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AIM 2025

JUNE 09-11, 2025 | Seattle, WA

ABSTRACT BOOK

2nd International Conference on

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

June 09-11, 2025, Seattle, WA

June 12, 2025, Online

DoubleTree by Hilton Hotel Seattle Airport
18740 International Blvd
Seattle, WA

aim@uniscigroup.org

https://artificialintelligence.unitedscientificgroup.org/

Key Note Presentations

Topology for AI

Gunnar Carlsson

BluelightAI, Inc. and Department of Mathematics, Stanford University

Abstract:

I will talk about how topological methods can be used for feature engineering particularly appropriate for natural networks, the general idea of graph structures for feature sets of features for data sets with many features, and discuss how one might extend the ideas to large language models.

Biography:

Dr. Gunner Carlsson is a Professor Emeritus at Stanford University. Taught at University of Chicago, University of California (San Diego), Princeton University, and since 1991 at Stanford University. Emeritus since 2015. Led various NSF and DARPA initiatives on topological data analysis, founded Ayasdi Inc. (2008), Founded BluelightAI (2021)

GenAI Trajectory: From Democratization to the Average Trap to Model Collapse

Ming-Hui Huang[1]*, Roland T. Rust[2]*

[1]National Taiwan University, Taipei, Taiwan
[2]University of Maryland, College Park, MD

Abstract:

We propose a conceptual trajectory—"democratization–average trap–model collapse"—to characterize emerging challenges in the development of generative AI (GenAI). This framework outlines how GenAI systems, as scale and diffuse, face compounded issues in data quality, model behavior, and alignment. Democratization increases accessibility and participation, enriching training data with broader representation. However, this also amplifies existing real-world biases, embedding sociocultural and demographic imbalances at scale. The Average Trap arises from next-token prediction objectives, leading models to overfit to high-probability patterns. Outputs become increasingly generic, suppressing originality and underrepresenting minority or edge-case content. Model Collapse occurs when GenAI models are recursively trained on their own outputs, degrading data diversity and semantic richness. This self-reinforcement accelerates divergence from human intent, reinforcing machine biases. To address these issues, we advocate: leveraging democratization for equity-aware data practices; mitigating the average trap via targeted fine-tuning and diversity-promoting generation techniques; and preventing model collapse through hybrid training (human + synthetic data), human-in-the-loop feedback, and cognitively grounded alignment strategies. We outline three directions for future research: preserving data distribution tails, countering entropy loss in generation, and designing interventions to reverse collapse trajectories in large-scale GenAI systems.

Biography:

Ming-Hui Huang is University Chair Professor and Distinguished Professor of Information Management at National Taiwan University. She earned her PhD from the University of Wisconsin-Madison. Globally recognized, she is a ScholarGPS 2024 Top 1% AI Scholar, a Scopus Top 2% Scientist (2022–2024), and a Clarivate 2023 Top 1% Highly Cited Researcher. Professor Huang is a Fellow of both the Association for Information Systems (AIS) and the European Marketing Academy (EMAC). She has been a Distinguished Research Fellow at the University of Maryland and was an International Research Fellow at the University of Oxford. She currently serve as Editor-in-Chief of the *Journal of Service Research*.

Roland T. Rust is Distinguished University Professor and David Bruce Smith Chair in Marketing at the University of Maryland's Robert H. Smith School of Business, and founder of the Center for Excellence in Service. He is VP of Publications for the American Marketing Association. Named among the top 100 "Best Scientists in Business and Management" by research.com, his honors include the AMA Irwin/McGraw-Hill Distinguished Marketing Educator Award, EMAC Distinguished Marketing Scholar Award, and Fellow-

ships in INFORMS and the American Statistical Association. He has edited leading journals, founded major conferences, consulted globally, and earned honorary doctorates from Switzerland and Norway.

Designing Safe SuperIntelligence

Craig A. Kaplan, PhD

iQ Company, USA

Abstract:

SuperIntelligence (SI) can be defined as advanced AI that can outperform humans on any cognitive task. SI may create tremendous benefits for humanity, but it also poses an existential threat to human existence if it is not developed safely.

Researchers face at least six challenges in developing safe, human-aligned SuperIntelligence (SI). First, we need safe SI by design. Second, we need a transparent and understandable SI. Third, we need to maintain some level of control as SI outstrips human ability to monitor its behavior. Fourth, we need means to align SI initially and to maintain alignment as SI increases in intelligence. Fifth, we need scalable safety mechanisms. Sixth, the design for SI must handle potential exponential changes in the SI's level of intelligence. The current approach to using machine learning to develop opaque models, supplemented by RLHF to test in safety, cannot meet these challenges.

We need a new approach emphasizing safety and alignment by design. One possible design for SI leverages the collective intelligence of many human and AI agents using a rigorous, transparent architecture that supports problem-solving, learning, and self-improvement. This design is compatible with current LLMs and foundation models. It is less costly, more powerful, and faster to develop than training trillion-parameter LLMs. Most importantly, it maximizes alignment with broadly representative human values and maintains dynamic alignment even as the SI surpasses human monitoring capabilities. More information about this design approach is available at SuperIntelligence.com.

