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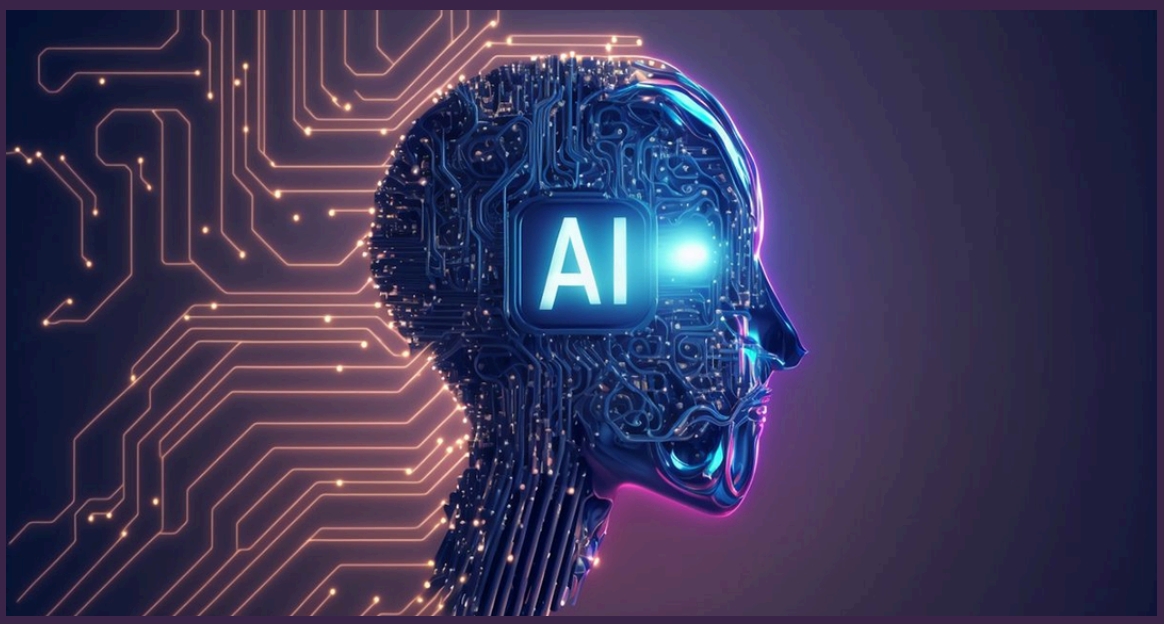
5TH INTERNATIONAL CONFERENCE ON

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

November 17-18, 2025 | London, UK



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AIML- 2025
Nov 17-18| LONDON

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Day 1

MONDAY

Artificial Intelligence & Machine Learning

November 17-18, 2025 | London, UK

Registrations & Opening Remarks (08:30-09:30)

Keynote Forum (09:30 - 10:00)

09:30-10:00 -----	**Title: Semi-Markov Models for Process Mining in Smart Homes** **Prof. Sally-McClean,** Ulster University, United Kingdom

REFRESHMENT BREAK & GROUP PHOTO (10:00 - 10:20)

Technical Session-I (10:20 - 13:00)

10:20-10:40 -----	**Title: A Multimodal Retrieval Augmented Generation Framework Using MedGemmafor Breast Cancer Diagnosis** **Dr. Elvis Twumasi,** KNUST, Ghana
10:40-11:00 -----	**Title: Urine Metabolomic Profiling and Machine Learning in ASD Diagnosis: Toward Precision Treatment** **Dr. Shazman,** The Open University of Israel, Israel
11:00-11:20 -----	**Title: E-life around us in Bangkok, Thailand Semi-Markov Models for Process Mining in Smart Homes** **Dr. Chutima Kitty Tongsaluay,** National Institute of Development Administration, Thailand
11:20-11:40 -----	**Title: Systemic Risk of Using AI-Generated Synthetic Data for Training and Testing of Autonomous Vehicles** **Dr. Qian Lu,** Coventry University, United Kingdom
11:40-12:00 -----	**Title: Congenital Heart Disease Classification Using Phonocardiograms: A scalable Screening Tool for Diverse Environments** **Mr. Abdul Jabbar,** Monash University, Australia
12:00-12:20 -----	**Title: AI-Driven Wood Sorting: Automating Quality Assessment with Computer Vision** **Dr. Julia Achatz,** Empa, Switzerland
12:20-12:40 -----	**Title: Decoding synthetic news: an interpretable multimodal framework for the classification of news articles in a novel news corpus** **Mr. Michael Schlee,** The University of Goettingen, Germany
12:40-13:00 -----	**Title: Predict, Personalise, Perform: How Advanced Analytics is Transforming Customer Experience** **Dr. Sajal Kanti Howlader,** Greene King Limited United Kingdom

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Day 1

MONDAY

Artificial Intelligence & Machine Learning

November 17-18, 2025 | London, UK

Lunch @ Restaurant (13:00- 13:50)

Poster Presentation (13:50-14:00)

Poster-I -----	**Title: Graph-Based Clustering and Large Language Models for Scalable Summarization of Safety Reports in Manufacturing Environments** **Dr/Prof. Mattia Beretta,** Pirelli & C. S.p.A., Milano, Italy

Keynote Forum (14:00-15:00)

14:00-14:30 -----	**Title: The AI Revolution - and our Responsibility for the Future of Humans, Organizations and Machines** **Prof. Ing. Klaus Henning,** RWTH Aachen University, Germany
14:30- 15:00 -----	**Title: Challenges to AIML in Industry 4.0 applications** **Prof. Soumaya Yacout,** Polytechnique Montreal, Canada

Technical Session-II (15:20-17:20)

15:20-15:40 -----	**Title: Internet of Robotic Things Intelligent Connectivity and Platforms." The Autonomous Intelligent Nexus: Internet of Robotic Things Embedding Edge AI, Connectivity, and Platforms** **Dr. Ovidiu Vermesan,** SINTEF, Norway
15:40-16:00 -----	**Title: Using Machine Learning in Developing an Effective Metric Model for Measuring Customer Trust Satisfaction: A Viewpoint of Australian Trustworthy Digital Society Granted Project** **Dr. Robert M. X. Wu,** University of Technology Sydney Australia
16:00-16:20 -----	**Title: A Deep Learning Feature Importance Test Framework for Integrating Informative High-dimensional Biomarkers to Improve Disease Outcome Prediction** **Prof. Baiming Zou,** University of North Carolina, USA

REFRESHMENT BREAK (16:20-16:40)

16:40-17:00 -----	**Title: Dynamic Customer Segmentation and Smart Campaign Recommendation System in Digital Wallets** **Mr. Ferhat Musa Uysal,** Turkcell Payment and Electronic Money Services Inc, Turkey

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Day

1

MONDAY

Artificial Intelligence & Machine Learning

November 17-18, 2025 | London, UK

17:00-17:20 -----

Title: CalTrig: A GUI-Based Machine Learning Platform for Accurate Ca^{2+} Transient Detection and Visualization in Freely Moving Mice

Dr. Yao-Ying Ma , Indiana University School of Medicine, USA

17:20-17:40 -----

Title: How to develop the world's fastest low-code platform for advanced analytics

Dr. Samvel Arustamov , LLC, Armenia, Yerevan

Pannel Discussions

Day-1 Concludes

Day

2

TUESDAY

Artificial Intelligence & Machine Learning

November 17-18, 2025 | London, UK

09:00-09:25 -----	**Title: Predicting Antarctic Blizzards Using Hybrid Deep Learning Models on Meteorological Data** **Dr. V S SAMY,** National Centre for Polar and Ocean Research, India
09:25-09:50 -----	**Title: Leftover Food Recognition Using Deep Learning** **Dr. Xiaoyan Dai,** KYOCERA Corporation , Japan
09:50-10:15 -----	**Title: Create distinctive databases of ancient languages and using acomputer vision model to accurately recognize and classify them** **Ms. Elaf A.Saeed,** Al-Nahrain University, Iraq
10:15-10:40 -----	**Title: Knowledge-Infused in Transformers for Text Classification in Low-Resource Languages** **Prof. Muhammad Shahid Iqbal I Malik,** HITEC University, Taxila, Pakistan
10:40-11:05 -----	**Title: Exploring potential circRNA biomarkers for cancers based on double-lineheterogeneous graph representation learning** **Ms. ZhenMei Wang,** GuangXi Vocational & Technical College, China
11:05-11:30 -----	**Title: Gene signature for response prediction to immunotherapy in metastatic Renal Cell Carcinoma** **Dr. Grace S. Shieh,** Institute of Statistical Science, Academia Sinica, Taiwan
11:30-11:40 -----	**Title: Enhanced State of Charge Estimation for Lithium-Ion Batteries Using xLSTM Networks** **Dr. Florian Krebs,** JOANNEUM Research, Austria
11:40-11:50 -----	**Title: Enhancing Deep Learning Models for Predicting Smoking Status Using Clinical Data in Patients with COPD** **Ms. Sehyun Cho,** Chonnam National University, South-korea
11:50-12:15 -----	**Title: Ai in Health Care** **Dr. Sarah Allabun,** Princess Nourah bint Abdulrahman University, Saudi-Araiba
12:15-12:40 -----	**Title: Beyond Cancer Detection: An AI Framework for Multidimensional Risk Profiling onContrast-Enhanced Mammography** **Prof. graziella di grezia,** Link Campus University , Italy
12:40-13:05 -----	**Title: On predicting an NBA game outcome from half-time statistics** **Dr. Michail Tsagris,** University of Crete , Greece

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Day 2

TUESDAY

Artificial Intelligence & Machine Learning

November 17-18, 2025 | London, UK

13:05-13:35 -----	**Title: Can we go on trusting AI?** **Prof. Dietrich Brandt,** RWTH Aachen University
13:35-14:00 -----	**Title: Artificial Intelligence Assisted Risk Prediction Models in Organ Transplantation** **Prof. Nithya Krishnan,** UHCW, Coventry, UK
14:00-14:25 -----	**Title: The Myth of the Linear Tech Career: How Non-Traditional Paths Build Better Designers** **Mr. Richard Adesoye,** Al in Science Education, UK
14:25-14:50 -----	**Title: Human-Centric AI: Enhancing Human Decision Making** **Dr. Marcel Koeleman,**
14:50-15:15 -----	**Title: Relevance and computational theory languages in designing AI solutions** **Prof. Pertti Saariluoma,** JY, Finland
15:15-15:40 -----	**Title: A Dataset for Multimodal Music Information Retrieval of Sotho-Tswana Musical Videos** **Dr. Osondu Oguike,** University of Johannesburg, South-Africa
15:40-16:05 -----	**Title: A Tutorial and Use Case Example of the eXtreme Gradient Boosting (XGBoost) Artificial Intelligence Algorithm for Drug Development Applications** **Dr. Jackson Burton,** Biogen, USA
16:05-16:30 -----	**Title: Machine Learning for Real-time Detection of Complications during Neurosurgery** **Dr. David Miller,** University of Oklahoma, USA
16:30-16:55 -----	**Title: Beating Bad-Actor AI** **Prof. Neil Johnson,** George Washington University, USA
16:55-17:25 -----	**Title: Leveraging AI Beings for Personalized Learning and Patient Engagement** **Dr. Marcos Sanchez-Gonzalez,** School of Health Services Administration, Bradenton, USA
17:25-17:55 -----	**Title: Static and Dynamic Connectionism** **Dr. Robert Worden,** United Kingdom

Pannel Discussions

Day-2 Concludes

Artificial Intelligence & Machine Learning

November 17-18, 2025 | London, UK

Sally McClean

Ulster University, UK

Semi-Markov Models for Process Mining in Smart Homes

Process Mining has grown rapidly in recent years, encompassing related topics, principally from data science and business process analysis, with the general aim of using data to better understand processes, their underlying root causes of failure, changes, or poor performance. Initial approaches to Process Mining focussed onusing basic statistics, process discovery and data mining techniques. These methods often lack a structured model, or knowledge, to characterise the data related to the sequencing or duration of individual process activities. However, more recent work has tended to focus on patterns and variability. As a result, probabilistic approaches, such as Markov, or semi Markov, models have recently come into play to provide a way of including such complexities.

Although Process Mining initially focussed on Business Processes, there are many other areas where processes are encounteredHealthcare is one such topic where improvements in medicine and medical technology have led to huge increases in longevity, with a corresponding rise in demands for healthcare. Such changes have been accompanied by major developments in digital technologies including sensors and the Internet of Things. Generally, these days people live longer but often with increased impairment and disabilities. They can, therefore, benefit greatly from assistive technologies, such as those using sensor technology in smart homes.

