

SACAIR2024

Southern African Conference for Artificial Intelligence Research

AI for Societal Impact

2 - 6 December 2024

University of the Free State
Bloemfontein

Monday, 2 December 2024 | Unconference

Venue | UFS | Unit for Engineering Sciences

07:30	-	08:30	Registration Tea & Coffee	
08:30	-	08:45	Welcome and Introduction, Johan Van Niekerk Vice Dean for Agriculture, Faculty of Natural and Agricultural Sciences, University of the Free State	
08:45	-	09:30	Changing world of Complexity Science, Jacques Maritz, Engineering Sciences, UFS	
09:30	-	09:50	Data-driven LSTM Power Grid Inertia Estimations	Ethan Codron, Jacques Maritz, Leonardo Rydin-Gorjão, Thomas Drageset and Philip Armand Bester
09:50	-	10:10	Spatio-Temporal Graph Neural Networks for Human Activity Recognition	Suvana Rohanlal and Deshendran Moodley
10:10	-	10:30	Temporal Hierarchical Time Series Modeling: A Comparative Analysis of Aggregation Techniques and Model Efficiency	Callyn Blayne Barath and Edgar Jembere
10:30	-	11:00	Tea & Coffee Refreshments	
Session 1 Session Chair: Albert Van Eck, UFS				
11:00	-	11:20	Automatic Grading of First-Year HTML and CSS Assignments	Jocelyne Smith
11:20	-	11:40	Implications of Privacy and Consent on Data-Driven Decision-Making Adoption in Higher Education	Silence Chomunorwa
11:40	-	12:00	Critiquing Cross-Cultural Ethics in Artificial Intelligence in Education	Nasreen Watson
12:00	-	13:00	Lunch Centenary Complex	
Session 2 Session Chair: Stefaans Erasmus, Soil Crop and Climate Science, UFS				
13:00	-	13:20	Exploring Predictive Anomaly Detection in Mineral Processing: A Machine Learning Approach	Morne Du Plessis and Deshendran Moodley
13:20	-	13:40	Exploring Implementations of KLM-Style Defeasible Explanation Algorithms (Poster)	Chipo Hamayobe
13:40	-	14:00	Can an intelligent robot inherit intellectual property?	Csilla Mónika Rác
14:00	-	14:20	Algorithm Marginalization: A Problem Beyond Technological Solutions	Bongekile Mkrola
14:20	-	14:50	Tea & Coffee Refreshments	
Session 3 Session Chair: Armand Bester, Pathology, UFS				
14:50	-	15:10	Utilizing Hybrid LSTM-CNN Deep Learning Models for Heart Disease Prediction	Elias Tabane
15:10	-	15:30	Propolingo: A Language Learning Application for Propositional Logic (Poster)	Bonga Gibson Baleni and Clayton Baker
15:30	-	15:50	A Comparative Study of Contemporary Cross Sectional Hierarchical Time Series Reconciliation Techniques	Ahana Maharaj
15:50	-	16:10	Break	
16:10	-	16:20	Announcement of the best student presentation by Jacques Maritz, UFS	
16:20	-	16:40	Closing by ICDF team	
16:40	for	17:00	Meet at the UFS Sci-Ed Science Education Centre for the Unconference Ice-Breaker Function	

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Tuesday, 3 December 2024 | Tutorials

Venue | UFS | Unit of Engineering Sciences

07:30	-	08:30	Registration Tea & Coffee	Engineering Sciences
08:30	-	08:45	Orientation Technical requirements for TUTS (Lab 1)	
08:45	-	09:30	Orientation Technical requirements for TUTS (Lab 2)	
				Lab 1
09:30	-	10:30	The Curse of Dimensionality Armand Bester, School of Pathology, University of the Free State, Medical Faculty	
10:30	-	11:00	Tea & Coffee Refreshments	Engineering Sciences
				Lab 1
11:00	-	12:00	AI and Graph Theory Gerhard Venter, Mathematics, University of the Free State	
12:00	-	13:00	Lunch Centenary Complex	Centenary Complex
				Lab 1
13:00	-	13:20	Cool Applications of AI in Astrophysics Lurgasho Minnie, Engineering Sciences, Physics, University of the Free State	
				Lab 1
13:20	-	14:20	AI narratives and global power balances Emma Ruttkamp-Bloem, Department of Philosophy, Faculty of Humanities, University of Pretoria, AI Ethics Lead: Centre for AI Research	
				Lab 2
13:20	-	14:20	(Mis)Trust in student-educator interactions mediated by AI Susan Brokensha, Department of English, Faculty of Humanities, University of the Free State	
14:20	-	14:45	Tea & Coffee Refreshments	Engineering Sciences
				Lab 1
14:45	-	15:45	The Use of AI in Agriculture Stefaans Erasmus, Soil, Crop and Climate Sciences, University of the Free State	
15:45	-	16:00	Closing	