Biography:

Dr. Craig A. Kaplan is the CEO of iQ Company and the founder of SuperIntelligence.com, specializing in AGI and SuperIntelligence. He previously founded PredictWallStreet, building intelligent systems used by hedge funds, and holds numerous patents on AI-related technologies. His work focuses on applying collective intelligence and quantitative modeling to design systems that learn, adapt, and make decisions in complex environments. His publications include a book, scientific journal articles, and blockchain whitepapers. Kaplan earned his PhD from Carnegie Mellon, where he co-authored research with Nobel Laureate Dr. Herbert A. Simon, a pioneer in artificial intelligence and decision theory.

Do we stand a chance? On Rapid Advancement of Generative AI.

David Doermann

University at Buffalo, Buffalo, NY, USA

Abstract:

The rapid evolution of generative AI has ushered in a new era of technological capability one that challenges our assumptions about creativity, labor, ethics, and even human identity. This keynote confronts a provocative and urgent question: Do we still stand a chance … of telling the difference? As generative models become increasingly sophisticated, capable of producing humanlike text, images,video, music, and code, the boundary between human and machinegenerated content is blurring at an unprecedented pace. In this talk, we explore the implications of this blurred boundary and what it means for trust in digital communications. Can detection tools keep pace with the models they aim to expose? And what happens when even experts can no longer reliably tell the difference? But this is more than a technical issue, it's a societal one. As AIgenerated content becomes ubiquitous, we must ask: Should we always know the origin of what we consume? And if not, what values are we willing to compromise? In a world where the artificial can so easily pass for the authentic, our ability to discern and our commitment to transparency—may be our last line of defense.

Biography:

Dr. David Doermann is a professor of Empire Innovation and the Chair of the Department ofComputer Science and Engineering at the University at Buffalo (UB). He was the inaugural director of the Institute

for Artificial Intelligence and Data Science (IAD) from 2018 2023. Before coming to UB, he was a program manager at the Information Innovation Office of the Defense Advanced Research Projects Agency (DARPA). At DARPA, he developed, selected, and oversaw research and transition funding in computer vision, human language technologies, voice analytics, and media forensics.

AI Agents Renaissance: Personalization, Proactivity, and Privacy

Chirag Shah

University of Washington, WA, USA

Abstract:

Dr. Chirag Shah reveals the compelling rebirth of autonomous agents in our AI-saturated world. This talk examines the critical evolution of AI agents—unpacking successes and failures while highlighting the essential dimensions of trustworthiness in modern systems. Shah presents a vision for responsible, human-centered agents that safeguard privacy by design, limiting data collection and ensuring user control over personal information. Experience how truly intelligent systems can proactively anticipate needs without intrusion, offering personalized assistance that adapts to individual preferences, behaviors, and contexts. Learn how tomorrow's AI partnerships can solve real problems while upholding human values, autonomy, and accountability—creating systems we can confidently rely on for consequential decisions in an increasingly automated world without compromising our digital rights or privacy expectations.

Biography:

Chirag Shah is Professor of Information and Computer Science at University of Washington (UW) in Seattle. He is the Founding Director for InfoSeeking Lab and Founding Co-Director of Center for Responsibility in AI Systems & Experiences (RAISE). His research focuses on building, auditing, and correcting intelligent information access systems. In addition to creating AI-driven information access systems that provide more personalized reactive and proactive recommendations, he is also focusing on making such systems transparent, fair, and free of biases. Shah is a Distinguished Member of ACM as well as ASIS&T, and a Senior Member of IEEE. He has published nearly 200 peer-reviewed articles and authored seven books, including text books on data science and machine learning. He also works closely with industrial research labs on cutting-edge problems, typically as a visiting researcher. The most recent engagements include Amazon, ByteDance, Getty Images, Microsoft Research, and Spotify

Oral Presentations

SensorChat: Interacting with Multimodal Sensors in Daily Life using Natural Language

Xiaofan Yu[1*], Lanxiang Hu[1], Benjamin Reichman[2], Dylan Chu[1], Rushil Chandrupatla[1], Xiyuan Zhang[1], Jack Truxal[2], Atishay Jain[2], Larry Heck[2], Tajana Rosing[1]

[1]University of California San Diego, USA; 2 Georgia Institute of Technology, USA

Abstract:

Natural language interaction with sensing systems is crucial for enabling all users to comprehend sensor data and its impact on their everyday lives. However, existing systems, which typically operate in a Question Answering (QA) manner, are significantly limited in terms of the duration and complexity of sensor data they can handle.