We here focus on the completion of activities of daily living (ADLs) by such patients, using smart homes and sensor technology to collect ADL data, and intelligent data analysis to support the management of these conditions. ADLs are here represented as states of a Markov-type process, where changes of state are indicated by sensor activations. This facilitates the extraction of key performance indicators (KPIs) in Smart Homes, e.g., the duration of an important activity, such as sleep, as well as the identification of anomalies in activity transitions and durations. The semi-Markov models allows for diverse representations of duration distributions corresponding to different activities. The approach is illustrated and evaluated using a publicly available Smart Home dataset comprising an event log of sensor activations. Results indicate that the methodology is well-suited to such scenarios, as it facilitates the use of diverse activity duration profiles.

Smart homes provide a promising approach to supporting elderly patients. By profiling underlying activities, such assistive technologies can support older people in their homes through reminding them of routine activities, detection of anomalous behaviour, and sending alarms to care providers.

doi.org/10.51219/URForum.2025.Sally-McClean ISBN: 978-1-917892-34-6

Biography

Sally McClean received her first degree in Mathematics from Oxford University, and then obtained a MSc in Mathematical Statistics and Operational Research from Cardiff University, followed by a PhD on Markov and semi-Markov models at Ulster University. She is currently Professor of Mathematics at Ulster University. Her main research interests are in Stochastic Modelling and Optimisation, particularly for Healthcare Planning, and Computer Science, specifically Process Mining, Databases, Internet of Things, Sensor Technology and Telecommunications. She has been grant holder on over £13 million worth of funding, mainly from the EPSRC, Industry, the EU and charities. Sally is a Fellow of the Royal Statistical Society, Fellow of the Operational Research Society, Fellow of the IMA, past President of the Irish Statistical Association and Member of the IEEE. She has published over six hundred research papers and was previously a recipient of Ulster University's Senior Distinguished Research Fellowship.

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Elvis Twumasi, Kenneth Dotse, Tabiri Asumadu, Lloyed Nii-Lamptey Akresi, Emmanuel K. Ansu-Amposah, Emmanuel P. Bortsie, Godwin Egyir, W. O Soboyejo

[1], [2], [4], [5], [6], [7]Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

[1],[3],[8]SUNY Polytechnic Institute, New York, USA

A Multimodal Retrieval Augmented Generation Framework Using MedGemma for Breast Cancer Diagnosis

This study presents a framework for a Retrieval Augmented Generation (RAG) system that leverages a multimodal fine-tuned model, MedGemma, for breast cancer diagnosis. The system integrates breast cancer medical data and diagnostic guidelines, enabling users to interact through text queries or medical images. Text-based queries allow clinicians or patients to request diagnostic insights through the Retrieval Augmented Generation system, while image inputs allow the model to interpret mammogram radiographic features. The RAG architecture uses a retriever that sources relevant breast cancer documents with MedGemma's generative capabilities to provide tailored responses. Evaluation of the system demonstrated high precision and recall, confirming its reliability in identifying relevant diagnostic information and generating accurate, contextually aligned explanations for breast cancer assessment. The prompt template of the developed medical Retrieval Augmented Generation system clearly communicates that the system is for academic purposes and information, and not a substitute for professional medical advice, to ensure ethical compliance.

Keywords
Multimodal, Retrieval, Augmented, Generation, Mammogram, Breast Cancer

Biography
Dr. Elvis Twumasi is a Lecturer at the Department of Electrical and Electronic Engineering KNUST Ghana. He is a research Scholar at the SUNY Polytechnic Institute, New York, USA. He has a PhD in Electrical and Electronic Engineering and researches mainly in Artificial Intelligence and Machine Learning, and its application in various fields.

doi.org/10.51219/URForum.2025.Elvis-Twumasi ISBN: 978-1-917892-34-6

Shula Shazman [1,*], Julie Carmel [2], Maxim Itkin [3], Sergey Malitsky [3], Monia Shalan [4], Eyal Soreq [5,6,7,8], Evan Elliott [2], Maya Lebow [8,*] and Yael Kuperman [8,*]

[1] Department of Mathematics and Computer Science, The Open University of Israel, Raanana, Israel

[2] Azrieli Faculty of Medicine, Bar Ilan University, Safed, Israel;

[3] Metabolic Profiling Unit, Life Sciences Core Facilities, Weizmann Institute of Science, Rehovot, Israel;

[4] Ziv Medical Center, Safed,

[5]Department of Brain Science, Faculty of Medicine, Imperial College London, London, UK;

[6] Care, Research & Technology Centre, UK Dementia Research Institute, London, UK

[7] The NIHR Imperial, Biomedical Research Centre, London, UK

[8] ANeustart, Ltd., Rishon LeZion, Israel

Urine Metabolomic Profiling and Machine Learning in ASD Diagnosis: Toward Precision Treatment

Background

Autism Spectrum Disorder (ASD) diagnosis traditionally relies on behavioral assessments, which can be subjective and lead to delayed identification. Recent advances in metabolomics and machine learning offer promising alternatives for more precise diagnostic approaches.

Objectives

This study aimed to investigate the potential of urine metabolomic profiling combined with machine learning techniques to differentiate between children with ASD and neurotypical controls, exploring both internal and external metabolites as potential diagnostic markers.

Methods

The study analyzed first-morning urine samples from 52 children (32 with ASD, 20 controls), aged 5.04±1.87 and 5.50±1.74 years, respectively. Using LC-MS, 293 polar metabolites were identified and categorized into 188 internal (endogenously produced) and 105 external (exposome-originated) metabolites. We compared the ability of different machines learning classifiers, (i.e. Random Forest, Logistic Regression, Random Tree, and Naïve Bayes), to differentiate between ASD and control groups using 10-fold cross-validation.

doi.org/10.51219/URForum.2025.Shula-Shazman ISBN: 978-1-917892-34-6

Results

When using all 293 metabolites, the Random Forest classifier achieved 85% accuracy and an Area Under the Curve (AUC) of 0.9. In which classification based on 189 internal metabolites seemed to drive the effect with the Random Forest classifier achieving 85% accuracy and an AUC of 0.86. In contrast, external metabolites alone provided lower classification performance, with an accuracy of 71% and AUC of 0.72.

Conclusions

This study demonstrates the potential of urine metabolomic profiling as a complementary diagnostic tool for ASD. The independent performance of internal metabolites suggests that the body's metabolic processing may be more informative than dietary metabolites in distinguishing ASD. The high classification accuracy implies the potential for developing an assistive diagnostic method, though further research is needed to correlate metabolite profiles with specific behavioral characteristics and ASD subtypes.

Keywords

Autism Spectrum disorder(ASD), Polar Urine Metabolites, Machine Learning

Biography

Dr. Shula Shazman is a scientist and academic at The Open University of Israel, specializing in machine learning, bioinformatics, and computational biology. She earned her B.Sc. in Information Systems Engineering and Ph.D. in Biological Sciences from the Technion, followed by a postdoctoral fellowship at Columbia University. Her research focuses on complex diseases, particularly autism and Type 2 Diabetes, using AI-driven approaches. She has published widely, presented internationally, and contributed to biomarker discovery and precision nutrition. A dedicated educator, she teaches AI, data mining, and programming, and has authored textbooks used in higher education. Dr. Shazman also advises academic ML projects globally.

doi.org/10.51219/URForum.2025.Shula-Shazman ISBN: 978-1-917892-34-6

Chutima Kitty Tongsaluay

National Institute of Development Administration, Thailand

E-life around us in Bangkok, Thailand Semi-Markov Models for Process Mining in Smart Homes

Bangkok, a city renowned for its vibrant energy, rapid urbanization, and growing tech-savvy population, presents an ideal environment for the adoption of smart home technology. The city's property market is increasingly embracing automated systems, driven by a desire for enhanced security, greater convenience, and improved energy efficiency. Developers are positioning smart features as a key differentiator, while consumers are captivated by the promise of a more connected and comfortable lifestyle.

The smart home is one of the emerging trends in Bangkok that aims to enhance the comfort of its residents. Let's consider the Semi-Markovac models; this system would analyze event logs to identify patterns and anomalies. For instance, it could detect if someone is spending significantly longer time in the restroom than the usual data collected from daily restroom usage. By analyzing these patterns, the system can provide valuable actions to the resident, helping them in case of a fall, fainting, or becoming unconscious in the restroom, requiring immediate medical assistance. The Semi-Markovac smart home could automatically connect with the hospital or inform the ambulance to provide immediate treatment to the homeowner.

But what if the smart home developer goes even further by connecting their SMM smart home with a super smartwatch certified with clinical grade used that indicates precise neurotransmitter signaling measurements in our bodies, for example, the crucial lower level of certain hormones such as Serotonin, which could perhaps trigger depression and negative actions and lead to regrettable incidences. With the connection of this clinical-grade smartwatch and the IoT of the Semi-Markcovac Models smart home, the smart watch could generate a warning signal when the lowering hormone occurred and results in a sudden mood change. The smart home system could then automatically contact the homeowner's doctor to provide appropriate treatment actions based on the severity of the lowering hormone.

In summary, the Semi-Markav Models smart home together with the clinical proven smart wearable gadgets such as the clinical grade certified smartwatches could potentially save the life of the homeowner, especially in today's society where there is an increasing aging population that may find it challenging to travel and stay home frequently.

doi.org/10.51219/URForum.2025.Chutima-Kitty-Tongsaluay ISBN: 978-1-917892-34-6

Biography

As a highly accomplished and results-driven technical leader with a Ph.D. in Management in Information Technology, my background is uniquely defined by:

-AIML and system integration: Extensive academic knowledge complimented by practical expertise in integration systems with AIML for managing, securing and deploying complex ISR situations with the resilient communication and autonomous systems.

-Specialized Knowledge: Deep managerial knowledge spanning advanced telecommunication network optimization, information management and cutting-edge data management.

-High-Impact Contributions : Specific focus on applying AIML to enhance mission capabilities in sensitive areas and demanding areas, including the various kinds of Unmanned autonomous vehicles UAVs.
This involves managing and integrating the specific maintenance models, enhancing AIML to illustrate the real-time situational awareness for command and control center(2C) through novel advanced level of radar and sensor fusion and maintaining the robust secure communication protocols into all of these elements.

I am positioned to deliver this powerful blend of management mastery and strategic IT expertise to lead high-stakes missions and development projects for Sea-Air-Space domains across the globe.

My goal is to drive strategic technological transformation and successfully integrate next-generation autonomous and intelligence system into critical operational frameworks.

doi.org/10.51219/URForum.2025.Chutima-Kitty-Tongsaluay ISBN: 978-1-917892-34-6

November 17-18, 2025 | London, UK

Qian Lu, Safraz Ahmend, Cong Zhou, Huw Davies, Vasile Palade

Coventry University, United Kingdom

Systemic Risk of Using AI-Generated Synthetic Data for Training and Testing of Autonomous Vehicles

AI-generated synthetic data is accelerating progress in autonomous vehicles (AVs), but large-scale reliance on it introduces systemic risks that extend beyond individual AVs to the safety, efficiency, and fairness of entire transportation ecosystems. This presentation reports findings from a mixed-methods study that combines a targeted literature review with extensive stakeholder engagement (surveys, interviews, and workshops), alongside a quantitative study of state-of-the-art generative models for AV synthetic data generation. We identify and synthesise 12 risk areas—spanning hallucination and inaccuracies, lack of realism and coverage gaps, and representational and societal bias—that can degrade AV perception and decision-making and, through correlated behaviours across fleets, trigger cascading failures and inequitable outcomes. Building on this taxonomy, we introduce evaluation frameworks for assessing synthetic data, offering actionable guidance for governing synthetic data across the AV lifecycle

Keywords
Autonomous Vehicles, Synthetic Data, Systemic Risk, Generative Models

Biography
Dr Lu is an Assistant Professor specialising in connected and autonomous driving vehicles. Her current research centers on risk assessment for AV safety and security assurance, GenAI in AV systems, AV verification and validation, AV control systems, and teleoperated vehicles. Dr. Lu has attracted significant research funding, including an AI Safety Grant and a Royal Society Short Industrial Fellowship, and she is a Co-Investigator on the Innovate UK-funded “Certus” project. She has published high-impact research papers, holds multiple patents in autonomous driving, and was the 2019 TATA Innovista European Regional Winner.