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Wednesday, 4 December 2024 | Main Conference | Day One

Venue | University of the Free State | Centenary Complex

07:00 - 08:00	Registration Tea & Coffee		
08:00 - 08:15	Introduction: Herkulaas Combrink, SACAIR 2024 Co-Chairperson Co-Director: Interdisciplinary Centre for Digital Futures, University of the Free State		
08:15 - 08:35	Welcome: Vasu Reddy, Deputy Vice-Chancellor Research and Internationalisation, University of the Free State		
08:35 - 09:35	Vukosi Marivate Associate Professor of Computer Science, ABSA UP Chair of Data Science at the University of Pretoria		
Session 1: Algorithmic and Data-Driven AI (Computer Science) Session Chair: Omowunmi E. Isafiade, University of the Western Cape			
09:35 - 09:55	7	Parameter-Efficient Fine-Tuning of Pre-trained Large Language Models for Financial Text Analysis Kelly Langa	Kelly Langa, Hairong Wang and Olaperi Okuboyejo
09:55 - 10:15	10	Optimally traversing explainability in Bayesian networks via the graphical Lasso Alta de Waal	Iena Derks and Alta de Waal
10:15 - 10:35	11	Assessing multilinguality of topic models on a short-text South African languages dataset Darren Roos	Darren Roos and Katherine Malan
10:35 - 10:55	Tea & Coffee Refreshments		
Session 2: Algorithmic and Data-Driven AI (Computer Science) (Continued) Session Chair: Bennie Botha, University of the Free State			
10:55 - 11:15	28	Cascaded RFM-based Fuzzy Clustering Model for Dynamic Customer Segmentation in Retail Sector Sive Sobantu	Sive Sobantu and Omowunmi Isafiade
11:15 - 11:35	29	Automatic assessment of speech impediment for South African early literacy readers Jaco Badenhorst	Jaco Badenhorst
11:35 - 11:55	36	Enhancing Credit Risk Assessment through Transformer Based Machine Learning Models Elekanyani Siphuma	Elekanyani Siphuma and Terence Van Zyl
11:55 - 12:15	37	Predicting and discovering weather patterns in South Africa using Spatial-Temporal Graph Neural Networks Hamza Amir	Adeeb Gaibie, Hamza Amir, Irene Nandutu and Deshendran Moodley
12:15 - 12:35	59	Benchmarking Political Bias Classification with In-Context Learning: Insights from GPT-3.5, GPT-4, LLaMA-3, and Gemma-2 Eduan Kotzé	Eduan Kotzé and Burgert Senekal
12:35 - 13:25	Lunch UFS Centenary Complex		

Session 3: Algorithmic and Data-Driven AI (Computer Science) (Continued)
 Session Chair: Eduan Kotzé, University of the Free State

13:25 - 13:45	30	Automated Enhancement of isiZulu Data Collection for the African Health Research Institute Jaco Badenhorst	Jaco Badenhorst and Avashna Govender
13:45 - 14:05	132	Deep Neural Network Compression for Lightweight and Accurate Fish Classification Daanyaal Salie	Daanyaal Salie, Dane Brown and Kenneth Chieza
14:05 - 14:25	84	Neural Network-based Vehicular Channel Estimation Performance: Effect of Noise in the Training Set Simbarashe Aldrin Ngorima	Simbarashe Aldrin Ngorima, Albert Helberg and Marelie Davel
14:25 - 14:45	88	Deep Learning-based Network Intrusion Detection Systems: A Systematic Literature Review Leonard Mutembei	Leonard Mutembei, Makhamsa Senekane and Terence van Zyl
14:45 - 15:05	110	Impact of batch normalization on convolutional network representations Hermanus Potgieter	Hermanus Potgieter, Coenraad Mouton and Marelie Davel

15:05 - 15:25 **Tea & Coffee | Refreshments**

Session 4: Algorithmic and Data-Driven AI (Computer Science) (Continued)
 Session Chair: Andronicus Akinyelu, University of the Free State

