
AI
2024

Cambridge UK
17-19 December 2024



44th SGAI International
Conference on Innovative
Techniques and
Applications of Artificial
Intelligence

Conference Information

17th-19th December 2024
Peterhouse College, Cambridge, UK

Keynote Speakers:

Prof. Frans Coenen
University of Liverpool

and

Prof. Steven Meers
DSTL

For further details see www.bcs-sgai.org/ai2024

CONFERENCE TIMETABLE

DAY 1	DAY 2	DAY 3
TUES. 17 th DECEMBER	WED. 18 th DECEMBER	THURS. 19 th DECEMBER
<p>09.30 Registration and Refreshments</p> <p>11.00 Workshop session 1 Two streams (<i>Th</i> and <i>UH</i>)</p> <p>12.30 LUNCH (Dining Hall)</p> <p>13.15 Workshop session 2 Two streams (<i>Th</i> and <i>UH</i>)</p> <p>14.45 REFRESHMENT BREAK (<i>LR</i>)</p> <p>15.15 Workshop session 3 Two streams (<i>Th</i> and <i>UH</i>)</p> <p>16.45 REFRESHMENT BREAK (<i>LR</i>)</p> <p>17.00 Workshop session 4 Two streams (<i>Th</i> and <i>UH</i>)</p> <p>18.30 Welcome Reception for delegates (<i>Lubbock Room</i>)</p>	<p>08.15 Registration and Refreshments</p> <p>09.00 Welcome Plenary Session (<i>Th</i>)</p> <p>09.15 Keynote Technical Lecture (<i>Th</i>) Professor Frans Coenen (University of Liverpool)</p> <p>10.00 Best Refereed Technical Paper (<i>Th</i>)</p> <p>10.45 REFRESHMENT BREAK (<i>LR</i>)</p> <p>11.15 Refereed paper session (Parallel streams) 1a (<i>Th</i>) and 1b (<i>UH</i>)</p> <p>13.00 LUNCH (Dining Hall)</p> <p>13.45 Poster Session 1 Refreshments in Lubbock Room</p> <p>14.15 to 16.00 Refereed paper session (Parallel streams) 2a (<i>Th</i>) and 2b (<i>UH</i>)</p> <p>16.15 Short Presentations by Authors of Poster Papers (<i>Th</i>)</p> <p>17.30 Refreshments</p> <p>18.00 to 19.15 Panel Discussion (<i>Th</i>) Is Large AI good or bad for society?</p> <p>19.30 Pre-Dinner Drinks (Combination Room)</p> <p>20.00 Gala Dinner (Dining Hall)</p> <p><i>After Dinner Speaker: Professor Lars Nolle</i></p>	<p>08.15 Registration and Refreshments</p> <p>09.30 Keynote Application Lecture (<i>Th</i>) Professor Steven Meers (DSTL)</p> <p>10.15 Best Refereed Application Paper (<i>Th</i>)</p> <p>11.00 REFRESHMENT BREAK (<i>LR</i>)</p> <p>11.30 Best Refereed Student Papers (<i>Th</i>) Technical Steam Application Stream</p> <p>12.15 Refereed paper session Session 3 (single stream) (<i>Th</i>)</p> <p>13.15 LUNCH (Dining Hall)</p> <p>14.00 Poster Session 2 Refreshments in Lubbock Room</p> <p>14.45 Refereed paper session (Parallel streams) 4a (<i>Th</i>) and 4b (<i>UH</i>)</p> <p>16.15 REFRESHMENTS and Best Poster Award (<i>LR</i>)</p> <p style="text-align: center;">Conference Close</p>

Th: Peterhouse Lecture Theatre

UH: Upper Hall

LR: Lubbock Room

REGISTRATION DESK

The conference team will be available throughout the event to help answer your questions and resolve problems. The Registration Desk will be open from 0815 each morning (0930 on Tuesday), and during coffee and meal breaks.

ACKNOWLEDGEMENTS

Our thanks go to the members of the programme committee and the executive programme committee for each of the two streams of refereed papers and to Giovanna Martinez (University of Nottingham) for organising the FAIRS event for research students on the day before the conference.

We would also like to thank Mandy Bauer and Kerry Wear from our parent body, the BCS, for providing administrative support. ConferenceExpert once again provided the software system for paper and review handling.

WORKSHOPS PROGRAMME

TUESDAY 17TH DECEMBER 2024

Sessions 1 and 2 - Stream 1 (11.00-12.30 and 13.15-14.45 Lecture Theatre)

AI in Education: towards developing international standards

Chair: Dr Haiming Liu, University of Southampton, UK

Co-organisers: Prof. Kate Borthwick (University of Southampton) and Prof. Jize Yan (University of Southampton)

This workshop seeks to explore the need for industry standards in AI in education, to understand the requirements and scope for any such standards, identify key stakeholders, and consider the process by which standards might be collaboratively created and agreed. It will work towards the establishment of a network of professionals who can work collaboratively in the development and realisation of such standards.