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Abdul Jabbar, Ethan Grooby, Jack Crozier, Alexander Gallon, Vivian Pham, Khawza I Ahmad, Md Hassanuzzaman, Raqibul Mostafa, Ahsan H. Khandoker, Faezeh Marzbanrad

Monash University, Australia

Congenital Heart Disease Classification Using Phonocardiograms: A Scalable Screening Tool For Diverse Environments

Congenital heart disease (CHD) is a critical condition that demands early detection, particularly in infancy and childhood. This study presents a deep learning model designed to detect CHD using phonocardiogram (PCG) signals, with a focus on its application in global health. We evaluated our model on several datasets, including the primary dataset from Bangladesh, achieving a high accuracy of 94.1%, sensitivity of 92.7%, specificity of 96.3%. The model also demonstrated robust performance on the public PhysioNet Challenge 2022 and 2016 datasets, underscoring its generalizability to diverse populations and data sources. We assessed the performance of the algorithm for single and multiple auscultation sites on the chest, demonstrating that the model maintains over 85% accuracy even when using a single location. Furthermore, our algorithm was able to achieve an accuracy of 80% on low-quality recordings, which cardiologists deemed non-diagnostic. This research suggests that an AI- driven digital stethoscope could serve as a cost-effective screening tool for CHD in resource-limited settings, enhancing clinical decision support and ultimately improving patient outcomes.

Keywords
Echocardiography · Phonocardiography (PCG) · Deep Learning, Congenital heart disease (CHD) · Lowand Middle-Income Countries (LMIC)

Biography
Abdul Jabbar is a PhD student at Monash University, researching the application of artificial intelligence (AI) in healthcare. His work focuses on developing deep learning models for the diagnosis of congenital heart disease using multimodal biosignals, particularly phonocardiograms (PCG) and electrocardiograms (ECG). He aims to create scalable, low-cost, and efficient diagnostic tools suitable for deployment in low- and middle-income countries.

doi.org/10.51219/URForum.2025.Abdul-Jabbar ISBN: 978-1-917892-34-6

Julia Achatz and Mark Schubert

Empa material science and technology, WoodTec group, Dübendorf, Switzerland

AI-Driven Wood Sorting: Automating Quality Assessment with Computer Vision

Wood is a sustainable material with the ability to capture CO_2, but its heterogeneity requires extensive manual sorting in production. AI-driven computer vision offers new opportunities to automate this processes, improving efficiency and reducing errors across the value chain. This work investigates deep learning for automating wood sorting at various processing stages, focusing on roundwood and wooden boards in sawmills. We acquired a diverse image dataset of over 18,000 samples, including roundwood cross-sections, debarked stems, and hardwood and softwood boards with corresponding quality labels. Using this dataset, we trained and evaluated deep learning models—including convolutional neural networks, autoencoders, and vision transformers—to classify wood and detect key features. Additionally, we explored knowledge transfer, leveraging models trained on softwoods to accelerate adaptation to hardwood species. To ensure industry applicability, we emphasized model explainability. Our results demonstrate the effectiveness of computer vision in automating wood sorting, achieving quality classification accuracies above 80% and species recognition exceeding 90%. Moreover, we show that softwood-trained models enable faster adaptation to hardwood species, unlocking new opportunities for wooden product innovation. These findings highlight AI's potential to enhance efficiency, sustainability, and scalability in the wood industry, paving the way for more advanced and automated production processes.

Keywords
Wood Sorting, Convolutional Neural Networks, Instance Segmentation, Process Automation, Transfer Learning, Computer Vision

Biography
Julia Achatz received her B.Sc. in Media Informatics in 2020 and her M.Sc. in Computer Science from LMU Munich in 2022. During her Master's program, she worked in the Data Science department at Philips Healthcare and served as a working student at Controme GmbH, where she developed AI solutions for heat control. Since 2022, she has been a Ph.D. student at Empa and ETH Zurich, focusing her research on deep learning, computer vision, and explainable AI applications in the wood industry.

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Michael Schlee, Gillian Kant, Christoph Ehrling, Benjamin Säfken, Thomas Kneib

The University of Goettingen, Goettingen, Germany

Decoding synthetic news: an interpretable multimodal framework for the classification of news articles in a novel news corpus

Recent advancements in Artificial Intelligence (AI), notably the development of Large Language Models (LLMs) and text-to-image diffusion models, have facilitated the creation of realistic textual content and images. Specifically, platforms like ChatGPT and Midjourney have simplified the creation of high-quality text and visuals with minimal expertise and cost. The increasing sophistication of Generative AI presents challenges in ensuring the integrity of news, media, and information quality, making it increasingly difficult to distinguish between real and artificially generated textual and visual content. Our work addressed this problem in two ways. First, by means of ChatGPT and Midjourney, we created a comprehensive novel multimodal news corpus named SyN24News based on the N24News corpus, on which we evaluated our model. Second, we developed a novel explainable synthetic news detector for discriminating between real and synthetic news articles. We leveraged a Neural Additive Model (NAM)-like network structure that ensures effect separation by handling input data in separate subnetworks. Complex structures and patterns are extracted by deep features from unstructured data, i.e., images and texts, using fine-tuned VGG and DistilBERT subnetworks. We ensured further explainability by individually processing carefully chosen handcrafted text and image features in simple Multilayer Perceptrons (MLPs), allowing for graphical interpretation of corresponding structured effects. Our findings indicate that textual information are the main drivers in the decision-making finding process. Structured textual effects, particularly Flesch-Kincaid reading ease and sentiment, have a much higher influence on the classification outcome than visual features such as dissimilarity and homogeneity.

Keywords
Generative AI · Multimodal synthetic data · Synthetic news articles ·
Explainable AI · Neural additive models · Feature importance analysis

Biography
Michael Schlee is a data scientist and Ph.D. candidate specializing in multimodal data analysis, with a Master's in Applied Statistics from Georg August University of Göttingen and international experience at Universidade de Lisboa. His expertise spans AI-driven research, computer vision, natural language processing, statistical modeling, and deep learning. He has worked across academia and industry, contributing to projects in experimental design, predictive modeling, and prompt engineering. Proficient in Python, R, and Java, Michael combines advanced programming skills with strong analytical capabilities, and is also an active football player, bringing teamwork and strategic thinking to both his research and the field.

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Sajal Kanti Howlader

Greene King Limited, UK

Static and Dynamic Connectionism

We all know what a great customer experience feels like. It's when your favourite café remembers your order, when your mobile provider solves a problem before you even notice it, or when a sports organisation makes it easy for you to engage without endless paperwork. These moments don't happen by accident — they happen because organisations understand their customers deeply and act on that knowledge.

But here's the reality: while companies now collect more customer data than ever before, many still fail to turn that information into action. Feedback surveys gather dust. Ratings sit in dashboards. Online reviews go unread. Meanwhile, customers grow frustrated, feeling like their voices don't matter. Businesses lose loyalty, revenue, and reputation.

This is where advanced analytics and machine learning can flip the script.

From Telecom to Hospitality: My Journey with Analytics I first saw the power of analytics in the telecom industry, working with one of the most competitive mobile markets in the world. With more than 80 million customers, the challenge was enormous. Even a tiny increase in customer churn — people switching to a rival network — could cost millions.

So we built models that went far beyond traditional demographics. Instead of grouping people by age or gender, we looked at their behaviours: how often they used data, how they interacted with offers, what their spending patterns looked like. This segmentation allowed us to tailor products and communications with far more relevance.

On top of that, we built churn and retention models that identified customers at the highest risk of leaving. Armed with these insights, we could reach out with personalised offers before they decided to switch. The result? A 20% improvement in customer retention.

We didn't stop there. Cross-sell and up-sell models revealed hidden opportunities to match customers with new services they actually wanted, boosting sales by 10%. And through conjoint analysis — a method that reveals what customers truly value in pricing — we restructured tariffs and offers, striking the right balance between profitability and fairness.

Those experiences taught me an important lesson: customer experience isn't about reacting to problems. It's about anticipating needs, acting early, and building trust through relevance.

Years later, I applied these same principles in completely different industries. At Greene

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King, one of the UK's largest pub and restaurant groups, segmentation models helped us understand distinct guest profiles — families looking for value, couples looking for experience, and loyal locals who returned weekly. Predictive models showed us how staffing, menu design, and even local events influenced satisfaction. That insight allowed managers to take action before complaints escalated, saving costs while making guests happier.

Even in sport governance, with UK Anti-Doping, the lessons carried over. Here, the "customers" were athletes and partner organisations. By applying segmentation and behavioural analysis, we discovered which groups were more likely to engage with education programmes, and predictive models helped us direct limited resources to where they would make the biggest difference. The result was improved efficiency, stronger relationships, and increased trust in a highly scrutinised environment.

Why Customer Experience Needs Analytics More Than Ever

Today, customer expectations are higher than ever. A diner in a local pub expects the same level of personalisation as they get from Amazon or Netflix. An athlete expects a sports body to provide the same smooth digital experience they enjoy from online shopping.

This "experience spillover" means customers no longer compare you only to your competitors. They compare you to the best service they've ever had anywhere. That's a high bar.

Meanwhile, businesses face tighter budgets. Leaders need every investment in customer experience to demonstrate measurable returns. That's exactly what advanced analytics offers: a bridge between happy customers and healthy business performance.

A Simple Framework

From my cross-industry journey, I've come to believe that organisations can make the biggest impact by following three principles:

1. Segment to Personalise

Don't just rely on age or income brackets. Understand behaviours, motivations, and needs. Design products and experiences for those groups in ways that feel relevant and meaningful.

2. Predict to Prevent

Don't wait for complaints. Use predictive models to forecast churn, dissatisfaction, or demand patterns. Solve problems before customers even notice them.

3. Experiment to Improve

Don't assume you know the answer. Test it. Use A/B experiments and pricing optimisation to learn quickly what works best and refine your approach continuously.

This framework shifts customer experience from being reactive and costly to proactive and profitable.

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Final Thoughts

Analytics is not about replacing people with algorithms. It's about giving organisations the tools to listen better and act smarter. The best analytics cultures empower managers, staff, and leaders to use data as a guide, not a crutch. Customers don't see the models behind the scenes — but they feel the difference in every interaction.

Across telecom, hospitality, and sport, one truth has been clear to me: when organisations listen to their data, they learn to listen to their customers. And those who learn to predict, personalise, and perform will be the ones who thrive in the future.

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Graph-Based Clustering and Large Language Models for Scalable Summarization of Safety Reports in Manufacturing Environments

Manufacturing environments generate large volumes of safety-related reports covering incidents, near-misses, and unsafe conditions—often written in unstructured natural language. Notably, only a small fraction of these records pertain directly to injuries; the majority highlight contributory factors or unsafe conditions which, if left unresolved, may ultimately result in incidents. Reviewing and summarizing these reports is a time-consuming task. We introduce an automated system that leverages graph-based clustering and Large Language Models (LLMs) to analyze and summarize extensive safety incident documentation efficiently. Developed in collaboration with the Pirelli Digital Solution Center of Bari as part of the "OR6 – Big Data Platform – GenAI platform" initiative, our solution helps Pirelli "Health, Safety and Environment" department identify patterns, emerging risks, and improve workplace safety by promptly and effectively processing safety records. The system constructs similarity graphs using semantic embeddings and applies the Louvain community detection algorithm to group related reports into meaningful clusters. Each cluster is then summarized by an LLM, producing concise overviews and one-line titles that provide rapid insights into core safety issues. The system also delivers basic statistics, such as event counts and time-based distributions, supporting data-driven safety management. Scalability is a key feature: the solution can process years of historical data encompassing thousands of events in just seconds. This allows safety professionals to spot trends, uncover hidden patterns, and reduce individual bias in manual evaluations. By integrating advances in natural language processing and graph theory, our approach offers manufacturing organizations an effective decision-support tool—enhancing situational awareness and supporting continuous improvement for safer workplaces.

Keywords
safety incident reports, workplace safety, text summarization, graph-based clustering, Large Language Models (LLM)

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Klaus Henning, Dietrich Brandt

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The AI Revolution - and our Responsibility for the Future of Humans, Organizations and Machines

AI systems permeate all aspects of life and represent the greatest cultural revolution since the invention of printing. Strong AI systems have their own consciousness. They are increasingly developing competencies which are difficult to distinguish from human intelligence in terms of how we perceive them. This requires a new understanding of human responsibility for the future of creation, based on the Hybrid Intelligence Approach: humans, organizations, and machines - all exist as digital shadows (twins) in their parallel world being constantly connected to each other. We have to proactively shape this complexity at the different levels of human communication, interaction between organizations, and the global coupling of machines. These tasks need to be performed with the ultimate primacy of human responsibility at all levels of society—family, communities, businesses, and politics. They result in spaces of shared hybrid consciousness between humans, organizations, and machines, and their respective digital shadows. They may also lead to the introduction of dialogue-based AI systems as separate legal systems and to the further development of ethical foundations for independently operating AI systems. Hence, humanity in the near future needs human reasoning and reflection when trusting AI. It means to continuously fight the system's tendency for hallucinations and fake information, by employing human agility and emotional awareness. These processes illustrate the democratic alternative to today's wide-spread dominance of AI-controlled human identity. But how are we keeping on being humans when human-human dialogues are increasingly getting replaced by human-AI dialogues while AI is perfectly simulating to be human? Hence, genuine cooperation between humans, organizations, and technology will always depend on the quality of the relationships between the people themselves involved.