15:25 - 15:45	114	Does simple trump complex? Comparing strategies for adversarial robustness in DNNs William Brooks	William Brooks, Marelie Davel and Coenraad Mouton
15:45 - 16:05	116	A novel approach to lion re-identification using vision transformers Boitumelo Matlatla	Boitumelo Matlatla, Dustin Van Der Haar and Hima Bindu Vadapalli
16:05 - 16:25	126	Assessing Data-Driven of Discriminative Deep Learning Models in Classification Task Using Synthetic Pandemic Dataset Sunday A. Ajagbe	Sunday A. Ajagbe, Pragasen Mudali and Matthew Adigun
16:25 - 16:45	138	Pre-training a Transformer-Based Generative Model Using a Small Sepedi Dataset Simon Ramalepe	Simon Ramalepe, Thipe Modipa and Marelie Davel
16:45 - 16:55	119	Knowledge Management Strategies and Tactics for Effective Dark Data Management to Advance Organizational Sustainability Hanlie Smuts	Hanlie Smuts and Alta Van der Merwe
16:55 - 17:05	25	The Effect of Generative AI on Cognitive Thinking Skills in Higher Education Institutions: A Systematic Literature Review Marita Turpin	Harry Moongela, Alta Van der Merwe, Machdel Mathee and Marita Turpin

17:45 - 18:00 **Busses Depart from Centenary Complex for Conference Dinner at the Naval Hill Planetarium**

07:15	-	08:00	Registration Tea & Coffee	
08:00	-	08:05	Introduction: Katinka de Wet, SACAIR 2024 Co-Chairperson Associate Professor: Sociology Interim Co-Director: Interdisciplinary Centre for Digital Futures, University of the Free State	
08:05	-	09:05	Damian Eke Assistant Professor, School of Computer Science, University of Nottingham Can Africa Trust AI?	
Session 5: Responsible and Ethical AI (Philosophy and Law) Session Chair: Susan Brokensha, University of the Free State				
09:05	-	09:25	63	Democratic AI: Justification for a Broad View of Public Reason Paige Benton
09:25	-	09:45	90	Responsible AI governance in Africa: A contextual analysis Faith Kabata
09:45	-	10:05	69	Moral Answerability and Relational Agency Fabio Tollon
10:05	-	10:35	Tea & Coffee Refreshments	
Session 6: Responsible and Ethical AI (Philosophy and Law) (Continued) Session Chair: Susan Brokensha, University of the Free State				
10:35	-	10:55	4	Humanoid robots with partial moral status: ethical and social impacts Cindy Friedman
10:55	-	11:15	58	Can Artificial Intelligence (AIs) be good Doctors? A Philosophical Analysis of Medical Artificial Intelligences Franklyn Echeweodor
Session 7: Symbolic AI (KRR) Session Chair: Jacques Maritz, University of the Free State				
11:15	-	11:35	40	Towards Propositional KLM-Style Defeasible Standpoint Logics Nicholas Leisegang
11:35	-	11:55	74	Non-monotonic Extensions to Formal Concept Analysis via Object Preferences Lucas Carr
11:55	-	12:15	149	Knowledge Compilation for KLM-Style Defeasible Reasoning Luke Slater
12:15	-	12:20	Message from our sponsor the Centre for Artificial Intelligence Research (CAIR) by Deshendran Moodley, Co-Director of CAIR	
12:20	-	13:20	Lunch Centenary Complex	

Session 8: Socio-technical AI (Information Systems) (IS)
Session Chair: Herkulaas Combrink, University of the Free State