In this talk, I will introduce our latest contributions, SensorQA and SensorChat. SensorQA is a human-created question-answering (QA) dataset for long-term time-series sensor data (e.g., IMU signals) collected during daily life monitoring. It includes 5.6K diverse and practical queries that reflect genuine human interests, paired with accurate answers derived from sensor data. SensorChat is an end-to-end system solution designed for answering real-life questions based on sensor data. SensorChat can effectively answer both qualitative (requiring high-level reasoning) and quantitative (requiring accurate responses derived from sensor data) questions. To achieve this, SensorChat uses a three-stage pipeline that includes question decomposition, sensor data query, and answer assembly, with the first and third stages powered by Large Language Models (LLMs). We implement SensorChat and demonstrate its capability for real-time interactions on a cloud server while also being able to run entirely on edge platforms after quantization.

Biography:

Xiaofan Yu is a Ph.D. candidate with the Department of Computer Science and Engineering at University of California, San Diego. Her research focuses on embedded systems and edge computing. Her work has been published in SenSys, IPSN, IoTDI, DAC, DATE, TCAD, AAAI, etc. Xiaofan has successfully led collaborations with faculty at top universities, including Georgia Tech and UPenn, as well as industrial labs such as Arm and Intel. Her work has earned her recognition as an EECS Rising Star in 2022, a CPS Rising Star in 2023 and a ML & Systems Rising Star in 2024. Xiaofan received her B.S. degree from Peking University, China in 2018 and her M.S. degree from University of California, San Diego in 2020.

The Gap between Artificial General Intelligence and Generative Artificial General Intelligence

Henry Hexmoor

Southern Illinois University, Carbondale, IL 62901

Abstract:

I outline the foundations and promises of Generative AI, contrasted with Artificial General Artificial Intelligence. I argue about the growing need for evolving change in the roles of mixed teams of humans and machines. Mixed initiation is a prominent focus, as is the responsibility and accountability of initiators and participants. I remark on the emergence of synthetic consciousness, projections, and implications for future developments, as well as collective clarion calls for action.

Biography:

Henry Hexmoor received an M.S. degree from Georgia Tech, Atlanta, and a Ph.D. degree in computer science from the State University of New York, Buffalo, in 1996. He taught at the University of North Dakota before a stint at the University of Arkansas. Currently, he is a tenured Professor with the School of Computing, Southern Illinois University, Carbondale, IL. He has published widely in artificial intelligence and multiagent systems. His long-term and sponsored research includes federal and state agencies and prime contractors. He is an IEEE senior member. His current interests include Cyber-physical systems, Wireless networks, Complex Networks, Multiagent Systems, cognitive science, Robotics, Digital forensics, Blockchain, and Artificial Intelligence.

How Does Critical Batch Size Scale in Pre-training?

Presenter and Co-author names: Hanlin Zhang1*, Depen Morwani1, Nikhil Vyas1, Jingfeng Wu2, Difan Zou3, Udaya Ghai4, Dean Foster4, Sham Kakade1,5

[1]*Harvard University, USA*
[2]*University of California, Berkeley, USA*
[3]*The University of Hong Kong, China*
[4]*Amazon, USA*
[5]*Kempner Institute*

Abstract:

Pre-training large machine learning models involves critical decisions regarding model size, data selection, and optimization hyperparameters, each carrying significant computational costs. Scaling laws, such as the Chinchilla scaling law, provide guidance on balancing compute budgets with performance by informing trade-offs between model size and dataset size. However, these laws often overlook practical considerations like wall-clock time, which is heavily influenced by batch size due to data parallelism. This study introduces the concept of Critical Batch Size (CBS), defined as the batch size beyond which increasing it no longer reduces wall-clock time without incurring additional compute overhead. Empirical investigations on autoregressive transformer-based language models, ranging from 85 million to 1.2 billion parameters and trained on the C4 corpus, reveal that CBS scales with dataset size rather than model size. Specifically, CBS follows a power law with the dataset size, indicating that training on larger datasets allows for more data parallelism and reduces the number of optimization steps needed to reach a target loss. Theoretical analyses support these findings, demonstrating that in infinite-width regimes, CBS remains nearly invariant when scaling up model size but increases with dataset size under certain conditions. These insights suggest that focusing on dataset size is more beneficial for optimizing data parallelism in large-scale pre-training than merely increasing model size.

Biography:

Hanlin Zhang is a Computer Science Ph.D. student at Harvard University, advised by Sham Kakade. He works on scientific foundations of machine learning and generative AI. He received his master's degree at Carnegie Mellon University under Eric Xing and has previously worked at Google, Amazon, Microsoft, and Mila.

The AI content revolution in E-commerce: Boosting Sales, Tracking Ethics, and shaping Tomorrow's Shopping

Presenter* and Co-author names : Aditi M Jain*

[1]Amazon, USA

Abstract :

In the rapidly evolving landscape of e-commerce, AI-generated content is revolutionizing how brands interact with consumers. This talk delves into the cutting-edge technologies driving this transformation, exploring the intricate interplay between large language models, computer vision, and personalization algorithms in creating dynamic, engaging e-commerce experiences.