The workshop will consist of a series of short talks and discussion to:

- establish the current needs and expectations of higher education institutions in relation to AI tools;
- discuss the enterprise opportunities offered by use of AI in education;
- consider how and what kind of industry standards might be created to respond to the needs in the education sector.

Sessions 1 and 2 - Stream 2 (11.00-12.30 and 13.15-14.45 Upper Hall)

Computer Vision Applications of AI - Part 1

Chair: Dr Carla Di Cairano-Gilfedder, BT Labs, UK

Organising Committee: Prof. Jinchang Ren, Prof. Huiyu Zhou, Prof. Lu Liu, Prof. Jan Boehm, Dr James Haworth, and Dr Simon Hadfield

Part 1 of this workshop will comprise scientific presentations around computer vision and remote sensing.

11:00 *Multimodal Image Sensing and Fusion for Effective Remote Inspection and Industrial Automation* (keynote), **Prof. Jinchang Ren**, Robert Gordon University, UK

Considering the limitations of single sensors such as colour cameras, synthetic aperture radar (SAR), thermal imaging and even hyperspectral cameras, it is natural to apply and fuse multimodal image sensing for the expanded outreach and enhanced observation, especially in harsh environments e.g. remote sensing. Key techniques and emerging applications of multimodal sensing will be discussed, covering satellite based offshore energy infrastructure detection and measurement, ocean colour remote sensing and Arctic sea ice analysis as well as lab-based or production-line driven industrial automation.

11:50 *Progress in computer vision for scene understanding in urban analytics*, **Dr James Haworth**, University College London (UCL)

In recent years, computer vision has found application across a range of tasks in urban analytics using a diverse set of image sources, such as street view imagery, CCTV and dashcam video. This talk will introduce the technologies that have enabled this work, focussing on case studies in scene understanding including walkability analysis, road safety perception and pedestrian navigation. The talk will conclude with a discussion of the impact

WORKSHOPS PROGRAMME

TUESDAY 17TH DECEMBER 2024

of emerging multimodal large language models (MLLMs) on the field, and their potential to transform the scope and efficiency of urban analytics tasks.

12:30 Lunch

13:15 *Artificial intelligence and its applications in remote sensing* (keynote), **Prof. Huiyu Zhou**, University of Leicester, UK

Recently, deep learning technologies have been widely used for remote sensing applications. In this talk, I will first introduce the characteristics and classification of remote sensing images. Then, I discuss the current challenges in remote sensing and our proposed solutions. Finally, I predict the future work in remote sensing in addition to the summary of the talk.

14:05 to 14.45 *Developing Robust Foundation Models for Reliable Remote Sensing Image Understanding*, **Dr Tianjin Huang**, University of Exeter, UK.

Remote sensing images are highly susceptible to various factors, such as weather conditions, sensor variability, and imaging angles, which can introduce significant noise and variability in the acquired data. Therefore, developing robust foundation models for remote sensing is crucial to enhance the models' ability to adapt to noise and data variability. Such models would ensure consistent and reliable results under diverse conditions, making them academically and practically valuable. In the era of foundation models, this presentation aims to discuss the key challenges and solutions for improving the resilience of these foundation models in handling noisy and diverse remote sensing data.

Sessions 3 and 4 - Stream 1 (15.15-16.45 and 17.00-18.30 Lecture Theatre)

Human-AI collaboration: advancing human, animal and environmental health

Chair: Dr Mercedes Arguello Casteleiro, BCS SGAI

Human-AI collaboration can bring humans and AI together to gain more valuable insights than either could achieve alone. The workshop goal is to gain an understanding about tasks where human-machine collaboration can facilitate advancements in 'one health', which embraces human, animal, and environmental health. Come along to find out more about the use of AI with human oversight.

15:15 *Machine learning supporting bovine tuberculosis eradication strategy in England*, **Pilar Romero**, Animal and Plant Health Agency, UK

15:45 *AI in veterinary medicine and the One Health approach*, **Prof. Kevin Wells**, University of Surrey, UK

16:15 to 16.45 (Tea Break) *Intelligent environments supporting health and wellbeing*, **Prof. Juan Carlos Augusto**, Middlesex University, UK

17:00 *AI to support medical decision-making*, **Prof. Adrian Hopgood**, University of Portsmouth, UK

17:30 *"Low-Code/No-Code AI" hands-on tutorial*, **Dr Mercedes Arguello Casteleiro**, BCS SGAI

Large Language Models fail to do clinical coding accurately. However, significant progress has been made in extracting terms (keywords) from different modalities of information (text, images, and sound files). Under low-code/no-code AI, there is a plausible way to extract information and acquire pertinent terms with a minimal amount of programming code. Attendees will have the opportunity to participate in a *low-code/no-code AI competition* and win a £50 Amazon voucher.