Keywords
Hybrid Intelligence Approach, Consciousness of Humsn-AI Systems, Hallucinations, Ethics

Biography
Klaus Henning has over 40 years of professional experience. For 25 years, he was head of the largest institute cluster for cybernetics (Cybernetics Lab) at RWTH Aachen University. He was member of the VDI Presidium for several years, furthermore Vice-Rector for Finance, and subsequently, Dean of the Faculty of Mechanical Engineering, at RWTH Aachen University. Together with two colleagues, he coordinated the German Chancellor's Future Dialogue "How do we want to live?" from 2011 to 2012. Today, he is an independent consultant and coach for complex change and transformation processes.

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Polytechnique Montréal, Montréal, Canada

Challenges to AIML in Industry 4.0 applications

AI and ML have achieved remarkable success in public applications that are based on language, vision, and speech recognition. However, their implementation in industrial applications remains challenging. This presentation exposes the main challenges facing the implementing of AI-ML in real industrial settings. The first challenge is data readiness. Industrial data is often fragmented across multiple sources. They are often unstructured and not aligned with the operational objectives of AI-ML modeling. They are not enough in volume and contain imbalances in which rare but critical events are underrepresented. The second challenge lies in the need to understand the underlying industrial processes before using AI-ML. The physics that control these processes need to be known, thus the necessity of multidisciplinary collaboration that combines domain expertise, data engineering, communication network engineering and AI expertise. The third challenge is the necessity of creating a digital twin for each equipment. This entails a bidirectional exchange of knowledge that needs high velocity. Our methodology for addressing these issues has been shaped across projects in aerospace, oil and gas, mining, transportation, and manufacturing. Our solutions included augmenting underrepresented data, designing architectures that combine multiple perspectives on system behavior, and developing AI-ML solutions that respect the physics and the dynamics of industrial systems. In each case, success was possible because of the composition of a multidisciplinary team that included the domain expertise who guided the choice of state representations, reward/loss functions, and feature engineering. These experiences highlight the need for AI-ML algorithms that are specifically tailored to industrial applications. We also recommend that organizations pursuing Industry 4.0 initiatives to (1) invest in data collection and quality improvement, (2) embed domain expertise into every stage of AI design, and implementation and (3) encourage multidisciplinary teamwork to ensure that solutions are feasible and operationally relevant.

Keywords
Industry 4.0, Artificiel Intelligence, Machine Learning

Biography
Soumaya Yacout is Professor in the Department of Mathematics and Industrial Engineering at Polytechnique Montreal in Canada. She is also the owner, President and CEO of DEXIN Inc. She earned her doctoral degree in Operations Research, her bachelor's in mechanical engineering and her master's in industrial engineering. She designed and taught courses on quality engineering, reliability and maintenance, and discrete event simulation. Her main research is in the analytics of faults and maintenance. She has publications in peer-reviewed journals including Quality Engineering, International Journal of Production Research, Computers and Industrial Engineering, IEEE Transactions, Journal of Intelligent Manufacturing, Expert Systems with Applications, and papers in international conferences, some of which received the best paper award. She is the co-editor and the co-writer of a book on minimal repair and interoperability. She has a patent on data-driven maintenance with machine learning.

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Dr. Ovidiu Vermesan
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"Internet of Robotic Things Intelligent Connectivity and Platforms." The Autonomous Intelligent Nexus: Internet of Robotic Things Embedding Edge AI, Connectivity, and Platforms

Internet of Robotic Things (IoRT) is a concept that integrates edge artificial intelligence (AI), combining the Internet of Things (IoT), AI, edge computing and immersive technologies with autonomous systems, such as robotics and autonomous vehicles. The presentation examines the transformative impact of edge AI on the IoRT, advancing a new paradigm of intelligent, autonomous, and collaborative systems, highlighting how the IoRT is evolving beyond simple connectivity into a dynamic ecosystem powered by next-generation AI. A key advancement is the integration of edge AI, which facilitates real-time data processing directly on mobile IoRT devices operating in fleets or swarms, while minimising latency and enhancing security, enabling real-time, informed decision-making in dynamic environments without constant reliance on centralised computing infrastructure. The deployment of generative AI, particularly through efficient language models, is enhancing human-robot interaction. The presentation further explores the concept of agentic AI, where IoRT devices function as autonomous agents. This autonomy is amplified through intrinsic or extrinsic and swarm intelligence, decentralised approaches where fleets or groups of autonomous mobile systems collaborate to solve problems and perform tasks collectively. Edge AI symbiosis with IoRT is built upon a foundation of robust sensor integration, hardware and software platforms, intelligent connectivity, edge AI frameworks, algorithms, datasets and data analytics. By examining the synergy between IoRT, advancements in edge AI, agentic AI, the integration of robotic operating system (ROS), the architecture elements developed in software- and AI-defined vehicles (SDVs/AIDVs), connectivity and platforms, the presentation will emphasise the future of automation, where interconnected IoRT devices can learn, adapt, and work together with efficiency and intelligence.

Keywords
edge AI , IoRT, agentic AI, autonomus systems, ROS, AIDVs

Biography
Dr. Ovidiu Vermesan holds a PhD degree in microelectronics and a Master of International Business (MIB) degree. He is Chief Scientist at SINTEF, Oslo, Norway and received SINTEF's 2003 award for research excellence for implementing an intelligent biometric system. He works on projects addressing nanoelectronics, edge AI, agentic AI, integrated sensor/actuator systems, generative edge AI, communication and autonomous systems. He published over 100 technical articles and conference papers. He is a member of the Alliance for AI, IoT and Edge Continuum Innovation (AIOTI) board. He is the coordinator of the Edge AI Technologies for Optimised Performance Embedded Processing (EdgeAI) project.

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Using Machine Learning in Developing an Effective Metric Model for Measuring Customer Trust Satisfaction: A Viewpoint of Australian Trustworthy Digital Society Granted Project

Our recent study highlights ten machine learning (ML) algorithms widely adopted for short-term forecasting in developing industrial prediction systems, including Autoregressive Integrated Moving Average (ARIMA), Back-Propagation-Resilient (BP-Resilient), Back-Propagation-Second-Order Gradient (BP-SOG), K-Nearest Neighbour (KNN), Linear Regression (LR), Long Short-Term Memory (LSTM), Perceptron, Random Forest (RF), Recurrent Neural Networks (RNN), and Support Vector Machine (SVM). Although our recent study highlights that no single algorithm can fit all business applications for short-term forecasting, LR, RF, and SVM are recognized as optimal algorithms. KNN has the best efficiency with the shortest computational time. However, our study has identified that no single ML algorithm can fit all industrial applications. The Australian Trustworthy Digital Society (TDS) is a collaborative effort between two leading Australian universities: the University of Technology Sydney (UTS) and the University of New South Wales (UNSW). It brings together experienced voices from both University and Industry to facilitate the creation of a digitally enabled society that is equitable, inclusive, and sustainable. The TDS brings together experienced voices from all disciplines and areas of study, as well as diverse communities and organizations, to develop multidisciplinary, world-leading, collaborative research on digital trust.

This presentation introduces a recently granted TDS project and aims to understand current research and explore an effective metric visualization model for measuring customer trust satisfaction in a trustworthy digital society. A hybrid ML algorithm is explored for predicting customer trust and satisfaction and building a metric model.

Keywords
machine learning, short-term forecasting, customer trust, customer satisfaction, trustworthy digital society, metric visualization

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Biography

Dr. Wu is a senior lecturer in the School of Professional Practice and Leadership atFaculty of Engineering and Information Technology, University of Technology Sydney. He is a pioneering researcher on digital transformation, driving the transition from traditional business to digital business/e-business. He is also an associate editor of the Electronic Journal of Business Research Methods.

He is an internationally renowned consulting expert in leading interdisciplinary projects, having demonstrated exceptional leadership, expertise, and innovation throughout his career, particularly in industry-engaged international collaborations. His track record demonstrates his dedication to fostering connections in the global academic and business communities.

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[2]Harvard University, Cambridge, MA, USA

A Deep Learning Feature Importance Test Framework for Integrating Informative High-dimensional Biomarkers to Improve Disease Outcome Prediction

Many human diseases result from a complex interplay of behavioral, clinical, and molecular factors. Integrating low-dimensional behavioral and clinical features with high-dimensional molecular profiles can significantly improve disease outcome prediction and diagnosis. However, while some biomarkers are crucial, many lack informative value. To enhance prediction accuracy and understand disease mechanisms, it is essential to integrate relevant features and identify key biomarkers, separating meaningful data from noise and modeling complex associations. To address these challenges, we introduce the high-dimensional feature importance test (HdFIT) framework for machine learning models. HdFIT includes a feature screening step for dimension reduction and leverages machine learning to model complex associations between biomarkers and disease outcomes. It robustly evaluates each feature's impact. Extensive Monte Carlo experiments and a real microbiome study demonstrate HdFIT's efficacy, especially when integrated with advanced models like deep neural networks (DNN), termed HdFIT-DNN. Our framework shows significant improvements in identifying crucial features and enhancing prediction accuracy, even in high-dimensional settings. This approach offers a promising avenue for advancing precision medicine, understanding complex disease mechanisms, and ultimately improving patient outcomes through more accurate diagnostics and targeted therapies.

Keywords

Complex association, Dimension reduction, Interpretable and scalable predictive modeling, Non-parametric feature selection, Stable deep neural network

Biography

Dr. Baiming Zou is an Associate Professor in the Department of Biostatistics at the University of North Carolina at Chapel Hill. With extensive experience in statistical methodologies and their applications in biomedical and public health research, Dr. Zou has contributed significantly to advancing quantitative approaches that support evidence-based decision-making in health sciences. His work spans biostatistical modeling, clinical trial analysis, and the development of innovative techniques to address complex data challenges in epidemiology and medical research.

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Dynamic Customer Segmentation and Smart Campaign Recommendation System in Digital Wallets

Especially since the onset of the COVID-19 pandemic, customer spending behavior has shifted toward cashless payments. Accordingly, financial services have experienced the accelerated adoption of digital wallets, which extensively require customer experience improvement aiming to maintain customer retention and acquisition. In our study, for Paycell, one of Türkiye's digital wallet leaders, we introduce a Dynamic Customer Segmentation and Smart Campaign Recommendation System by proposing a four-stage architectural framework that combines dimensionality reduction, clustering, predictive modeling, and real-time campaign assignment. We use MongoDB to manage large-scale data, and Python for model training. Based on a sample exceeding 75,000 customers, after applying necessary conversion and scaling techniques, we perform PCA-enabled K-Means clustering, yielding five distinct customer clusters, validated through Elbow and Silhouette Methods. From a predefined campaign pool, these clusters are assigned with appropriate campaign responses generated by LightGBM, operationalized into dynamic real-time interaction by Apache Flink, and delivered through mobile applications via an API layer. Overall, our approach provides a dynamic and scalable framework that is beneficial for financial service providers to design more effective segment-specific marketing strategies, yielding enhanced customer engagement.

Keywords
Machine learning, flink, complex event processing, financial technology, digital wallet, big data

Biography
Ferhat Musa Uysal is a Technical Product Manager in the Technology Department at Turkcell Payment and Electronic Money Services Inc. (Paycell R&D Center). He started working as a Deployment Engineer at Ericsson in 2013. He then worked as an analyst on large projects in SAP Commerce Cloud for 6 years. He has been working as a Technical Product Manager on Digital Wallet Projects since the beginning of 2023. He is currently working on AI/ML usage in digital wallets.

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[2], Stark Neurosciences Research Institute, Indiana University School of Medicine, Indianapolis, IN 46202, USA.

CalTrig: A GUI-Based Machine Learning Platform for Accurate Ca^{2+} Transient Detection and Visualization in Freely Moving Mice

Recent advances in in vivo Ca^{2+} imaging using miniature microscopes have transformed our ability to record single-neuron activity in freely moving animals. However, extracting meaningful information from these large and noisy datasets remains a major analytical challenge. Tools such as MiniAN and CalmAn convert Ca^{2+} imaging videos into numerical signals (CaIV2N), yet post-processing steps—such as synchronizing multimodal data, validating output quality, and reliably detecting transient events—are still time-consuming and technically demanding.

We present CalTrig, an open-source, graphical user interface (GUI)-based software designed to streamline post-CaIV2N analysis. CalTrig integrates multiple data streams, including Ca^{2+} imaging traces, neuronal spatial footprints, and behavioral recordings, enabling synchronized visualization and direct evaluation of signal quality. It incorporates three complementary approaches for Ca^{2+} transient detection: manual labeling, parameter-based identification, and machine learning (ML)-driven classification.