We'll examine the architecture of state-of-the-art generative AI systems designed specifically for e-commerce, discussing how they leverage vast product catalogs, user behavior data, and natural language processing to create compelling, personalized product descriptions, recommendations, and marketing copy at scale. The talk will showcase real-world examples of how these systems are dramatically improving conversion rates, user engagement, and operational efficiency. However, with great power comes great responsibility. We'll critically analyze the ethical implications of AI-generated content in e-commerce, addressing concerns about transparency, potential biases, and the impact on human creativity and jobs. We'll explore technical solutions to these challenges, including explainable AI models and bias detection algorithms. Looking ahead, we'll discuss emerging trends such as multimodal AI that combines text, image, and video generation, and the potential of federated learning to enhance personalization while preserving user privacy. We'll conclude with a roadmap for the future, outlining how e-commerce platforms can responsibly harness the power of AI-generated content to create more engaging, efficient, and ethical shopping experiences. Join us for an insightful journey into the technological frontier of AI-powered e-commerce content generation.

Biography:

As an AI specialist and software developer, I've implemented cutting-edge technologies in e-commerce and content creation. My recent work includes developing a generative AI platform for optimizing brand content on major retail sites, directly addressing the challenges and opportunities of AI-generated content in e-commerce. I've published several papers in IEEE-sponsored conferences on AI-driven content creation, personalization systems, and the ethical considerations of AI in digital platforms. My research spans topics from novel architectures for personalized user experiences to the implications of large language models in commercial applications.

Evaluating a ReAct-Based Agent for Agricultural Planning

Karanbir Singh

Salesforce, USA

Abstract:

Planning is a core aspect of intelligence, enabling both humans and AI to address complex challenges. This talk explores the capabilities of AI-driven agents to reason and plan, using the intersection of AI and agricultural planning as a practical testbed. Focusing on the Gardening Planner, a ReAct-based agent, the study integrates advanced tools such as Retrieval-Augmented Generation (RAG), weather forecast APIs, and dynamic web search to generate personalized, context-aware crop plans. While the agent demonstrates potential, achieving effective plans only 50% of the time, the findings reveal critical limitations in its reasoning and planning processes. This talk offers insights into the challenges of deploying AI in dynamic, real-world scenarios and its implications for advancing agent-based intelligence.

Biography:

Karanbir Singh is a Senior Software Engineer at Salesforce with over seven years of expertise in AI/ML en-

gineering, backend systems, and time series analysis. As a Senior IEEE Member and speaker, he has presented on AI, Responsible AI, and RAG systems. His research includes Kubernetes resource optimization and AI in agriculture.

Prediction of Mental Health Disorder: An Identification of Precise and Reliable Machine Learning Algorithm

Dawood Qamar[1*] (Presenter and Crossponding Author), Waheed Anwar[2], Salman Bahoo[3]

[1]The Islamia University of Bahawalpur, Pakistan, Bahawalpur, 06314.
[2]The Islamia University of Bahawalpur, Pakistan, Bahawalpur, 06314.
[3]EDC Paris Business School, France, Paris, 92807.

Abstract:

This paper identifies machine learning (ML) algorithms based on their exceptional precision and reliability in predicting mental health disorders data of 187000 New York State office mental health patients. The eight ML algorithms, such as Support Vector Machines, Decision Trees, Random Forest, Naive Bayes, Gradient Boost Classifier, K Neighbors, Logistic Regressions, and Stacking, are trained by using matrices of the PR curve,Confusion Matrix, and F1 Confidence Curve. The Stacking Model emerged as the top performer, achieving an impressive accuracy rate of 97.9% and a weighted average F1 score of 98%. These findings have significant implications for advancing a more precise ML algorithm for predicting mental health disorders.

Keywords: Mental Health Disorder; Machine Learning; Stacking Model; Decision Tree; Random Forest

Biography:

Dawood Qamar affiliated with Department of Computer Science, The Islamia University of Bahawalpur, Pakistan. He is M. Phil in Computer Science (specialized in Artificial Intellige) and works as an expert with companies related to AI. His research interest is related to Artificial Intelligence and Machine Learning. He published his research in Technology Forecasting and Social Change.

Advanced Strategies for Traffic Management and Safety in Cooperative ITS with NGSIM

Sultan Ahmed Almalki[1*]

Najran University, Kingdom of Saudi Arabia

Abstract:

The research introduces a new extensive framework which utilizes NGSIM data combined with modern machine learning approaches for bettering C-ITS operations regarding both traffic movement efficiency and security. The operation of C-ITS depends heavily on both efficient traffic management and strong cybersecurity because autonomous vehicles and smart city infrastructure increases rapidly. LSTM models bring improvements to traffic efficiency through their application which leads to noticeable congestion reduction as well as substantial increases in vehicle throughputs. A security-focused model formed from Autoencoder and Isolation Forest components serves to detect False Data Injection Attacks (FDIA) while delivering high precision results for protecting C-ITS systems.

The LSTM-based traffic optimization model achieves improved results compared to Random Forest and Gradient Boosting Machines in experimental testing since it delivers a 14.5% rise in vehicle throughput combined with an 18.7% improvement in traffic flow reduction. When applied to cybersecurity monitoring the FDIA detection model reaches a F1-score rate of 0.943 while reaching an AUC-ROC value of 0.981 superior to K-Means clustering and typical threshold-based detection methods. Through this comprehensive solution the transportation network obtains better operational traffic flow while securing itself against cyber-attacks that are essential for contemporary urban transportation system stability.