18:30 End

WORKSHOPS PROGRAMME

TUESDAY 17TH DECEMBER 2024

Sessions 3 and 4 - Stream 2 (15.15-16.45 and 17.00-18.30 Upper Hall)

Computer Vision Applications of AI - Part 2

Chair: Dr Carla Di Cairano-Gilfedder, BT Labs, UK

Organising Committee: Prof. Jan Boehm, Dr James Haworth, and Dr Simon Hadfield

Part 2 of this workshop will comprise two tutorial sessions.

15:15 *Transforming Raw Earth-Observation Data into AI-Ready Datasets using SentinelHub*
- **Dr Simon Hadfield**, University of Surrey, UK+.

Earth Observation (EO) data is captured daily from a variety of orbiting payloads. It is a prime example of a data-intensive industry where AI has tremendous potential but faces significant data access and labelling challenges. This tutorial will explore how to overcome these challenges using SentinelHub which provides on-request access to a wide range of labelled satellite imagery. The focus will be on leveraging SentinelHub's API to search ML-ready data captures and how to integrate classical computer vision techniques with the platform's data to autonomously label other specialist/non-public data collections.

16:45 Tea break

17:00 *Understanding Urban Scenes with AI* - **Prof. Jan Boehm** and **Dr James Haworth**, University College London (UCL), UK

This hands-on session will provide a brief introduction to using multimodal large language models (MLLMs) for urban analytics tasks. We will show how the zero-shot capabilities of MLLMs can be used quickly and efficiently to understand urban scenes. Participants should leave with ideas about how they can leverage MLLMs in their own work. Knowledge of Python programming language is recommended to make the most of the session.

18:30 End

CONFERENCE WELCOME RECEPTION

18.30 LUBBOCK ROOM

WEDNESDAY 18TH DECEMBER 2024

PLENARY SESSION – LECTURE THEATRE (09.00-10.45)

WELCOME PLENARY SESSION (09.00-09.15) Lecture Theatre

Chair: Professor Max Bramer, University of Portsmouth

TECHNICAL KEYNOTE LECTURE (09.15-10.00) Lecture Theatre

Chair: Professor Max Bramer, University of Portsmouth

What has AI ever done for Health Care?

Prof Frans Coenen, University of Liverpool

(Further information about this lecture is given on Page 19.)

BEST REFEREED TECHNICAL PAPER: (10.00-10.45) Lecture Theatre

Chair: Professor Max Bramer, University of Portsmouth

NER Explainability Framework: Utilizing LIME to Enhance Clarity and Robustness in Named Entity Recognition

Morten Grundetjern, Per-Arne Andersen, Morten Goodwin and Karl Audun Borgersen (University of Agder, Norway)

REFRESHMENT BREAK (10.45-11.15) - Lubbock Room

REFEREED PAPER SESSION – parallel streams (11.15-13.00)

Paper Session 1a: Deep Learning (Lecture Theatre)

Chair: Prof. Adrian Hopgood, University of Portsmouth

Bitcoin Forecasting using Deep Learning and Time Series Ensemble Techniques

H. Zafar and S. Kapetanakis (Middlesex University, UK, Distributed Analytics Solutions, UK)

TRAPL: Transformer-based Patch Learning For Enhancing Semantic Representations Using Aggregated Features to Estimate Patch-Class Distribution

Sander R. Jyhne, Morten Goodwin and Per-Arne Andersen (University of Agder, Norway), Ivar Oveland (Norwegian Mapping Authority, Kristiansand, Norway)

DATE: Derivative Alignment Training for Extrapolation with Neural Networks

Enrico Lopodoto, Tillman Weyde and Kizito Salako (City, University of London, UK)

Interactive Simulator Framework for XAI Applications in Aquatic Environments

Ahmed H. Elsayed, Tarek A. El-Mihoub, Christoph Manss, Andre, Miedtank (German Research Center for Artificial Intelligence), Lars Nolle (Jade University of Applied Sciences) and Frederic Stahl (German Research Center for Artificial Intelligence)

Advancing Financial Text Sentiment Analysis with Deep Learning and Ensemble Models

W.L.R. Tang (University of Manchester, Manchester, UK)

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Paper Session 1b: Machine Vision (Upper Hall)

Chair: Dr. Frederic Stahl, DFKI

Optimizing Autonomous Vehicle Racing using Reinforcement Learning with Pre-trained Embeddings for Dimensionality Reduction