We systematically compared four ML architectures—Gated Recurrent Unit (GRU), Long Short-Term Memory (LSTM), Transformer, and Local Transformer—using ground-truth datasets from C57BL/6J mice. The GRU model demonstrated superior accuracy, computational efficiency, and cross-session stability across animals and brain regions. By combining flexibility, analytical rigor, and an intuitive interface, CalTrig allows users with minimal coding experience to perform robust Ca^{2+} transient detection and visualization.

CalTrig thus represents a scalable, user-friendly tool for decoding neural activity from complex in vivo imaging data. Its integration of behavioral and neuronal signals provides a powerful framework for exploring neural dynamics underlying cognition, behavior, and disease mechanisms.

Keywords

in vivo calcium imaging, miniScope, calcium transients, machine learning, GRU, data visualization

Biography

Dr. Yao-Ying Ma is an Associate Professor in Department of Biochemistry, Molecular Biology, and Pharmacology at the Indiana University School of Medicine. Her research focuses on neural circuit mechanisms underlying addiction, motivation, and neuropsychiatric disorders, combining ex vivo whole cell patch clamp, in vivo calcium imaging, optogenetics, and machine learning–based analysis. Dr. Ma's laboratory develops computational and imaging tools for decoding neuronal activity in freely moving animals. She is committed to integrating neuroscience and artificial intelligence to advance the understanding and treatment of brain disorders.

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Samvel Arustamov. Megaladata

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How to develop the world's fastest low-code platform for advanced analytics

The global volume and complexity of data have been growing exponentially, creating increasing pressure on analytical systems to deliver high speed, reliability, and scalability. Traditional high-code approaches provide flexibility but suffer from long development cycles and high maintenance costs, while workflow orchestrators introduce architectural control but still require substantial coding effort. Low-code platforms offer rapid development and broad accessibility, yet they are often criticized for limited performance and scalability, with 32% of organizations doubting that low-code can meet their needs and 28% expressing concerns about its ability to scale. This paper addresses the research question of whether a low-code platform can achieve true enterprise-level analytical performance comparable to or exceeding coded systems. The study presents an engineering-driven approach to designing a high-performance low-code platform for advanced analytics. The methodology includes custom memory-management optimization, low-level system programming, SIMD-based string operations, full in-RAM data processing, multithreading, vectorization, and distributed execution. The system architecture incorporates client-server clustering, Kubernetes-based horizontal scaling, and a hybrid workflow model combining visual design with embedded Python/JavaScript logic. Benchmark results demonstrate processing of 108 GB in 3 minutes 30 seconds on a server and 58 GB in 2 minutes 35 seconds on a laptop, confirming substantial performance gains. The conclusion is that low-code platforms, when engineered with a systems-level focus, can overcome traditional limitations and operate as fully industrial analytical engines, enabling both accessibility and extreme performance at scale.

Keywords

writing, template, sixth, edition, self-discipline, good

Biography

Managing Director at Megaladata (Yerevan), formerly a lead technical specialist. Holds a degree in Computer Science and Mathematics. Experienced in building analytical platforms, integrating AI solutions, and leading technology teams.

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Predicting Antarctic Blizzards Using Hybrid Deep Learning Models on Meteorological Data

This research presents a hybrid Deep Learning (DL) framework for the prediction of extreme weather events, with a particular focus on Antarctic blizzards—hazardous phenomena that pose significant operational and safety challenges in polar environments. The proposed model integrates a Recurrent Neural Network (RNN) architecture enhanced with Long Short-Term Memory (LSTM) units and is trained on real-time meteorological data collected from Bharati Station, India's coastal Antarctic research base. Two predictive configurations were developed and evaluated: a univariate model using wind speed alone, and a bivariate model combining wind speed and atmospheric pressure. The hybrid RNN+LSTM model achieved classification accuracies of 49.60% (univariate) and 55.19% (bivariate), with corresponding RMSE values of 0.0023 and 0.0021. These results outperformed baseline models including ANN, CNN, and standalone RNN/LSTM, demonstrating superior robustness in sparse and extreme meteorological environments. Feature importance analysis indicated wind speed and air pressure as the most significant predictors for blizzard forecasting, while temperature and humidity showed limited impact. The model architecture (Figure 1) comprises sequential RNN and LSTM layers followed by dense layers, enabling the capture of both short-term fluctuations and long-term dependencies in time-series data. This makes the model particularly effective for identifying abrupt and prolonged weather events such as blizzards. In addition to improving forecasting accuracy, the model supports early warning systems, enhances safety protocols, and aids operational planning in Antarctica. The architecture's flexibility allows for further tuning—such as increasing training epochs or expanding input datasets—to improve performance. Beyond polar applications, this adaptive model holds potential for forecasting other extreme weather events, including heatwaves and cold waves in non-polar regions.

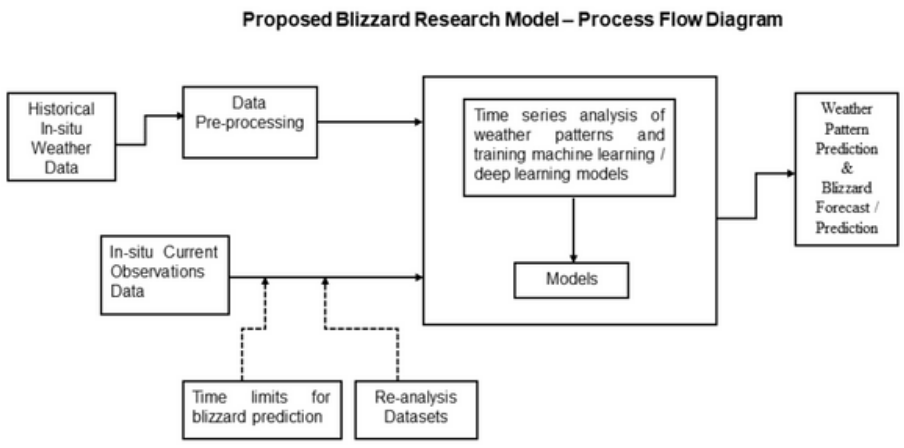

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Figure 1. Proposed deep learning architecture based on a hybrid Recurrent Neural Network (RNN) and Long Short-Term Memory (LSTM) model, developed within a data-driven and free-model framework for predicting Antarctic blizzards.

Keywords: writing, template, sixth, edition, self-discipline, good

Biography

V S Samy, Scientist F, Polar Data Service Section, National Centre for Polar and Ocean Research (NCPOR), Goa, India. His research lies in the prediction of weather pattern and extreme events using the polar weather datasets. He developed National Polar Data Center at National Centre for Polar and Ocean Research, Ministry of Earth Sciences, Govt. of India.

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Xiaoyan Dai

KYOCERA Corporation, Japan

Leftover Food Recognition Using Deep Learning

Recently, food recognition technology is expected to be more widely used, such as in real-time telemedicine dietary monitoring and post-checkout systems used in canteens. For these purposes, perception recognition of dietary intake becomes more fundamental and important than meal recognition itself. Recent research has shown that computer vision technology can help automatically recognize diverse foods and estimate the amount of food intake. However, training models requires a large amount of data in order to recognize various leftovers, and improving performance while reducing data collection and labelling costs is quite a big challenge. This paper proposes a deep-learning-based food and leftover quantity recognition system with designed system architecture, data augmentation approach and semi-supervised learning approach, which achieves high performance even with a small amount of labeled data. The recognition performance of dish, food and leftover classes with our own evaluate data sets is higher than 0.97. The proposed system can be applied to canteen self-checkout or calorie monitoring.

Biography

Xiaoyan Dai, Received her Ph.D. in image processing from Muroran Institute of Technology in Japan in 2004, specializing in computer vision and machine learning. Since then, she has focused on image processing and document processing at Canon Inc. In 2019, she joined the Research Center of Kyocera Corporation as an Expert. Her current interests include Artificial Intelligence, Machine Learning, Deep Learning, Computer Vision, Pattern Recognition, Anomaly Detection, Data Miningand Natural Language Processing. She serves as an organizing committee member for multiple international conferences. She is also a speaker at multiple international conferences.

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Elaf A. Saeed, Ammar D. Jasim, Munther A. Abdul Malik

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Create distinctive databases of ancient languages and using a computer vision model to accurately recognize and classify them

Cuneiform writing, an old art style, allows us to see into the past. Aside from Egyptian hieroglyphs, the cuneiform script is one of the oldest writing systems. It emerged in the second half of the fourth millennium BC. Most people believe that the Sumerians created it in southern Mesopotamia. Many historians place the Hebrews' origins in antiquity. For example, we used the same approach to decipher the cuneiform languages; after learning how to decipher one old language, we would visit an archaeologist to learn how to decipher any other ancient language. We propose a deep-learning-based sign detector method to speed up this procedure to identify and group cuneiform tablet images according to Hebrew letter content. The Hebrew alphabet is notoriously difficult and costly to gather the training data needed for deep learning, which entails enclosing Hebrew characters in boxes. We solve this problem by using preexisting transliterations and a sign-by-sign representation of the tablet's content in Latin characters. We recommend one of the supervised approaches because these do not include sign localization. We find the transliteration signs in the tablet photographs by comparing them to their corresponding transliterations. Then, retrain the sign detector using these localized signs instead of utilizing annotations. Afterward, a more effective sign detector enhances the alignment quality. Consequently, this research aims to use the Yolov8 object identification pretraining model to identify Hebrew characters and categorize the cuneiform tablets. Images illustrating Hebrew passages have been culled from a Hebrew-language book. This book is known as the Old Testament, and it was organized into around 500 illustrations to aid in reading and pronouncing the characters. Another ancient document was recently discovered in Iraq, dating back to 500. It reached over a thousand photos after pre-processing and augmentation. The Cuneiform Digital Library Initiative (CDLI) website and the Iraqi Museum have compiled photographs of cuneiform tablets, with over a thousand photos available in each language.

Biography

Elaf A. Saeed, serves as a systems and control engineer at the University of Al-Nahrain, College of Information Engineering, in Iraq. Her expertise spans control, Embedded Systems, Artificial Intelligence, and IoT. Recognized for her programming talent, Elaf has authored eleven books published by Lambert Academic. Distinguished as the top student throughout her B.Sc. studies, she also brings four years of teaching experience to her role. She completed her master's degree in artificial intelligence with a very good grade. Her research focuses on artificial intelligence, machine learning, computational vision, embedded systems, and robotics.

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Dr. Muhammad Shahid Iqbal Malik

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Knowledge-Infused in Transformers for Text Classification in Low-Resource Languages

Transformers have emerged as the foundation of state-of-the-art natural language processing (NLP). However, their effectiveness often declines in low-resource language settings due to limited training data and increased linguistic complexity. In this talk, I will introduce the concept of knowledge infusion and provide a concise overview of leading techniques used to enhance transformer models with external knowledge. I will then present a case study focused on applying knowledge-infused transformers for threatening speech detection in a low-resource language, demonstrating how structured linguistic and domain-specific information can improve performance. I will conclude my talk with a discussion of key challenges and promising opportunities in advancing NLP for low-resource languages.

Biography

With over 22 years of experience in developing innovative artificial intelligence solutions, Dr. Malik serves as an Associate Professor and Head of the AI Program at HITEC University, Taxila, Pakistan. He recently completed a Postdoctoral Fellowship at the School of Data Analysis and Artificial Intelligence, National Research University Higher School of Economics (HSE), Moscow, Russia. Prior to his academic career, he spent more than a decade in the HVAC industry, where he led the development of embedded system solutions that integrated real-world engineering with intelligent, data-driven computing. His research interests include data mining, social media mining, natural language processing, data science, and explainable artificial intelligence. His work emphasizes the development of interpretable, robust, and socially responsible AI systems, particularly in low-resource and multilingual settings. Dr. Malik has authored numerous peer-reviewed publications in reputable SCI and Scopus-indexed journals and international conferences.