The proposed framework shows adequate scalability along with flexible characteristics which aligns well with fast-evolving urban areas that need to scale up their technologies. The study represents a major advancement in the development of secure transportation systems through efficient intelligent systems which benefit smart cities and connected and autonomous vehicles of the future.

Biography:

Currently an Assistant professor of Computer Department, Applied College, Najran University, Saudi Arabia. He received the B.Sc. degree in Information systems from King Abdul Aziz University, Saudi Arabia, the M.Sc. degree in Computer Science from Saint Xavier University, United States of America, and the Ph.D. degree in Computer Science from University of Idaho, United States of America. His research interests include, but not limited to Malware Analysis, Data Analysis, IDS, Artificial Intelligence, and Machine Learning.

Towards Interpretable, Adaptive, and Robust Online Machine Learning for Data Streams with Multiple Streaming Natures

Zhong Chen[1*]

[1]School of Computing, Southern Illinois University, IL, United States.

Abstract:

Online machine learning (OL) aims to learn a model incrementally from streaming data in a sequential manner, which is significantly different from conventional batch-based offline machine learning paradigms that require the availability of all data before training a model. Due to its high scalability and efficiency, it has been shown to be effective in handling large-scale and high-velocity data streams. However, most existing studies for OL neglect some important streaming natures of data streams, such as skewed distributions, concept drifts, streaming features, and mix-typed features. To the end, we investigated a set of intelligent online machine learning methods that are able to tackle the highdimensional data streams with skewed distributions (Part I), handle concept-drifting and noisy streaming data (Part II), promote sparse online learning from data streams with streaming features (Part III), and model the correlation among mix-typed features (Part IV). We will also discuss some potential streaming applications for online anomaly detection, and future work on online semi-supervised learning, online label shift or distribution learning, and online continuous learning.

Biography:

Zhong Chen is an Assistant Professor at School of Computing, Southern Illinois University, Carbondale, IL, United States. His research investigates the theoretical foundations of online and incremental machine learning for streaming data analysis, and deep learning enhanced methodologies for environmental data analysis, cancer health disparity studies, 3D dose prediction for cancer radiation therapy, and health-related AI applications. He has published 45 (21 first-authored) peer-reviewed articles in scientific journals and conferences such as PRL, IVC, JMLC, KAIS, T-IV, T-ITS, TCBB, Bioinformatics, MLJ, SDM, IEEE BigData, ICDM, CIKM, ECMLPKDD, DSAA, and AAAI. He has been invited to serve as the ad hoc reviewer and PC member of TCRT, INS, TMI, TFS, TKDD, TGCN, IoT, TCSS, TNNLS, TV, JMLC, ICDM, SDM, AAAI, CIKM, IJCAI, BIBM, PAKDD, KDD, FAccT, SMC, ICPR, ECMLPKDD, AAAI-AISI, ECAI, ICLR, and ICME.

Training Strategies for Remote Sensing Object Detection

Yechan Kim[1] , Jonghyun Park[1] , Sooyeon Kim[1] , Moongu Jeon[1*]

[1]Gwangju Institute of Science and Technologyy, S. Korea

Abstract:

Modern detectors in computer vision typically have a backbone network to extractuseful features from raw input images, and common practice with them is to initialize it with pre-trained weights available online. To process remote-sensing images, we usually need the fine-tuning of the backbone. While the prolonged training could lead to over-fitting, it can gradually extract deeper insights and richer representations from raw data. Adjustingthese competing factors is critical for the model achieve optimal performance. In this research, we propose a novel method named the Dynamic Backbone Freezing to produceoptimal features with long-term training dynamically. Extensive experiments on DOTA and DIOR-R demonstrate that our approach helps to learn more accurate model while we can reduce computational costs substantially in long-term training. Our proposed method can be seamlessly adopted without additional effort due to its straightforward design.

Biography:

Dr. Moongu Jeon received a B.S. degree in architectural engineering from Korea University, Seoul, South Korea, in 1988 and M.S. and Ph.D. degrees in computer science and scientific computation from the Uni-

versity of Minnesota, Minneapolis, MN, USA, in 1999 and 2001, respectively. As a postgraduate researcher, he worked at the University of California at Santa Barbara, Santa Barbara, CA, USA, from 2001 to 2003 and then moved to the National Research Council of Canada, where he worked on the biodiagnostics and image processing until 2005. In 2005, he joined the Gwangju Institute of Science and Technology, Gwangju, South Korea, where he is currently a full professor with the School of Electrical Engineering and Computer Science. His current research interests are in machine learning, computer vision and artificial intelligence.