Martin Holen, Jayant Singh, Christian W. Omlin, Jing Zhou, Kristian M. Knausgård and Morten Goodwin (University of Agder, Norway)

Semantic Segmentation for Landslide Detection using Segformer

Hasnain Murtaza Syed, Mahdi Maktabdar Oghaz, and Lakshmi Babu Saheer (Anglia Ruskin University)

Vision-Based Human Fall Detection using 3D Neural Networks

S.M. Toh, N. Helian, Y. Sun (University of Hertfordshire, UK), K. Pasipamire, T. Pasipamire (Delight Supported Living, UK)

Drone-Assisted Infrared Thermography and Machine Learning for Enhanced Photovoltaic Defect Detection: A Comparative Study of ViTs and YOLOv8

A. Memari and T. Debich (Jade University of Applied Sciences, Germany)

Detection of vascular leukoencephalopathy in CT images

Zuzana Cernekova, Viktor Sisik and Fatana Jafari (Comenius University Bratislava, Slovakia)

LUNCH (13.00-13.45) - DINING HALL

WEDNESDAY 18TH DECEMBER 2024

**POSTER SESSION 1 (13.45-14.15)
CORRIDOR AND LUBBOCK ROOM**

POSTER PAPERS

Technical Stream

OK Google, what is the stock forecast for next week? Leveraging Search Engines for Data Collection, Sentiment Analysis and Stock Predictions

N. A. Frederick-Preece and N. Abbas

University News: A New Data Source for NLP Bias Research

Rawan Bin Shiha, Eric Atwell and Noorhan Abbas

Enhancing Nepali Text Understanding with Machine Translation and LoRA Fine-Tuning of Open-Source LLM

Kshitiz Rimal, Dr. Noorhan Abbas

Audio-visual emotion recognition using Deep Learning methods

M. Tolegenov, B. Saheer Lakshmi and M. Maktabdar Oghaz

Spatial interpolation of air quality: A UK Case study

Lorenzo Garbagna, Praseed Melethil, Lakshmi Babu Saheer, Mahdi Maktab Dar Oghaz

Talk like a local: Evaluating Large Language Models for Arabic Dialect Translation Using Similarity Scores

A. Bouomar and N. Abbas

On Monadic Binary, with Application to Machine Understanding

M.J. Wheatman

A Proposed ELM Ensemble Approach for Predicting Railway Delays

Matthew Day

Semantic Bone Structure Segmentation in 2D Image Data: Towards Total Knee Arthroplasty

Tobias Neiß-Theuerkauff, Arne Schierbaum, Thomas Luhmann, Till Sieberth, Frank Wallhoff

(Continued on next page)

POSTER PAPERS (continued)

Application Stream

An Ensemble Modelling of Feature Engineering and Predictions for Enhanced Fake News Detection
Patricia Asowo, Sangeeta Lal and Uchenna Daniel Ani

A Child-Robot Interaction Experiment to Analyze Gender Stereotypes in the Perception of Mathematical Abilities

Madalina Croitoru, Pablo Laviron, Sio Bando, Eric Gilles, Amine Milled, Royce Anders, Nathalie Blanc, Gowrishankar Ganesh, Emmanuelle Brigaud

Reinforcement Learning for Patient Scheduling with Combinatorial Optimisation
Xi Liu, Changgang Zheng, Zhen Chen, Yong Liao, Ren Chen, Shufan Yang

Nursing Activity Recognition for Automated Care Documentation in Clinical Settings
F. Wallhoff and F.T. Hesselmann

Exploring Efficient Job Shop Scheduling Using Deep Reinforcement Learning
Reshma Maharjan, Per-Arne Andersen and Lei Jiao

Respiratory Disease Detection Using Deep Convolutional Transformer Models
H. Burrows, M. Oghaz, L. Saheer

Evaluating the performance of LLMs when translating Saudi Arabic as Low Resource Language
S. Alahmari, E. Atwell, M. Alsalka and H. Saadany

Bi-directional LSTM Applied to the Maritime Target Motion Analysis Problem
Lars Nolle, Nils Meinardus, Martin Kumm, Christoph Tholen

REFEREED PAPER SESSION – parallel streams (14.15-16.00)

Session 2a: Large Learning Models; Machine Learning (Lecture Theatre)

Chair: Dr. Mercedes Arguello Casteleiro, BCS SGAI

PlanBERT: From Messy Zonal Plans to Informative Vector Embeddings

Henrik Brådlund (University of Agder, Norway and Norkart AS, Norway), M. Goodwin and P-A. Andersen (University of Agder, Norway), Alexander S. Nossun (Norkart AS, Norway)

ArgueMapper Assistant: Interactive Argument Mining Using Generative Language Models