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Gene signature for response prediction to immunotherapy in metastatic Renal Cell Carcinoma

To date, immune checkpoint inhibitors (ICIs) have emerged as a leading treatment for metastatic cancer, significantly improving patient survival while causing relatively few side effects. However, the objective response rate for ICIs remains low—approximately 20-25% in renal cell carcinoma (RCC), underscoring the urgent need for predictive response biomarkers. Several state-of-the-art signatures have been revealed in top-tier journals, highlighting the importance of this field. As the number of genes (~20,000) far exceeds the sample sizes of typical training sets (generally ≤ 300), we first developed feature selection procedures to reduce the number of features to a few hundred. We then trained multiple machine learning classifiers using the selected genes and the IMmotion150 dataset, which includes RNA-seq and clinical data from 77 patients with metastatic RCC (mRCC). Notably, our predictor LogitDA, using the identified 27-gene signature, achieved a prediction AUC of 0.72 in an independent dataset PCD4989g(mRCC). Our signature for mRCC was second to T exhaust in prediction AUC but surpassed the six established signatures in prediction accuracy. Finally, from our signature, we identified we uncovered two prognostic biomarkers FLNC and NIPAL1 for progression-free survival with BH-adjusted P < 0.02 (log-rank test; adjusted P < 0.0025) in the IMmoton150 dataset.

Keywords

biomarker, cancer, immunotherapy, machine learning, regression, prediction

Biography

Prof. Grace S. Shieh received her PhD in Statistics from Dept. Of Statistics, University of Wisconsin, and is currently a Full research fellow at Inst. Of Statistical Science, Academia Sinica, and is an adjunct professor at National Taiwan University. She is an Associate editor of STAT and Frontiers in Genetics, Statistical Genetics and Methodology Section. She has been working on computational oncology since 2010, and recently her team focuses on precision medicine, esp. prediction of response of cancer patients to immunotherapy.

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ZhenMei Wang

GuangXi Vocational & Technical College, Nanning, China

Exploring potential circRNA biomarkers for cancers based on double-line heterogeneous graph representation learning

Compared with the time-consuming and labor-intensive for biological validation in vitro or in vivo, the computational models can provide high-quality and purposeful candidates in an instant. Existing computational models face limitations in effectively utilizing sparse local structural information for accurate predictions in circRNA-disease associations. This study addresses this challenge with a proposed method, CDA-DGRL (Prediction of CircRNA-Disease Association based on Double-line Graph Representation Learning), which employs a deep learning frame-work leveraging graph networks and a dual-line representation model integrating graph node features.CDA-DGRL comprises several key steps: initially, the integration of diverse biological information to compute integrated similarities among circRNAs and diseases, leading to the construction of a heterogeneous network specific to circRNA-disease associations. Subsequently, circRNA and disease node features are derived using sparse autoencoders. Thirdly, a graph convolutional neural network is employed to capture the local graph network structure by inputting the circRNA-disease heterogeneous network alongside node features. Fourthly, the utilization of node2vec facilitates depth-first sampling of the circRNA-disease heterogeneous network to grasp the global graph network structure, addressing issues associated with sparse raw data. Finally, the fusion of local and global graph network structures is inputted into an extra trees classifier to identify potential circRNA-disease associations.

Keywords

Graph networks,Representation learning,Heterogeneous,Neural network, node2vec

Biography

Zhenmei Wang, Software Designer. Her research interests include artificial intelligence and bioinformatics. She has participated in one National Natural Science Foundation project, presided over one municipal/ministerial-level project, published four academic papers, and obtained one authorized invention patent.

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Florian Krebs and Stefan Grebien

JOANNEUM Research, Graz, Austria

Enhanced State of Charge Estimation for Lithium-Ion Batteries Using xLSTM Networks

Lithium-ion batteries are central to the transition toward a sustainable energy economy, enabling reduced reliance on fossil fuels through their widespread use in electric vehicles and portable devices. Accurate estimation of the battery's state of charge (SOC) is vital not only for operational safety but also for guiding user behaviors that prolong battery lifespan and support reuse. Traditional methods for SOC estimation often rely on Long Short-Term Memory (LSTM) networks due to their capacity to model temporal sequences; however, LSTMs struggle with capturing long-range dependencies inherent in battery discharge and charging cycles. In this study, we evaluate the effectiveness of xLSTM, an enhanced variant of LSTM designed to better handle extended temporal contexts, in improving SOC prediction. We conduct experiments on two publicly available battery datasets that include various usage profiles and degradation states. Our methodology involves training and testing both LSTM and xLSTM models on these datasets, using consistent preprocessing and evaluation metrics to ensure comparability. Results show that xLSTM generally outperforms standard LSTM models in SOC estimation accuracy, particularly in sequences requiring long-term memory retention. These findings demonstrate that xLSTM offers a promising direction for more reliable battery state modeling, with implications for safer, more efficient battery management systems in practical applications.

Keywords
State of Charge Estimation, Lithium-Ion Batteries, xLSTM, Battery Management Systems, Time Series Prediction, Deep Learning

Biography
Florian Krebs is a Senior Researcher at JOANNEUM RESEARCH in Graz, Austria, specializing in machine listening and intelligent acoustic systems. He holds degrees in electrical and sound engineering from TU Graz and the University of Music and Performing Arts Graz. After earning his PhD in automatic music analysis from JKU Linz in 2017, he joined JOANNEUM RESEARCH, where he now leads national projects such as DURAICELL, focusing on acoustic monitoring of battery performance. His work combines artificial intelligence with real-time acoustic sensing to advance environmental and industrial monitoring in complex, dynamic environments.

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Enhancing Deep Learning Models for Predicting Smoking Status Using Clinical Data in Patients with COPD

Background

Chronic obstructive pulmonary disease (COPD) is a major health concern, with smoking as its most critical modifiable risk factor. Advanced deep learning approaches integrating clinical, behavioral, and psychosocial factors are needed to improve predictive performance.

Purpose

This study aimed to develop and evaluate deep learning models to improve the prediction of persistent smoking in patients with COPD, using clinical data from a prospective survey that incorporates behavioral and psychosocial variables along with variables from our previous model based on a structured national dataset.

Methodology

Three deep learning models and one machine learning model were developed and evaluated using clinical, behavioral, and psychosocial variables from 350 patients with COPD, including 51 current smokers. Data preprocessing involved imputing missing values, transforming variables, and adjusting for class imbalance. Hyperparameter optimization was performed using the Optuna framework. Model performance was evaluated through repeated stratified K-fold cross-validation to ensure a narrower 95% confidence interval. The macro F1 score was used as the primary evaluation metric. Additionally, Shapley Additive Explanations (SHAP) were applied to assess feature importance and enhance model interpretability.

Results

The Residual Neural Network (ResNN) model achieved the highest performance, with a macro F1 score of .87 (95% CI: .83–.89), followed by FT Transformer (.87, CI: .80–.92), XGBoost (.80, CI: .77–.83), TabTransformer (.78, CI: .74–.81). SHAP analysis identified professional advice to quit, employment status, sputum symptoms persisting for more than three months, perceived stress level, health check-up experience, and health literacy as key predictors of persistent smoking, particularly in the ResNN model.

Conclusion

This model integrating behavioral and psychosocial data outperformed our previous model by better capturing complex smoking patterns while maintaining interpretability. These findings highlight the importance of multidimensional data for identifying high-risk patients and guiding targeted smoking cessation strategies in COPD care.

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Keywords
classification, deep learning, machine learning, chronic obstructive pulmonary disease, smoking

Biography
SEHYUN CHO received her B.S. degree in Nursing from Honam University, Gwangju, Republic of Korea. She is currently a Ph.D. candidate in the integrated M.S.-Ph.D. program at the College of Nursing, Chonnam National University. She worked as a clinical nurse at Chonnam National University Hospital for five years. Her research interests include chronic disease management, inhaler use behavior, patient education, and the application of artificial intelligence in healthcare.

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Dr.Sarah Allabun

Associate professor of biomedical informatics, Medical Education Department, Medicine College, Princess Nourah Bint Abdulrahman Universit, Saudi Arabia

AI and Medical Informatics applications in Healthcare Systems

Artificial intelligence (AI) and medical informatics are reshaping contemporary healthcare systems by enhancing diagnostic accuracy, strengthening clinical decision-making, and advancing personalized and data-driven care. As healthcare environments generate massive volumes of complex and heterogeneous data, AI technologies—particularly machine learning and deep learning—play a pivotal role in extracting meaningful insights, identifying clinical patterns, and improving operational efficiency. Medical informatics complements these advancements by structuring, analyzing, and managing health information to support both research and clinical workflows. Together, these interdisciplinary domains have become fundamental drivers of innovation within healthcare delivery.

The integration of AI-powered platforms, including digital pathology systems, intelligent imaging solutions, clinical decision support tools, and AI-enhanced electronic health records, demonstrates tangible improvements in early disease detection, treatment planning, and population-level health management. Examples such as Google DeepMind Health, PathAI, Aidoc, Epic Systems, and Tempus illustrate how AI-driven algorithms can outperform traditional methods in identifying abnormalities, predicting patient outcomes, and optimizing personalized therapeutic strategies. Furthermore, telehealth technologies, remote monitoring tools, and AI-enabled virtual assistants expand access to care and empower patients through continuous, real-time health engagement.

Despite these transformative benefits, several challenges require careful consideration, including data privacy, algorithmic bias, transparency, interoperability limitations, and the high cost of implementation. Ethical frameworks—emphasizing informed consent, fairness, accountability, and equitable access—are essential to ensuring responsible adoption of AI technologies in clinical settings. Addressing these issues will be critical for building trust and safeguarding patient rights.

Looking ahead, AI and medical informatics will continue to drive the evolution of healthcare through predictive analytics, robotic surgery advancements, accelerated drug discovery, and more precise personalized medicine. By strategically leveraging these technologies while upholding ethical and regulatory standards, healthcare systems can achieve a safer, more efficient, and patient-centered future.

Biography

Dr. Sarah Allabun is an Associate Professor of Biomedical Informatics at Princess Nourah University and the first Saudi woman to earn a PhD in Biomedical Informatics. With a PharmD background and expertise in digital health, AI in healthcare, and medical education innovation, she has led major accreditation, curriculum, and quality initiatives across multiple Saudi universities. Her research focuses on AI-driven healthcare solutions, telepharmacy, EHR interoperability, and digital transformation, with active collaborations

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Graziella Di Grezia
Link Campus University, Rome - Italy

Beyond Cancer Detection: An AI Framework for Multidimensional Risk Profiling on Contrast-Enhanced Mammography

Purpose
To assess whether AI-based models improve reproducibility of breast density (BD) and background parenchymal enhancement (BPE) classification, and to explore whether contrast-enhanced mammography (CEM) can serve as a proof-of-concept platform for systemic risk surrogates.

Materials and Methods
In this retrospective single-center study, 213 women (mean age 58.3 years; range 28–80) underwent CEM in 2022–2023. Histology was obtained when lesions were present (BI-RADS 4/5). Five radiologists independently graded BD and BPE; consensus served as ground truth. Linear regression and a deep neural network (DNN) were compared with a simple linear baseline. Inter-reader agreement was measured with Fleiss' κ. External validation on 500 BI-RADS C/D cases from VinDr-Mammo targeted density endpoints. A secondary exploratory analysis tested a multi-output DNN to predict BD/BPE together with bone mineral density and systolic blood pressure surrogates.

Results
Baseline inter-reader agreement was κ=0.68 (BD) and κ=0.54 (BPE). With AI support, agreement improved to κ=0.82. Linear regression reduced prediction error by 26% versus baseline (MSE 0.641 vs 0.864), while DNN achieved similar performance (MSE 0.638). AI assistance decreased false positives in C/D by 22% and shortened reading time by 35% (6.3−4.1 min). Validation confirmed stability (MSE ~0.65; AUC 0.74–0.75). In exploratory analysis, surrogates correlated with DXA (r=0.82) and sphygmomanometry (r=0.76).

Conclusion
AI significantly improves reproducibility and efficiency of BD/BPE assessment in CEM and supports feasibility of systemic risk profiling.

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Keywords
background parenchymal enhancement; breast density; contrast-enhanced mammography; deep learning; interobserver variability; multi-task learning; preventive imaging

Biography
Graziella Di Grezia is a Tenure-Track Researcher at Link Campus University, Department of Life Sciences, Health, and Healthcare Professions, Rome, Italy. She is also an ASN Associate Professor (Seconda Fascia) and serves on the board of the Italian Society of Medical and Interventional Radiology (SIRM). She holds an MD with honors, a PhD in Pharmacological Sciences and Clinical and Experimental Medicine, a specialization in Radiodiagnostics, and a Master's Degree in Breast Diagnostics and Interventional Surgery. Dr. Di Grezia has an extensive research portfolio, with over 100 publications indexed in PubMed and a Scopus h-index of 20. Her scientific expertise spans oncological and abdominal imaging, focusing on advanced techniques such as diffusion-weighted imaging (DWI), contrast-enhanced mammography, and artificial intelligence applications in diagnostic imaging. She is Principal Investigator in clinical research on DWI Breast MRI for dense breast tissue and actively participates in translational studies on gastrointestinal pathologies and tumor imaging.