13:20	-	13:40	26	LLMs as Enablers of Accessible Business Process Modeling Seline Wenger	Seline Wenger, Maja Spahic-Bogdanovic and Andreas Martin
13:40	-	14:00	66	The role of artificial intelligence in modern language translation and its societal applications: A systematic literature review Samuel Ssemugabi	Samuel Ssemugabi
14:00	-	14:20	150	Deep Learning Forecasting of Photovoltaics Output Using Digital Twin Data Nomfundo Vilakazi	Nomfundo Vilakazi and Terence van Zyl
14:20	-	14:25	Break		
14:25	-	14:45	34	Large Language Models for Sentiment Analysis to Detect Social Challenges: A Use Case with South African Languages Koena Ronny Mabokela	Koena Ronny Mabokela, Tim Schlippe and Matthias Wölfel
14:45	-	15:05	53	Use of AI Technologies to Enhance Information Processing Capabilities in Nigerian Banks David Akobe	David Akobe, Wallace Chigona and Laban Bagui
15:05	-	15:25	83	The Roles of Reinforcement Learning in South Africa's Just Transition Claude Formanek	Claude Formanek, Callum Rhys Tilbury and Jonathan Shock
15:25	-	15:55	Tea & Coffee Refreshments		
Session 9: Algorithmic and Data-Driven AI (Computer Science) Session Chair: Andronicus Akinyelu, University of the Free State					
15:55	-	16:15	35	AI in Education: A Comparison of Large Language Models for Twi Automatic Short Answer Grading Tim Schlippe	Alex Agyemang and Tim Schlippe
16:15	-	16:35	62	Uncovering the ANPR Performance Gap: A Commercial Systems Analysis Frank Zandamela	Frank Zandamela, Rofhiwa Seletani, Patrick Malatjie, Teboho Sekopa, Nana Muhammad and Dumisani Kunene
16:35	-	16:55	142	Automated Fish Detection in Underwater Environments: Performance Analysis of YOLOv8 and YOLO-NAS Kenneth Chieza	Kenneth Chieza, Dane Brown, James Conan and Daanyaal Salie
16:55	-	17:15	16	Deep Learning for Cleaning Cultural Heritage Point Clouds Luc Hayward	Luc Hayward, Patrick Marais and Jan Dirk Wegner
Session ends					

07:30	-	08:00	Registration Tea & Coffee	
08:00	-	08:05	Announcement of SACAIR 2025 , Aurna Gerber, Chairperson of the SACAIR Steering Committee, University of the Western Cape Introduction , Herkulaas Combrink, SACAIR 2024 Co-Chairperson Co-Director: Interdisciplinary Centre for Digital Futures, University of the Free State	
08:05	-	08:25	Closing: Vasu Reddy , Deputy Vice-Chancellor Research and Internationalisation, University of the Free State	
Session 10: Online Session Chair: Jacques Maritz, University of the Free State				
08:25	-	08:45	3	Requirements Engineering (RE) in Artificial Intelligence (AI) Systems Implementation: The Need to Emphasize Non-Functional Requirements (NFRs) for Ethical AI Eddie Liywalii
08:45	-	09:05	8	Feasibility of nnUNet Model in MR Image Segmentation: A Case of Glioma Segmentation in Sub-Saharan Africa Everlyne Nalule
09:05	-	09:25	127	Enhancing Agricultural Diagnostics: An Ensemble Approach Using VGG16 and InceptionV3 for Multiclass Crop Disease Classification Habiba Ngugi
Session 11: Algorithmic and Data-Driven AI (Computer Science) (Continued) Session Chair: Herkulaas Combrink, University of the Free State				
09:25	-	09:45	32	Driver Activity recognition: A Transformer-based approach leveraging optical flows Mkhusele Ngxande
09:45	-	10:05	33	Analysing Public Transport User Sentiment on Low Resource Multilingual Data Rozina Myoya
10:05	-	10:25	41	A two-step approach in detecting misinformation in Sepedi, Setswana, Sesotho and English code-switched tweets on loadshedding Matome Brilliant Ledwaba
10:25	-	10:45	46	How real is real? Evaluating the utility of synthetic data generated from a Bayesian network Luyanda Mdhuli
10:45	-	11:05	Tea & Coffee Refreshments	
Session 12: Algorithmic and Data-Driven AI (Computer Science) (Continued) Session Chair: Andronicus Akinyelu, University of the Free State				
11:05	-	11:25	48	Enhanced Electronic Health Record Text Summarization Using Large Language Models Ruvarashe Madzime
11:25	-	11:45	49	Enhancing Affinity Propagation for Improved Public Sentiment Insights Mayimunah Nagayi
11:45	-	12:05	51	Deep clustering for South African Residential Load Profiles Leonard Chuang
12:05	-	12:25	73	A Comparative Study of SVM and Random Forest Machine Learning Algorithms in Customs Fraud Detection Innocent Chilomo
12:25	-	12:45	137	Adaptive Threshold Selection for Improved Autoencoder-Based Anomaly Detection Shikar Rajcomar
12:45	-	13:05	145	Enhancing Underwater Images for a Robust Fish Classification System Kenneth Chieza
13:05	-	14:05	Lunch Centenary Complex	
				Conference Ends



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We wish to thank the generous sponsors and partners of SACAIR2024