M. Lenz and R. Bergmann (Trier University and DFKI, Germany)

Contextual Transformers for Goal-Oriented Reinforcement Learning

Oliver Dippel, Alexei Lisitsa and Bei Peng (University of Liverpool)

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Localized Affinity-based Reinforcement Learning for Interpretable State-specific Decision-making

A. Vishwanath and C. Omlin (University of Agder, Norway)

Navigating the Landscape of Case Fidelity and Competence in Case-Based Reasoning

Adwait P. Parsodkar (Indian Institute of Technology, Madras, India), Deepak P (Queen's University Belfast, UK), Sutanu Chakraborti (Indian Institute of Technology, Madras, India)

Paper Session 2b: Learning and Reasoning (Upper Hall)

Chair: Dr. Stelios Kapetanakis, University of Brighton

Tree-based Genetic Programming for Evolutionary Analog Circuit with Approximate Shapley Value

Xinming Shi (Queen's University Belfast, UK), Leandro L. Minku (University of Birmingham, UK), Xin Yao (Lingnan University, Hong Kong SAR)

Using Pseudo Cases and Stratified Case-Based Reasoning to Generate and Evaluate Training Adjustments for Marathon Runners

Ciara Feely, Brian Caulfield, Aonghus Lawlor and Barry Smyth (University College Dublin, Ireland)

A Homogeneous Approach to Reasoning Over Global Geographic Data

Alia I Abdelmoty and Abdurauf Satoti (Cardiff University, Cardiff, UK)

Revealing limitations of ResNet models for deep evaluation in chess

Jakub Zeman and Ladislava Smítková Janků (Czech Technical University)

Emotion Detection in Hindi language using GPT and BERT

R. Agarwal and N. Abbas (University of Leeds, Leeds, UK)

PLENARY SESSION – LECTURE THEATRE (16.15-17.30)

SHORT PRESENTATIONS BY AUTHORS OF POSTER PAPERS

Chair: Prof. Juan Carlos Augusto, Middlesex University

A series of short presentations. Each author will be allocated THREE minutes to summarise the topic of his/her poster. One minute is allowed for changeovers between talks. Strict timekeeping will be enforced!

Programme

Short Technical Papers	
16.15	OK Google, what is the stock forecast for next week? Leveraging Search Engines for Data Collection, Sentiment Analysis and Stock Predictions <i>N. A. Frederick-Preece and N. Abbas</i>
16.19	University News: A New Data Source for NLP Bias Research <i>Rawan Bin Shiha, Eric Atwell and Noorhan Abbas</i>
16.23	Enhancing Nepali Text Understanding with Machine Translation and LoRA Fine-Tuning of Open-Source LLM <i>Kshitiz Rimal, Dr. Noorhan Abbas</i>
16.27	Audio-visual emotion recognition using Deep Learning methods <i>M. Tolegenov, B. Saheer Lakshmi and M. Maktabdar Oghaz</i>
16.31	Spatial interpolation of air quality: A UK Case study <i>Lorenzo Garbagna, Praseed Melethil, Lakshmi Babu Saheer, Mahdi Maktab Dar Oghaz .</i>
16.35	Talk like a local: Evaluating Large Language Models for Arabic Dialect Translation Using Similarity Scores <i>A. Bouomar and N. Abbas</i>
16.39	On Monadic Binary, with Application to Machine Understanding <i>M.J. Wheatman</i>
16.43	A Proposed ELM Ensemble Approach for Predicting Railway Delays <i>Matthew Day</i>
16.47	Semantic Bone Structure Segmentation in 2D Image Data: Towards Total Knee Arthroplasty <i>Tobias Neiß-Theuerkauff, Arne Schierbaum, Thomas Luhmann, Till Sieberth, Frank Wallhoff</i>
Short Application Papers	
16.51	An Ensemble Modelling of Feature Engineering and Predictions for Enhanced Fake News Detection <i>Patricia Asowo, Sangeeta Lal and Uchenna Daniel Ani</i>
16.55	A Child-Robot Interaction Experiment to Analyze Gender Stereotypes in the Perception of Mathematical Abilities <i>Madalina Croitoru, Pablo Laviron, Sio Bando, Eric Gilles, Amine Milled, Royce Anders, Nathalie Blanc, Gowrishankar Ganesh, Emmanuelle Brigaud</i>
16.59	Reinforcement Learning for Patient Scheduling with Combinatorial Optimisation <i>Xi Liu, Changgang Zheng, Zhen Chen, Yong Liao, Ren Chen, Shufan Yang</i>
17.03	Nursing Activity Recognition for Automated Care Documentation in Clinical Settings <i>F. Wallhoff and F.T. Hesselmann</i>