Concave-Regularized Neural Networks for High-Dimensional Feature Selection

Bin Luo[1*] and Susan Halabi[2]

[1]Kenesaw State University, USA
[2]Duke University, USA

Abstract:

Simultaneous feature selection and non-linear function estimation are challenging, especially in high-dimensional settings where the number of variables exceeds the available sample size in modeling. We investigate the problem of feature selection in neural networks. Although the group LASSO has been utilized to select variables for learning with neural networks, it tends to select unimportant variables into the model to compensate for its over-shrinkage. To overcome this limitation, we propose a framework of sparse-input neural networks using group concave regularization for feature selection in both low-dimensional and high-dimensional settings. The main idea is to apply a proper concave penalty to the l_2 norm of weights from all outgoing connections of each input node and thus obtain a neural net that only uses a small subset of the original variables. We also develop an efficient algorithm based on backward path-wise optimization to produce stable solution paths and tackle complex optimization landscapes. Our extensive simulation studies and real data examples demonstrate satisfactory finite-sample performances of the proposed estimator, in feature selection and prediction for modeling continuous, binary, and time-to-event outcomes.

Biography:

Bin Luo is an Assistant Professor in the School of Data Science and Analytics at Kennesaw State University. He holds a Ph.D. in Computational Mathematics from the University of North Carolina at Greensboro and previously worked as a Postdoctoral Associate in the Department of Biostatistics and Bioinformatics at Duke University. His research focuses on high-dimensional data, survival analysis, robust statistics, deep neural networks, and their applications in genomics and cancer research. He is particularly interested in integrating AI techniques into statistical modeling to enhance real-world data analysis in health sciences.

Financial Fraud Detection with Entropy Computing

Lac Nguyen[*] and Babak Emami, Wesley Dyk, David Haycraft, Carrie Spear, Nicholas Chancellor

Quantum Computing Inc, 5 Marine View Plaza, Hoboken, NJ 07463

Abstract:

We propose a novel approach for detecting financial fraud using CVQBoost, a continuous-variable optimization method that determines the weight of a subset of weak classifiers to form a stronger ensemble classifier. The motivation of this technique is to map natively into Dirac-3 quantum optimization machine, an hybrid hardware implementation of Quantum Computing Inc's Entropy Quantum Computing (EQC) paradigm \cite{Nguyen et. Al. arXiv:2407.0451}. To evaluate the efficiency of our approach, we benchmark CVQBoost running on Dirac-3 to XGBoost running on 48 CPUs and 4 NVIDIA L4 GPUs via RAPIDS AI framework. Our results demonstrate that as the size of the training dataset and the number of features increase, CVQBoost on Dirac-3 achieves a runtime advantage of up to 20× compared to its classical counterpart while maintaining an area under the curve (AUC) score of 0.88 on both the Kaggle Credit Card Fraud public dataset and a synthetic dataset. These findings highlight the potential of the CVQBoost algorithm on quantum optimization hardware to drive broader adoption of unconventional computing approaches in financial fraud detection.

Biography:

Lac Nguyen is Quantum Technology Lead at Quantum Computing Inc. She works with passionate and tal-

ented scientists and engineers with diverse backgrounds to design and develop open quantum systems on lithium niobate platforms that are resilient, SWAP-C capable, room-temperature, scalable, and sustainable. She has more than eight years of experience in quantum information science, quantum optics, and quantum and classical communication. She is holding multiple patents that presents core technologies at QCi, including the Edison Patent Award in Science and Technology in 2023.

Advancing Arabic NLP: Evaluating Large Language Models for Emotion Detection in Digital Communication

Mohammed Alshahrani[1*]

Computer Department, Applied College, Najran University, Najran 66462, Saudi Arabia

Abstract:

Emotion detection in Arabic natural language processing (NLP) presents unique challenges due to linguistic complexity,dialectal diversity, and cultural nuances. With the increasing reliance on digital platforms and social media for communication,accurately detecting emotions in Arabic text has become crucial for applications in sentiment analysis, mental health monitoring,and user engagement analytics. This study investigates the effectiveness of pre-trained transformer-based language models,specifically AraBERT and GPT-4, in classifying emotions expressed in Arabic text. We evaluate their ability to distinguish finegrainedemotions and explore their potential as automatic labeling tools to improve emotion classification accuracy in real-world scenarios.

By analyzing public reactions to major events on social media and digital platforms, we assess the strengths and limitations of generative models like GPT-4 and fine-tuned models such as AraBERT in understanding Arabic emotional expressions. Our findings reveal the impact of domain adaptation, pre-training strategies, and dataset quality on the performance of emotion detection models. We further discuss the challenges posed by code-switching, dialect variations, and limited annotated resources in Arabic NLP. Additionally, we explore methods to enhance emotion classification through hybrid modeling techniques and context-aware training.

This study contributes to the ongoing development of Arabic NLP by providing insights into optimizing transformer-based models for sentiment analysis and affective computing. The results offer practical implications for researchers and developers working on emotion-aware applications, including social media monitoring, crisis response, and AI-driven customer interactions in Arabic-speaking communities.

Biography:

I am an Assistant Professor at Najran University, specializing in Artificial Intelligence, Natural Language Processing, and Data Science. I hold a Ph.D. in Computer Science from the University of Essex, UK. My research focuses on AI in general, NLP, machine learning, and big data analytics, with multiple publications in renowned journals.

