First Pan-African Artificial Intelligence and Smart Systems Conference

(PAN-AFRICAN AIS 2021)
October 7-9, 2021, University of Namibia, Windhoek, Namibia
Virtual Conference due COVID-19 Pandemic

Message from the Organizing Committee

Welcome to the First Pan-African AI and Smart Systems conference (PAAI&SS- 2021), initiated to bring together leading academic scientists, industry practitioners, independent scholars, and innovators from across the continent of Africa and around the world to explore, exchange, and discuss the challenges and opportunities of harnessing the capabilities of Artificial Intelligence (AI) that have emerged as the engine of the next wave of future innovations. AI holds tremendous promise to benefit nearly all aspects of society, including the economy, transportation, healthcare, security, agriculture, transportation, science, and engineering. Realizing the unprecedented potential of AI, nations around the world have developed long-term investment strategies in research and development of AI-enabled capabilities that make them competitive. A question that will naturally arise in this context is Africa's place in the AI-powered economies of the future. Any global perspective on the future of an AI-powered society must include Africa, home to some 1.5 billion people and some of the planet's most abundant natural and intellectual resources. However, visa restrictions on African AI researchers to travel to major international conferences in North America, the UK, and the EU present a major obstacle. The PAAI&SS initiative is an attempt to address this issue by creating a forum on the continent for AI researchers and innovators to exchange ideas and share research results on the emerging fields of AI and Smart Systems.

Building on the enthusiastic reception from the African computing community in the diaspora and on the continent, PAAI&SS will become an annual conference held in a different region of the African continent each year. The conference will continue to seek original high-quality technical papers from academia, government, and industry in the areas of AI and smart system applications. Future conferences will be broadened to include topics such as Ph.D. dissertations seminars, proposal writing coffee rooms, and African women in AI, to name but a few. We look forward to your exciting presentations and we hope you will enjoy the conference.

PAAI&SS Organizing Committee

CONFERENCE PROGRAMME

Day 1: Thursday October 7 (Namibian Time)

14:00 – 14:30 (GMT+2)	Welcome Message **Prof. Anicia Peters** PVC: Research, Innovation and Development, University of Namibia, Namibia
14:35 – 14:50 (GMT+2)	History of the Conference **Dr Thomas Ndousse**
15:00 – 16:00(GMT+2)	Keynote Address The Important Role of Operations Research (OR) Tools in the Success of AI and Smart Systems **Prof. Attahiru S. Alfa** Professor Emeritus in the Department of Electrical and Computer Engineering , University of Manitoba, Manitoba, Canada and Extraordinary Professor in the Department of Electrical, Electronic and Computer Engineering, University of Pretoria, South Africa
16:00 – 16:20(GMT+2)	**Break**
	Session 1 : **Deep Learning** - Session Chair : **Telex M. N. Ngatched**
16:20 – 16:40 (GMT+2)	A Critical Analysis of Deep Learning Architectures for Classifying Breast Cancer Using Histopathology Images *Yusuf Seedat and Dustin Van Der Haar*
16:40 – 17:00 (GMT+2)	A Patch-based Convolutional Neural Network for Localized MRI Brain Segmentation *Trevor Vambe, Serestina Viriri and Mandlenkosi Gwetu*
17:00 – 17:20 (GMT+2)	Copy-Move and Splicing Forgeries in Digital Images using Deep Learning *Brice Mboule Ebele, Hippolyte Tapamo Kenfack, Serge Essuthi, Oscar Eone Etoua and Amos Mbietieu Mbietieu*
17:20 – 17:40(GMT+2)	Facial Recognition through Localized Siamese Convolutional Neural Networks *Timothy Takawira Dongo, Attlee Gamundani and Mercy Chitauro*
17:40 – 18:40 (GMT+2)	**Lunch Break**
18:40 – 19:40(GMT+2)	Keynote Address Artificial Intelligence for Africa by Africans: Opportunities and Challenges **Prof. Ndapa Nakashole** Assistant Professor at the University of California, San Diego, USA
19:40 – 20:00(GMT+2)	**Break**
	Session 2 : **Classification and Pattern Recognition I** - Session Chair : **Jules R Tapamo**
20:00 – 20:20(GMT+2)	Face Recognition in Databases of images With Hidden Markov's Models *Amos Mbietieu Mbietieu, Hippolyte Tapamo Kenfack, Oscar Eone Etoua, Serge Essuthi Essoh and Brice Mboule Ebele*
20:20 – 20:40(GMT+2)	Auto-encoders for Brain MRI Segmentation *Kishan Jackpersad and Mandlenkosi Gwetu*
20:40 – 21:00(GMT+2)	Effective Feature Selection for Improved Prediction of Heart Disease *Ibomoiye Domor Mienye and Yanxia Sun*
21:00 – 21:20(GMT+2)	Convolutional Neural Network Feature Extraction for EEG Signal Classification *Liresh Kaulasar and Mandlenkosi Gwetu*