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17.07	Exploring Efficient Job Shop Scheduling Using Deep Reinforcement Learning <i>Reshma Maharjan, Per-Arne Andersen and Lei Jiao</i>
17.11	Respiratory Disease Detection Using Deep Convolutional Transformer Models <i>H. Burrows, M. Oghaz, L. Saheer</i>
17.15	Evaluating the performance of LLMs when translating Saudi Arabic as Low Resource Language <i>S. Alahmari, E. Atwell, M. Alsalka and H. Saadany</i>
17.19	Bi-directional LSTM Applied to the Maritime Target Motion Analysis Problem <i>Lars Nolle, Nils Meinardus, Martin Kumm, Christoph Tholen</i>

REFRESHMENT BREAK (17.30-18.00) – LUBBOCK ROOM

WEDNESDAY 18TH DECEMBER 2024

PLENARY SESSION – LECTURE THEATRE (18.00-19.15)

PANEL SESSION (18.00-19.15) Lecture Theatre

Is Large AI good or bad for society?

Panel Organiser: Andrew Lea, PersuasionXP

The panel session will discuss the proposition as to whether Large AI is good or bad for society, and what should be done to make it beneficial to society. For this session, we can define “Large AI” as AI that is so big or expensive to train or run that only large organisations can afford the finance or resources to do so.

There are several ways in which this question might be considered. For example, people may consider that information is the key force which will either drive or divide society, that information is the “the stock in trade of AI”, and that these may or will collide, especially with the advent of Large AI. But if Large AI - and hence the commerce of information - is under the control of a near-oligopoly, then maybe so too is the information it controls.

Amongst other questions, we may therefore ask in the panel session if information, “facts”, and perception are at the heart of a culture war dividing Western society? Information is also the fuel of “Large AI” - but are Large AIs neutral or partisan creations? As cutting-edge Large AI gets bigger, can only mega corporations can afford to build, own, and control it? Is Large AI becoming, and making society, less democratic?

We might also consider environmental aspects. Together, Large AI such as some large language models are now significant contributors to energy use and hence CO2 emissions and global warming. Do the benefits outweigh the environmental impact? Others may be concerned that there may be impact on employment. If Large AI can replace many jobs, is society mature enough so that the benefit is shared and all need to work less, or will the benefit be absorbed by ever-larger and less efficient government, or will it simply result in a richer elite?

Is Large AI, in the way in which it is being used, good for society? What should we do to ensure that it is good for society?

Panel Members

Chair: Andrew Lea, PersuasionXP

Dr. Mercedes Arguello Casteleiro (BCS SGAI)
Prof. Frans Coenen (University of Liverpool)
Dr. Loïc Lannelongue, University of Cambridge
Dr. Giovanna Martinez (University of Nottingham)

PRE-DINNER DRINKS – COMBINATION ROOM (19.30)

GALA DINNER – DINING HALL (20.00)

After-dinner Speaker: Prof. Lars Nolle (Jade University of Applied Science, Germany)

THURSDAY 19TH DECEMBER 2024

PLENARY SESSION - LECTURE THEATRE (09.30-11.00)

APPLICATION KEYNOTE LECTURE (09.30-10.15) Lecture Theatre

Chair: Richard Ellis, RKE Consulting

Harnessing the power of AI & Autonomous Systems for Defence & Security

Prof. Steven Meers, DSTL

(Further information about this lecture is given on Page 20.)

BEST REFEREED APPLICATION PAPER (10.15-11.00) Lecture Theatre

Chair: Richard Ellis, RKE Consulting

Adaptive CNN Method For Prostate MR Image Segmentation Using Ensemble Learning

Lars E.O. Jacobson, Mohamed Bader-El-Den, Adrian A. Hopgood, Shamsul Masum, Vincenzo Tamma (University of Portsmouth, UK), David Prendergast (Innovative Physics Ltd, UK), Peter Osborn (Portsmouth Hospitals, University NHS Trust, UK)

REFRESHMENT BREAK - LUBBOCK ROOM (11.00-11.30)

PLENARY SESSION - LECTURE THEATRE (11.30-12.15)

BEST REFEREED STUDENT PAPERS

Chair: Prof. Max Bramer, University of Portsmouth

Best Student Paper - Technical Stream

A Dominance-based Surrogate Classifier for Multi-Objective Evolutionary Algorithms

Tiwonge Msulira Banda and Alexandru-Ciprian Zăvoianu (Robert Gordon University, UK)

Best Student Paper - Application Stream

Evaluating Algorithms for Missing Value Imputation in Real Battery Data

D.N. Sheni, A.H. Basson and J. Grobler (Stellenbosch University, South Africa)

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**REFEREED PAPER SESSION – single stream
LECTURE THEATRE (12.15-13.15)**

Paper Session 3: Applications of Machine Learning (Lecture Theatre)