From Thought to Motion: Unifying Agentic 'Brains' and Physical 'Muscles' for End-to-End Embodied Intelligence

Arit Kumar Bishwas

PricewaterhouseCoopers, CA, USA

Abstract: Not Available

Poster Presentations

Artificial Intelligence Adoption and its Effect on Online Retail Marketing Performance in Emerging Markets.

Chivizhe, Takunda Victor

Wits Business School, University of the Witwatersrand, Johannesburg, South Africa

Abstract:

Digital marketers are facing the challenge of improving marketing performance, particularly in terms of non-financial metrics such as service quality and customer satisfaction, within an increasingly data-driven marketplace. Despite significant advancements in digital transformation within the Fourth Industrial Revolution, digital marketers continue to struggle with finding effective strategies to enhance customer experiences and deliver personalised services that meet the shifting expectations of digital consumers. This comprehensive study conducted in three of Africa's emerging markets, addresses a pressing question; could the adoption of AI digital assistants be the solution to this challenge? The study examines how AI, especially in the form of digital assistants, chatbots, image recognition, voice recognition and semantic analysis, can revolutionise online retail by improving non-financial performance metrics. By automating customer interactions, tailoring recommendations, and optimising customer service processes, AI has the potential to significantly enhance service quality and customer satisfaction, surpassing what traditional marketing approaches can achieve. The study also examines if the AI-driven solutions can address the growing complexity of digital consumer demands, offering digital marketers AI driven solutions to augment marketing performance in a highly competitive, data-centric environment.

This understanding is particularly valuable, as the successful adoption of AI digital assistants and their effect on online retail marketing performance could reshape marketing strategies not only in emerging markets but globally. If AI proves effective in enhancing these non-financial metrics, businesses in the African emerging markets will be better equipped to tailor their marketing efforts, strengthen customer relationships, and achieve long-term success. This study helps fill a gap in existing literature by providing practical insights into the role of AI in improving marketing performance within under-explored research contexts, emerging markets in Africa. Likewise, the study addresses this gap by testing an integrated conceptual model that combines the SERVQUAL model and the Expectation Confirmation Theory to examine AI adoption and its effect on online retail marketing performance in emerging markets. The research design employs a quantitative descriptive approach, with three separate studies conducted across Kenya, Nigeria, and South Africa. A total of 871 respondents from the online retail sectors across the selected emerging markets participate in online surveys to provide insights into the effects of AI digital assistants on service quality and customer satisfaction. SPSS and AMOS are utilised for data analysis. By adopting a multi-dimensional conceptualisation of marketing performance, this research identifies that reliability, responsiveness, service quality, expectations, perceived performance, customer satisfaction of AI digital assistants as determinants of enhancing online retail marketing performance in emerging markets. However, Study 1 conducted in South Africa does not support the hypothesis that the perceived performance of digital assistants positively influences customer satisfaction. To the best of the researchers' knowledge, this is the first study to integrate four distinct AI digital assistants and examine their effect on marketing performance using service quality and customer satisfaction metrics across three diverse research contexts within emerging African markets. This study makes a significant contribution to both digital marketing and AI literature, while also offering valuable practical insights for practitioners aiming to navigate the evolving digital landscape in these regions. The dynamic shift in digital consumer demands highlighted in this study underscores the pressing need to explore their perspective on AI digital assistants and their effect on service quality and customer satisfaction. This research suggests a focused examination using the same key constructs; reliability, responsiveness, expectations, and perceived performance.

Keywords: Artificial Intelligence Adoption, Marketing Performance, Customer Satisfaction, Service Quality, Online Retail, Emerging Markets.

Biography:

Takunda Victor Chivizhe is an accomplished academic, researcher, and consultant with over a decade of experience in higher education and the business sector. He is currently a PhD candidate at Wits Business School, specialising in Artificial Intelligence adoption and its effect on online retail marketing performance in emerging markets. Victor's expertise lies in digital transformation, customer experience, and e-commerce in Africa, with his work presented at international conferences. A seasoned lecturer in digital marketing and tourism, he has supervised undergraduate and honours students, developed innovative curricula, and implemented modern teaching strategies. Victor bridges academia and industry, delivering valuable insights into the digital economy.

Smart Arabic text diacritization: Deep learning Approach

Mohammed M. Abu Shquier[1*], Ahmed M. Hawamdeh[1], Ahmed M. Abu Shquier[2]

[1]Taha Zerrouki - Universite de Bouira / Algeria.
[2]Ra'ed Al Khateeb - Yarmouk University / Jordan.
[3]Ahmed Abu Shquier - Ajloun University / Jordan

Abstract:

Arabic diacritization represents an emerging trend in the realm of deep learning, leveraging the capabilities of Natural Language Processing (NLP) to scrutinize any given Arabic sentence. The intricacies of Arabic diacritical marks pose significant challenges not only for native Arabic speakers but also for learners of the language, owing to its complex structure. This research endeavors to create deep learning-based NLP models aimed at overcoming this formidable challenge. The models developed are both self-contained and interactive in nature. A diverse array of Arabic sentences was utilized, along with a series of preprocessing techniques that included segmentation, stemming, part-of-speech tagging, and named entity recognition, all crucial for preparing the sentences for model integration. Following the implementation of these four preprocessing steps, the results indicated a commendable performance in achieving diacritization. These findings promise to provide valuable support for Arabic speakers and learners alike, particularly benefiting educators and students within academic settings.