She contributes to the scientific community as a reviewer and editorial board member for multiple international journals, maintaining rigorous standards in scientific publication. Beyond medicine, Dr. Di Grezia is a classical pianist and artist, and founder of the Mail Poetry Project®, bridging creativity with scientific outreach.

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Michail Tsagris, Christos Adam and Pavlos Pantatosakis

Department of Economics, University of Crete

On predicting an NBA game outcome from half-time statistics

Predicting the outcome of an NBA game is a major concern for betting companies and individuals who are willing to bet. We attack this task by employing various advanced machine learning algorithms and techniques, utilizing simple half-time statistics from both teams. Data collected from 3 seasons, from 2020/21 up to 2022/23 were used to assess the predictive performance of the algorithms at two axes. For each season separately, apply the algorithms and estimate the outcomes of the games of the same season and secondly, apply the algorithms in one season and estimate the outcomes of the games in the next season. The results showed high levels of accuracy as measured by the area under the curve. The analysis was repeated after performing variable selection using a non-linear algorithm that selected the most important half-time statistics, while retaining the predictive performance at high levels of accuracy.

Keywords
Half-time statistics, Game outcome, Machine learning

Biography
Michail Tsagris is an Associate Professor at the Department of Economics of the University of Crete (UoC) and an Adjunct Professor in the Department of Mathematics and Statistics at the University of New Brunswick Saint John. Prior to these he worked as a Teaching Fellow and then as an Assistant Professor at the Department of Economics (UoC), as a Research Associate at the Department of Computer Science (UoC), as an Assistant Professor at the American University of the Middle East (Kuwait) and as a Research Associate at the School of Mathematical Sciences of the University of Nottingham. He received his BSc and MSc in statistics from the Athens University of Economics and Business (Greece) and his PhD in statistics from the University of Nottingham. Michail has published more than 70 papers in journals, conference proceedings and book chapters and has (co-)developed 50 R packages. His current research interests include computational statistics, compositional and directional data analysis, applied econometrics and machine learning.

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Dr. Dietrich Brandt

Senior Researcher, Cybernetics Lab, RWTH Aachen University, Germany

Can we go on trusting AI?

Looking at AI based communication by employing some kind of global view, there is around us the increasing uncertainty about whether information through technological communication channels are fake and hallucinations - or truth. Furthermore, the frequent bias of this constructed reality is becoming increasingly visible specifically within the so-called Social Media. These media are often the domain of spreading pre-conceived and primary reactions and public positions which are straight fake or lies. They are deliberately created by powerful groups within society or politics. So far, there are no means around to check the truth of such messages. Additionally, there are those video-based personalities who communicate with us like genuine humans but they have been created by AI - and it has become nearly impossible to recognize such virtual reality as such if compared to reality recordings. The final aim of human-human communication is to establish some kind of equality of information and power between the communication partners. In Human-AI communication, however, the technological system remains continuously in power. System control through human intervention means that we have the power to separate systemic lies from truth and facts – but the system has been designed not to grant us this power. Hence, can we in the long run risk to trust AI in similar ways as we as humans have been fundamentally open for trusting each other? Or may we even give up to fundamentally trust each other as humans across society because we all are continuously surrounded by technology which offers more or less fakes and alternative facts and lies?

Biography

Dietrich Brandt holds a PhD in Physics, University of Mainz, Germany. He taught Physics at several German Universities, the University of London and M.I.T. (USA). From 1974 until 2003, he worked as Senior Researcher at the Cybernetics Lab, RWTH Aachen University, Germany. He was then structuring control and automation engineering projects towards AI. From 1993 to 1999, he was chairman of the Committee on Social Impact of Automation, International Federation of Automatic Control IFAC. He has widely published in prestigious journals and contributed to many conferences world-wide, and he has been the author and editor of several books.

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N S Krishnan MBBS, FRCP, MD

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Artificial Intelligence Assisted Risk Prediction Models in Organ Transplantation

End-Stage Renal Failure (ESRF) represents a significant global health burden, necessitating costly renal replacement therapy (RRT). Kidney transplantation is the preferred RRT, offering substantial survival advantages, improved quality of life, and long-term cost-effectiveness compared to dialysis. Despite growing efforts, the demand for kidneys continues to far exceed supply. The extensive waitlist for deceased donor organs underscores significant disparities in access, especially among socio-economically disadvantaged populations and ethnic minority groups.

Living Donor Kidney Transplantation (LDKT) offers several advantages over deceased donor transplants, including superior graft survival, better overall patient survival, lower incidence of complications such as delayed graft function, and the opportunity for pre-emptive transplantation. However, LDKT is often limited by immunological incompatibilities, which prevent LDKT in more than one-third of otherwise willing donor-recipient pairs.

The ability to predict future outcomes of deceased-donor and live-donor kidney transplantation improves allocation decision-making for transplant clinicians, and life expectancy and quality of life for potential recipients. However, capacity of current models to predict outcomes is limited. To improve the transplant selection process world-wide, we used novel AI algorithms to develop improved risk stratification.

Machine Learning offers promising avenues to address these limitations and enhance outcomes. Using anonymised registry data from UK and US transplant dataset, we have developed UK and US Transplant Outcome Prediction models. Strengths of these models are that they are trained on large volume of registry data. Leading to twenty percent improvement in prediction of graft survival over ten years. (C index: 0.75 vs. 0.55 (UK-KDRI), AUC: 0.72). Critically, these models have been implemented in a publicly accessible web-based application (https://organpredict.ai/), demonstrating a direct translational pathway to support clinical decision-making in donor acceptance.

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Biography

Professor Krishnan is a physician with a national and international profile in various clinical, research and educational areas in nephrology and transplantation. She is leadership trained, including the Harvard Leading Innovations in Health Care & Education program, and has over 250 peer-reviewed academic outputs. Her main research interests include antibody incompatible transplantation, prediction models in transplantation using AI, long term outcomes of transplantation, live donation, nonadherence in young adults and health inequalities. She is particularly passionate about helping women around the world, to break the glass ceilings and fly off from glass cliffs.

As Consultant Transplant Nephrologist at UHCW she conceptualized and devised a formal partnership in Transplantation, between UHCW and Oxford, forming the COxTNet, which has pioneered the way for collaborative partnerships between other units in U.K.

As the Education Committee Co-chair of The Transplantation Society, she has been involved in setting up training programs in transplantation to benefit trainees globally. She has actively helped with the launch of the Commonwealth 'Tribute to life', a consortium in transplantation to enable organ donation and transplantation in developing countries.

As the first Professor of Clinical Health at Coventry University, she is leading the educational and research collaboration with MOHAN Foundation, India, and developing online training modules for nurses, coordinators and doctors in transplantation world-wide.

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November 17-18, 2025 | London, UK

Richard Adesoye

ADEXR Technologies Ltd, UK

The Myth of the Linear Tech Career: How Non-Traditional Paths Build Better Designers

The tech & design industry often presents a linear career progression narrative, suggesting that professionals must follow a specific path for success. However, my presentation challenges this assumption by exploring how non -traditional and cross -disciplinary experience enhances innovation in user experience (U.X.). Drawing from my own experiences, which ranges from a non -design role in Lagos-Nigeria, to leading UI/UX design projects, I look into how exposure to diverse work environments fosters adaptability & problem - solving skills that traditional pathways may not cultivate.

Furthermore, the talk will outline a framework for understanding the 'hidden curriculum' of non-linear careers. The key /important themes include transferable skills, cognitive flexibility, and the significance of diverse backgrounds in shaping human - centered tech solutions. The ultimate goal is to inspire designers and developers to view atypical career experiences as valuable assets rather than detours.

Keywords

non-linear careers, UX design, innovation, adaptability, AI/ML workforce

Biography

My name is Richard Adesoye, a UI/UX Designer and Founder of Adexr Technologies Ltd, a uk-based software development company. With a background spanning non-design roles in Lagos, Nigeria to designing digital products for global audiences, my work focuses on human-centered design, and creating inclusive user experiences across sectors. Additionally, with my passion for mentoring, I regularly speak on topics at the intersection of design, technology, and professional growth, encouraging others to leverage non-linear career paths as a strength.

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Technē + Tuchē for living a Good Life; AI check by Habermas' validity claims. A brief orientation

The good life has technical, ethical, and philosophical connotations. Computer technology in general, and artificial intelligence in particular, makes a technological contribution to that good life, but also has an increasing ethical and philosophical impact. Placed in a philosophical context, the degree to which people have control over the unpredictable largely determines the good life. So say philosophers such as Plato and, more recently, Martha Nussbaum. This relates to the distinction made in classical Greek philosophy between technē and tuchē. Technē is what we can foresee and oversee, what we can control and influence. Tuchē is the unpredictable to which we as humans are at the mercy of good or bad luck. Philosophers such as Plato and Nussbaum ask: how strong and complete can I make my technē to control tuchē? The development of computer technology initially offered considerable promise for strengthening that technē, but the power of technology increasingly appears to be such that it becomes more autonomous and generates products that no longer directly stem from the intentions with which humans designed the technology, through algorithms and the like. AI seems capable of developing its own tuchē, moving us further and further away from the control over tuchē via technē. This also has consequences for the ethical side of the good life: who can take responsibility for the resulting products and outcomes of AI? This contribution examines the possibilities of using human communicative action to verify validity. Habermas's validity claims enable us to verify AI through rational communication. Based on four so-called validity claims, argumentative validity is achieved. The assumption is that this validity then enables the placement of the AI product in question in an ethical-communicative context, through which and with which technē and tuchē can be bridged and potentially connected.

One of the results of this contribution is an AI-generated checklist based on Habermas's validity claims. This result can then be tested against itself and assessed for its validity claims.

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Biography

Marcel Koeleman is based in Rotterdam and brings a uniquely multidisciplinary background to his work, with academic training in environmental engineering, visual arts, and business economics. He studied visual arts at the Royal Academy of Art in The Hague and later earned his Master's degree in Business Administration from the Rotterdam School of Management, Erasmus University. His master's thesis focused on aesthetics in leadership, a topic that grew from his longstanding interest in how individuals perceive and understand the world through sensory and aesthetic experiences.

Marcel's intellectual interests extend to the role of non-rationality in human behavior, the nature of aesthetic decision-making, communicative action, and the evolving relationship between humans and artificial intelligence. He is currently developing several articles exploring aesthetic decision-making capacity and the influence of unpredictability on the quality of human life.

Professionally, Marcel works at the Ministry of Infrastructure and Water Management, where he serves as a member of the Management Team within the Department of Soil, Spatial Planning, and Climate Adaptation. His interdisciplinary expertise and commitment to understanding human perception and behavior continue to shape his contributions to policy, organizational leadership, and academic inquiry.

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Relevance and computational theory languages in designing AI solutions

Theory lnguanges are tools designers use in constructing AI applications. These languanges have three important layer. The lowest level theory-languanges is formal, such as mathematics and logic. Their semantics is build on formal sets. Second level of AI languanges are computational. In them semantics is build on elements and operations which are meaningful in realworld. Finally, the highest level is natural language. In this system of three types of theory languages. The main difference between formal and computational theory languages is that in latter it makes sense to discuss relevance of information. One can ask whether a desing solution make sense thinking the task is intended to taske care of. Capacity to create mental representations with relevant elements and information structures is one major characteristic of human thinking. People define what is relevant, but in designing AI systems. Relevance opens thus also an important criterion for goodness of challece for designers. Machine intelligence opens an additional problem field for matascience of design. LLM:s for example are able to construct relevanvat information representaations as they rely on datamasses constructed by people and for this reason they have sense making structure. Relevance makes it necessary to develop holistic design processes for intelligent technologies.

Keywords
Relevance, Computatioal languages, AI

Biography
Pertti Saariluoma is professor of cognitive science (Emeritus) and research director in Jyväskylä University, Finland. He has studied and worked in Oxford, Carnegie Mellon, Cambridge Universities, IIASA, Aberdeen, Granada and Eindhoven. His work has concerned cogitive psychology of thinking, expertise and memory, foundations of scientific research, HTI, and AI-design methodologies. He has supervised over fifty thesis on the presented topics.

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Osondu Oguike and Mpho Primus
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A Dataset for Multimodal Music Information Retrieval of Sotho-Tswana Musical Videos

Sotho-Tswana languages are languages spoken by the Sotho-Tswana people in Southern Africa. They have been used to compose diverse musical videos on different social media platforms. Music Information Retrieval, MIR is a research area that combines Artificial Intelligence, like Natural Language Processing and Machine Learning to retrieve music information. It consists of the following tasks: music emotion/sentiment recognition, identification of singing language in music, music genre classification, etc. It bridges the gap between speakers of Sotho-Tswana languages and non-speakers of Sotho-Tswana languages in music information understanding. Since music communicates through different modalities, like lyrics, audio, and visual, music information retrieval tasks have been extended to include multimodal music information retrieval. Multimodal music information retrieval can only be possible with the availability of a multimodal music dataset. This effort creates a multimodal dataset for music information retrieval of Sotho-Tswana musical videos. The multimodal dataset combines three modalities, lyrics, audio, and visual modalities, with a recommended feature level/late fusion technique, which will be used to combine the results of model training of each of the various modalities.