Chair: Nadia Abouayoub

Djinn - Data Journalism Interface for Newsgathering and Notifications

Sara Elo Dean (IBM, Finland), Lars Adrian Giske (iTromsø, Norway), Herman Jangsett, Mostein (Visito, Norway), Silvia Podesta (IBM, Denmark), Halvor Helland Barndon, Sara Stegane and Henrik Nordberg (Visito, Norway)

Classification and Recommendation of Mental Health Assistance Events Using an RNN-LSTM, Fast-and-Frugal Trees and Weighted Sum System

N.R. Dickson and N.H.M. Caldwell (University of Suffolk, UK)

Digit Detection: Localizing and Convoluting

T. Martens and J.Z. Zhang (University of Lethbridge, UK)

LUNCH – DINING HALL (13.15-14.00)

**POSTER SESSION 2 (14.00-14.45)
CORRIDOR AND LUBBOCK ROOM**

A list of Poster Papers is given on Pages 10-11.

**REFEREED PAPER SESSION (14.45-16.15)
PARALLEL STREAMS**

Paper Session 4a: Neural Nets (Lecture Theatre)

Chair: Dr. Mathias Kern, BT

Quasi Biologically Plausible Category Learning

Christian Huyck (Middlesex University, UK)

Streamlining Attention for Text Classification: Sequence Length Reduction with Pooling Attention

Daniel Biermann (University of Agder, Norway), Fabrizio Palumbo (University of Agder, Norway; Oslo Metropolitan University, Norway), Morten Goodwin and Ole-Christoffer Granmo (University of Agder, Norway)

LSTM for Modelling and Predictive Control of Multivariable Processes

Krzysztof Zarzycki and Maciej Ławryńczuk (Warsaw University of Technology, Warsaw, Poland)

Structured Radial Basis Function Network: Modelling Diversity for Multiple Hypotheses Prediction

Alejandro Rodriguez Dominguez, Muhammad Shahzad and Xia Hong (University of Reading, UK)

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Paper Session 4b: AI Applications (Upper Hall)

Chair: Dr. Giovanna Martinez, University of Nottingham

Explaining a Staff Rostering Problem using Partial Solutions

GianCarlo A.P.I. Catalano, Alexander E.I. Brownlee and David Cairns (University of Stirling, UK), John A.W. McCall, Martin Fyvie (National Subsea Centre, Robert Gordon University, UK), Russell Ainslie (British Telecom Research, UK)

Formalise Regulations for Autonomous Vehicles with Right-Open Temporal Deontic Defeasible Logic

P. Y. Chan, X. Li and Y. Lu (University of Edinburgh, UK), Yuhui Lin (University of Edinburgh, UK and Heriot-Watt University, UK) and A. Bundy (University of Edinburgh, UK)

The Initial Blueprint of Privacy-Oriented Legal Query Assistance: Exploring the potential of Retrieval-Augmented Generation for German Law using SPR

J. Agater and A. Memari (Jade Hochschule, Wilhelmshaven, Germany)

On the Development of a Pixel-wise Plastic Waste Identification System for Multispectral Remote Sensing Applications

Christoph Tholen (German Research Center for Artificial Intelligence), Eike Rodenbäck and Lars Nolle (German Research Center for Artificial Intelligence and Jade University of Applied Sciences), Robert Rettig and Frederic Stahl (German Research Center for Artificial Intelligence)

**REFRESHMENTS AND BEST POSTER AWARD
LUBBOCK ROOM (16.15)**

FOLLOWED BY CONFERENCE CLOSE

TECHNICAL KEYNOTE LECTURE

WEDNESDAY DECEMBER 18TH

What has AI ever done for Health Care?

Prof. Frans Coenen (University of Liverpool)



Abstract

Artificial Intelligence (AI) in its many forms is increasingly seen by governments and governmental organisations as the panacea to the increasing funding crisis within health care. A funding crisis fuelled, to a large extent, by an increase in life expectancy of the global population. But can AI really plug this funding gap? This presentation will consider what AI can do for health care in terms of eight “spheres” of interest: from early diagnosis and prediction, to end of life care. There are, of course, challenges to the uptake of AI, both from the perspective of the providers and regulators of health care, and those at the receiving end of health care. In many areas there is a certain amount of “reticence” with respect to the technology! These challenges are also explored in the presentation.

Frans Coenen is an Emeritus Professor of Computer Science at The University of Liverpool. He has been working in the field of AI for some 38 years, especially in the context of Machine and Deep Learning. He is particularly interested in the application of the techniques of Machine/Deep Learning and AI to medical applications, such as: (i) medical 2D and 3D image analysis (currently electrocardiogram and echocardiogram data), (ii) the analysis of Flow Cytometry (blood cell) data, (iii) triage in accident and emergency departments and (iv) explanation generation in the context of medical prediction. He has supervised over 70 PhD students working on many aspects of AI, especially in the context of health care, and over 35 post-doctoral research associates working on funded projects; he has some 450 refereed research publications and has been on the programme committees for many Machine Learning conferences and related events.