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Day 2: Friday October 8 (Namibian Time)	
14:00 – 15:00(GMT+2)	Keynote Address A Practical Framework for Impactful Statistical Machine Learning in Artificial Intelligence **Prof. Ernest Fokoue** Professor at the School of Mathematical Sciences, Rochester Institute of Technology, Rochester, New York, USA
15:00 – 15:20(GMT+2)	**Break**
	Session 3 : **Neural Networks and Support Vector Machines** – Session Chair : **Isaac Woungang**
15:20 – 15:40 (GMT+2)	Hybridized Loss Functions for Improved Neural Network Generalization *Matthew Dickson, Anna Bosman and Katherine Malan*
15:40 – 16:00(GMT+2)	Diverging Hybrid and Deep Learning Models into Predicting Students' Performance in Smart Learning Environments – A Review *Elliot Mbunge, Stephen Fashoto, Racheal Mafumbate and Sanelisiwe Nxumalo*
16:00 – 16:20 (GMT+2)	Combining Multi-Layer Perceptron and Local Binary Patterns for Thermite Weld Defects Classification *Mohale Molefe and Jules-Raymond Tapamo*
16:20 – 16:40(GMT+2)	Classification of Semantic Web Ontologies with Support Vector Machines *Gideon Koech, Jean Vincent Fonou Dombeu and Mandlenkosi Gwetu*
16:40 – 17:00 (GMT+2)	**Break**
	Session 4 : **Smart Systems** - Session Chairs: **Thomas Ndousse and Victoria Hasheela-Mufeti**
17:00 - 17:20 (GMT+2)	An Elliptic Curve Based Biometric User Authentication Protocol for Smart Homes Using Smartphone *Amir Mohammadi Bagha, Isaac Woungang, Sanjay K. Dhurandher and Issa Traore*
17:20 –17:40 (GMT+2)	Efficient Sub-channel and Power Allocation in Multi-cell Indoor VLC Systems *Sylvester Aboagye, Telex M. N. Ngatched and Octavia A. Dobre*
17:40 –18:00 (GMT+2)	Autonomic IoT: Towards Smart System Components with Cognitive IoT *Justice Owusu Agyemang, Dantong Yu and Jerry John Kponyo*
18:00 –18:20(GMT+2)	Study of customer sentiment towards smart lockers *Colette Malyack, Cheickna Sylla and Pius Egbelu*
18:20 – 18:50(GMT+2)	**Lunch Break**
18:50 – 19:50(GMT+2)	Keynote Address Applications of Artificial Intelligence in Next-Generations Wireless Communications **Prof. Telex M. N. Ngatched** Associate Professor at the School of Science and the Environment , Memorial University of Newfoundland, Canada
19:50 – 20:10(GMT+2)	**Break**
	Session 5 : Classification and Pattern Recognition II – Session Chair : **Serestina Viriri**
20:10 – 20:30(GMT+2)	Race recognition using enhanced local binary pattern *Hippolyte Tapamo Kenfack, Brice Mboule Ebele, Amos Mbietieu Mbietieu and Serge Essuthi Essoh*
20:30 – 20:50(GMT+2)	Detection and Classification of Coffee Plant Diseases by Image Processing and Machine Learning *Serge Essuthi Essoh, Hippolyte Tapamo Kenfack, Brice Mboule Ebele, Amos Mbietieu Mbietieu and Oscar Eone Etoua*
20:50 – 21:10(GMT+2)	Plant Diseases Detection and Classification using Transfer Learning *Emma Genders and Serestina Viriri*

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Day 3: Saturday October 9 (Namibian Time)	
14:00 – 18:00	Tutorial On the Ubiquity of the Bayesian Paradigm in Artificial Intelligence and Statistical Machine Learning **Prof. Ernest Fokoue** Professor at the School of Mathematical Sciences, Rochester Institute of Technology, Rochester, New York, USA
18:00 – 18:20	**Break**
18:20 – 20:00	**Concluding Remarks**