traffic according to the real-time changes in road networks by the integration of an adaptive vehicle route guidance system. The proposed system is implemented and simulated under a multiagent platform in order to discuss the improvement of the global road traffic quality in terms of time, fluidity and adaptivity.</p>
15.25 -15.45	Tarek Gaber, VŠB-TUO.	<p><b>Biometric-based Animal Identification: Opportunities and Challenges</b></p> <p><b>Abstract:</b> Animal identification and traceability are very crucial to control safety policies of animals and management of food production. In addition, they are important to identify and control infected animals. This talk will present biometric-based approaches for animal identification. Such approaches are very promising ways for animal identifications as they are inexpensive, non-invasive, and accurate biometric cattle identifiers.</p>
15.45 -16.00		- - - Q & A + END OF WORKSHOP - - -