APPLICATION KEYNOTE LECTURE

THURSDAY DECEMBER 19TH

Harnessing the power of AI & Autonomous Systems for Defence & Security Prof. Steven Meers (DSTL)



Abstract

Accelerating the safe and responsible adoption of AI is a priority within the UK's Defence AI Strategy. This talk will describe the current work by the Defence Science and Technology Laboratory and the Defence AI Centre to apply AI to a range of use-cases and to establish appropriate systems, processes and best practice designed to enable AI-solutions to be deployed at scale and pace across the Ministry of Defence.

The development of AI has significant implications for Defence and Security, including the changing nature of the threat faced and new risks that must be mitigated. It also presents significant opportunities for the modernisation of defence capability, from battlefield solutions designed to enhance military capability, to back-office applications that improve productivity and efficiency. Examples of current work will illustrate how AI can enable fundamentally different approaches to key military tasks such as Intelligence, Surveillance and Reconnaissance and countering AI-generated misinformation.

Finally, the talk will focus on MOD's commitment to safe and responsible adoption and will summarise current activity designed to ensure robust approaches to topics such as AI ethics and Test, Evaluation, Verification and Validation of AI systems. This talk will provide an opportunity to hear practical experience from the forefront of AI adoption in the vitally important and challenging environment of Defence and Security.

PROFESSOR STEVEN MEERS

Fellow, Cyber and Information Systems Division, Defence Science and Technology Laboratory
Head of Research & Experimentation Defence AI Centre
Royal Academy of Engineering Visiting Professor of Applied AI for Defence and Security, University of Southampton

Professor Meers is a Fellow at the Defence Science and Technology Laboratory (Dstl) specialising in application of artificial intelligence and machine learning to Defence and Security challenges. He is the Technical Strategy Leader for Dstl's AI & Data Science Capability and is the Head of Research & Experimentation for the UK Defence AI Centre. He provides advice at the highest levels within the Ministry of Defence regarding the opportunities and threats presented by artificial intelligence and machine learning and how the UK can responsibly & safely adopt these technologies to strengthen Defence and National Security.

FURTHER INFORMATION

SGAI - BRITISH COMPUTER SOCIETY SPECIALIST GROUP ON ARTIFICIAL INTELLIGENCE

SGAI is part of the British Computer Society and has been a member of EurAi (formerly known as ECCAI) since 1992. The Group was founded in 1980 by British AI pioneer Donald Michie and has played a substantial role in supporting the development of the field in Britain. It is probably best known for its long-running annual series of conferences (AI-20xx) held in Cambridge each December and as the host of the annual series of 'Real AI' and 'UK Knowledge Discovery in Data (UK KDD)' events.

Membership of SGAI is free to members of the British Computer Society (all grades).

AI-2024 Conference Committee	
Conference Chair	Professor Max Bramer <i>University of Portsmouth</i>
Technical Programme Chair	Professor Max Bramer <i>University of Portsmouth</i>
Application Programme Chair	Dr. Frederic Stahl <i>DFKI</i>
Workshop Organiser	Professor Adrian Hopgood <i>University of Portsmouth</i>
Treasurer and Local Arrangements Organiser	Rosemary Gilligan
Panel Session Organiser	Andrew Lea <i>Persuasion XP</i>
Poster Organiser	Professor Juan Carlos Augusto <i>Middlesex University</i>
FAIRS	Dr. Giovanna Martinez <i>University of Nottingham</i>
Conference Administrators	Mandy Bauer and Kerry Wear <i>BCS</i>
Paper Administrator	Bryony Bramer

MONDAY DECEMBER 16TH 2024

SPECIAL EVENT: FAIRS-24

Forum for AI Research Students (FAIRS)

SGAI is offering this free event for the sixteenth time this year. From its inception in 2007, this annual event has offered practical support and advice for PhD and MRes/MPhil research students in the AI field. The Forum is taking place on Monday 16th December and offers students:

- Guidance on conducting research and writing the thesis
- Advice on undergoing a viva
- Advice and discussion on careers after a PhD
- The chance to meet other research students and develop networks
- An opportunity to discuss work with senior researchers and practitioners

This forum (which is free except for a contribution towards the cost of refreshments) has become a regular preliminary feature of the conference. Academic delegates are encouraged to spread the word about the event on return to their own institutions. Should you have any questions, please contact the organiser Giovanna Martinez (Giovanna.Martinezarellano@nottingham.ac.uk).