Biography

Associate Professor Osondu Everestus OGUIKE is a native of Orji in Owerri North Local Government Area of Imo State. Nigeria. He attended the following schools, Orji Town Primary School, Orji Uratta, Owerri; Holy Ghost College, Owerri; University of Lagos, Lagos, Nigeria; Queen Mary and Westfield College, University of London and University of Nigeria, Nsukka. He obtained the following certificates, degrees and diploma, First School Leaving Certificate (1980), WAEC/GCE O' Level (1985), B.Sc (Hons.) Mathematics and Statistics (1990), PGD Information Technology and M.Sc Information Technology (1991) and Ph.D (Mathematical Modelling/Computational Mathematics) in January 2018. While in school, and at work place, he received the following academic awards/prizes, University of Lagos scholarship for the best students in 1987/88, best graduating student, Department of Mathematics, University of Lagos, Nigeria in 1988/89, ODA Shared Scholarship Scheme, Queen Mary and Westfield College, University of London in 1990/91, Intra-Africa Academic Mobility Scholarship, University of Yaounde, Cameroon, March 2022, Post-Doctoral Research Fellowship, University of Johannesburg, South Africa, 2023/2024. Though he has worked in the industry in Nigeria as Computer Programmer, he started his academic career at the University of Nigeria, Nsukka as Lecturer II, in 1999. He has continued there, till date as an Associate Professor in Computer Science. His research outputs have been published in impact factor, international journals and conference proceedings. He has served and currently serving as editorial board member in many international journals. He has served and currently serving as technical committee member in many international conferences, in different parts of the world. He has authored many books and book chapters. He has served as Head of Computer Science Department at Veritas University Abuja, and is currently the Head of Department of Department of Computer Science, University of Nigeria, Nsukka. He was part of the team that developed different course materials for the M.Sc (Artificial Intelligence), African Center of Excellence on Technology Enhanced Learning (ACETEL), National Open University of Nigeria.

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A Tutorial and Use Case Example of the eXtreme Gradient Boosting (XGBoost) Artificial Intelligence Algorithm for Drug Development Applications

Approaches to artificial intelligence and machine learning (AI/ML) continue to advance in the field of drug development. A sound understanding of the underlying concepts and guiding principles of AI/ML implementation is a prerequisite to identifying which AI/ML approach is most appropriate based on the context. This tutorial focuses on the concepts and implementation of the popular eXtreme Gradient Boosting (XGBoost) algorithm for classification and regression of simple clinical trial-like datasets. Emphasis is placed on relating the underlying concepts to the code implementation. In doing so, the aim is for the reader to gain knowledge about the underlying algorithm and become better-versed with how to implement the algorithm functions for relevant clinical drug development questions. In turn, this will provide practical ML experience which can be applied to algorithms and problems beyond the scope of this tutorial.

Keywords
XGBoost, Boosting, Quantitative Clinical Pharmacology

Biography
Dr. Jackson Burton is a Scientific Director in Clinical Pharmacology and Pharmacometrics at Biogen. He currently works in immunology and neurology therapeutic areas doing model-informed drug development. He is also active in understanding the applications of AI in drug development. Jackson was previously the Executive Director of the Quantitative Medicine Program at the Critical Path Institute overssing the development of quantitative solutions for neurological disorders, immunology and inflammation, rare diseases, and pediatrics. He earned his Ph.D. from the University of Arizona in applied math.

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Machine Learning for Real-time Detection of Complications during Neurosurgery

While surgical intervention offers the highest cure rate for neurovascular disorders, the complication rate remains high at 15%. The leading cause of complications is reduced cerebral blood flow (CBF) during the procedure, which causes brain tissue damage.1 Intraoperative CBF imaging provides vital information about vascular patency and cerebral perfusion to guide surgical decision-making that mitigates complications, however, the current intraoperative standard-of-care tool for CBF visualization, indocyanine green angiography (ICGA), cannot be performed continuously nor is it sensitive to tissue perfusion. We present on a novel imaging and computer-aided diagnosis (CAD) platform for real-time detection of complications related to cerebral blood flow during neurosurgery. Our platform is an optical imaging system augmented by machine learning algorithms. It utilizes the optical imaging technique laser speckle contrast imaging (LSCI), which produces real-time and continuous blood flow and perfusion images without injected dyes or tissue contact. We use the nnUNet framework adapted to our specific LSCI imaging modality to perform accurate, real-time segmentation of brain vessels, cortical tissue, and other structures. nnU-Net's self-configuring nature makes it ideal for surgical settings. We used intraoperative data from neurosurgery to apply nnU-Net for multiclass segmentation of LSCI during neurosurgery from n=6 patients including 109 training/validation images and 28 testing images. We achieved a mean Dice score of 0.695 and IoU of 0.570 on the test set. Class-wise Dice scores were 0.513 for blood vessels, 0.650 for cortical tissue, and 0.923 for non-vessels/non-tissue. These results indicate promising performance and we will present our plans for future optimization and initial results for applying the CAD platform for realtime detection of complications.

Keywords
nnU-Net, blood flow imaging, laser speckle contrast imaging, computer-aided diagnosis

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Biography

Dr. David Miller is an Assistant Professor of Neuroengineering at the University of Oklahoma (OU) Biomedical Engineering Department and adjunct Assistant Professor within the OU Department of Neurosurgery. Dr. Miller received his PhD in Biomedical Engineering from UT Austin, where he was an NSF Graduate Research Fellow. He completed a postdoctoral fellowship at Massachusetts General Hospital and Harvard Medical School. At OU, Dr. Miller leads the Translational Neuroimaging Lab which focuses on developing and translating novel neuroimaging and neuroengineering technology to better understand and treat brain diseases.

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Beating Bad-Actor AI

This talk addresses the growing challenge posed by the misuse of artificial intelligence (AI) to inflict societal harm. We begin by confronting four pivotal questions: What forms of bad-actor AI activity are likely to emerge? Where and when are these threats expected to materialize? And critically, how can such threats be controlled, and the impact of mitigation policies accurately predicted? In contrast to prevailing discourse grounded in speculative or verbal reasoning, our analysis is rooted in a uniquely detailed empirical mapping of current online bad-actor ecosystems, coupled with a first-principles mathematical modeling framework that captures their dynamics.

In the second part of the talk, we shift focus to the AI systems themselves, dissecting behavior at the fundamental level of the Attention mechanism—a core building block of modern AI architectures. By analyzing its function in detail, we reveal new vulnerabilities to manipulation and provide scientifically grounded guidance for designing more secure and resilient AI systems. This includes recommendations for architectural design, training protocols, and fine-tuning strategies. Our findings open up a new direction for understanding and countering adversarial manipulation of AI at both the macro and micro scales.

Biography

Neil Johnson is a professor of physics at GW and heads up a new initiative in Complexity and Data Science which combines cross-disciplinary fundamental research with data science to attack complex real-world problems. His research interests lie in the broad area of Complex Systems and ‘many-body’ out-of-equilibrium systems of collections of objects, ranging from crowds of particles to crowds of people and from environments as distinct as quantum information processing in nanostructures through to the online world of collective behavior on social media.

He is a Fellow of the American Physical Society (APS) and is the recipient of the 2018 Burton Award from the APS. He received his BA/MA from St. John's College, Cambridge, University of Cambridge and his PhD as a Kennedy Scholar from Harvard University. He was a Research Fellow at the University of Cambridge, and later a Professor of Physics at the University of Oxford until 2007, having joined the faculty in 1992. Following a period as Professor of Physics at the University of Miami, he was appointed Professor of Physics at George Washington University in 2018. He presented the Royal Institution Christmas Lectures "Arrows of Time" on BBC TV in 1999. He has more than 300 published research papers across a variety of research topics and has supervised the doctoral theses of more than 25 students. His published books include.

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Leveraging AI Beings for Personalized Learning and Patient Engagement

The integration of artificial intelligence (AI) in education has transformed both teaching and learner engagement, particularly within flipped classroom models. This seminar explores the dual role of adaptive AI beings in reshaping medical education and extending their utility into patient education pathways. Drawing on research from a series of implementation studies—including published findings from middle school to medical schools and residensy rpograms—the present seminar examines how conversational AI tutors (via the edYOU platform; Los Angeles, CA, USA) enhance academic performance, engagement, and real-time feedback in undergraduate and graduate medical education. Central to this approach are the Personalized Ingestion Engine (PIE), which tailors content to each learner's needs, and the Intelligent Curation Engine (ICE), which ensures ethical, bias-free, and secure delivery of educational material. Together, these systems support dynamic adaptation, meaningful feedback, and instructional integrity. Building on this foundation, we further explore how the same AI-powered adaptive logic is being repurposed to guide patients through evidence-based digital Health Journeys. These journeys—such as the "Painless" series—automate behavioral interventions and deliver tailored resources in response to patient assessments, providing scalable support in primary care, pain management, mental wellness, and lifestyle modification. This presentation showcases AI-driven personalization for lifelong learning in education and healthcare. It will cover training, patient self-management, and digital medicine strategies at the population level.

Keywords
Artificial Intelligence in Education; Flipped Classroom; Personalized Learning; Conversational AI; Digital Health Journeys; Adaptive Learning Technologies

Biography
Dr. Marcos A. Sanchez-Gonzalez is a physician-scientist, healthcare executive, and educator with nearly two decades of experience across academia, clinical care, and the pharmaceutical industry. At LECOM, he serves as Adjunct Professor of Health Services Administration and Lead Professor for AI in Healthcare and Machine Learning. He is also the Chief Research Officer at edYOU, where he leads AI-enhanced learning innovation, and Vice President of Medical & Scientific Affairs at QHSLab, advancing digital health strategies. Dr. Sanchez-Gonzalez is recognized for his leadership in quality improvement, curriculum innovation, and translational research that improves clinical outcomes.

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Robert Worden

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Static and Dynamic Connectionism

Artificial neural nets typically use simple units modelled on the McCulloch-Pitts neuron, with static connectivity defined by physical synaptic links, and synapse-based learning. Real neurons may have much greater computational capability. Processes of neuron growth and maintance use complex chemical signalling between cell bodies and synapses, ferrying chemical messengers over microtubules and actin fibres. These processes could support computation which, while slower than neural electrical signalling, allows any neuron to act as a complex Finite State Machine (FSM), changing state over intervals of seconds. The FSM can selectively de-activate synapses, allowing network connectivity to change dynamically, sculpting a dynamic neural net from the static neural connections. The dynamic net can do fast electrical computation. The dynamic neural net has the potential to (a) represent dynamic data structures, such as trees and graphs of unlimited depth; (b) use slowly changing metadata to define the meaning offast-changing electrical signals; (c) use alternative models of memory and learning, whose speed comes closer to animal learning, unlike the glacial learning rates of static neural nets. It may also support the more efficient evolution of animal brains. These proposals are illustrated by simulations. They can be applied to artificial neural nets, opening up new capabilities – such as learning at biologically realistic speeds.

Keywords

dynamic neural net; intra-neural computation; dynamic data structures; Finite State Machine; metadata; memory; learning.

Biography

Dr. Robert Worden did research in high energy physics at Cambridge, CalTech and CERN, before working in commercial computer software. He ran a corporate research center in Cambridge , researching software engineering, AI and human-computer interfaces. He has published papers on AI, evolution, neuroscience, and cognitive science including language and consciousness.

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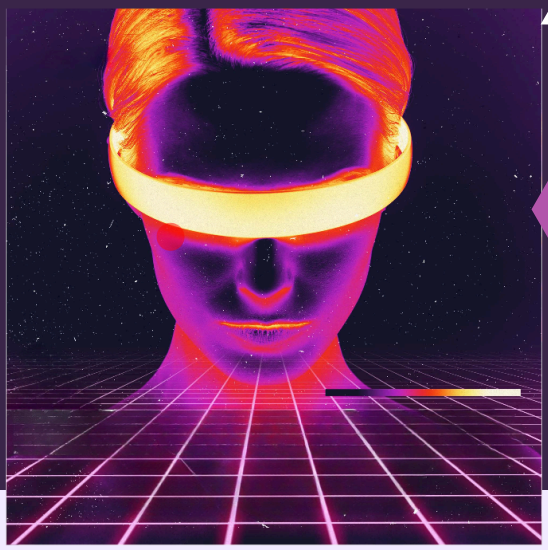

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