Biography:

Prof. Dr. Mohammed M. Abu Shquier, the Assistant President of Jerash University, the Dean of E-Learning and Distance Education Deanship, and the Manager of Planning and Development Unit. before, he acted the position of the Dean of the Faculty of Computer Science and Information Technology / Jerash University, he also worked as an Assistant professor at the University of Tabuk, KSA for the past five years. Before that he worked as a head of Computer Science Dept. at Jerash University, Jordan. He also worked for two years as a senior lecturer at the American Degree Program (ADP) in Taylors University (Subang Jaya) / Malaysia. Abu Shquier received his Masters degrees from the school of Computer Science at The University of Science Malaysia in Peneng (USM), and he received his Ph.D from the National University of Malaysia in Bangi (UKM). Abu Shquier research focuses on developing Novel Arabic Machine Translation (Rule and Statistical Based). He also interested in conducting research in the areas of Computational Linguistics, Informaiton Retrieval and Arabic Natural Language Processing in general. In addition to that he had conducted good research in the area of Arabic Morphology, Syntactic and Symantic. He has published a number of papers in excellent international journals and conferences. Abu Shquier has more than 10 years of experience in teaching under-graduate and post-graduate students with different majors.

Application to Convolutional Neural Network for Chirality Prediction Modeling

Seung Hwan Park[1*], Jae Uk Choi[1], Juyong Gwak[2], Jaebeom Lee[2]

[1]Department of Mechanical Engineering, Chungnam National University, Daejeon, 34134, Republic of Korea.
[2]Department of Chemical Engineering and Applied Chemistry, Chungnam National University, Daejeon, 34134, Republic of Korea.

Abstract:

Chirality, a crucial property in biology, physics, and chemistry, contains extensive information within three-dimensional structures. When applied to biometric recognition, chirality has the potential to enhance security capabilities significantly. However, existing studies on chirality computation in three-dimensional structures suffer from limited practicality due to their substantial computational demands. This study proposes an alternative approach utilizing convolutional neural networks (CNNs) to address this limitation. The research methodology consists of the following steps: First, three-dimensional data is transformed into two-dimensional data. Then, the two-dimensional data is mapped to its corresponding chirality values to construct a training dataset. Subsequently, the dataset is used to train a CNN model, followed by performance evaluation. The dataset employed in this study comprises fingerprint data, and the proposed model demonstrates its potential to predict chirality effectively. This research contributes to the field of virtual metrology using deep learning models and advances studies on dimensionality reduction in data analysis.

Biography:

He received a Ph.D. in industrial management engineering from the Korea University in 2017. He worked

as a data scientist at SK Hynix from 2017 to 2018. In 2018, he joined the School of Mechanical Engineering at Chungnam National University, where he is currently an Associate Professor. He actively conducts data-driven modeling research through collaboration across diverse disciplines. Specifically, he is a dedicated researcher specializing in advancing intelligent manufacturing systems through big data-driven optimization and modeling in the domains of equipment, process, and quality management. Their work also focuses on enhancing the reliability of inspection and measurement sensors via experimental methods, optimization, and modeling.

Plenary Presentation

Recent triumphs and future opportunities for computer-assisted connoisseurship of fine art paintings and drawings

David G. Stork

Stanford University, CA, USA

Abstract:

Our cultural patrimony of fine art paintings and drawings comprise some of the most important, memorable, and consequential images ever created, and present numerous problems in art history and the interpretation of "authored" stylized images. While sophisticated *imaging* (by numerous methods) has long been a mainstay in museum curation and conservation, it is only in the past few years that true image *analysis*—powered by computer vision, machine learning, and artificial intelligence—have been applied to fine art images. Fine art paintings differ in numerous ways from the traditional photographs, videos, and medical images that have commanded the attention of most experts up to now: such paintings vary extensively in *style*, *content*, *non-realistic conventions*, and especially intended *meaning*.

Rigorous computer methods have outperformed even seasoned connoisseurs on several tasks in the image understanding of art, and have provided new insights and settled deep disputes in art history. Additionally, the classes of problems in art analysis, particularly those centered on inferring meaning from images, are forcing computer experts to develop new algorithms and concepts in artificial intelligence.

This talk, profusely illustrated with fine art images and computer analyses, argues for the new discipline of *computer-assisted connoisseurship*, a merger of humanist and scientific approaches to image understanding. Such work will continue to be embraced by art scholars, and addresses new grand challenges in artificial intelligence.

Biography:

David G. Stork, PhD is Adjunct Professor at Stanford University and a graduate in Physics from MIT and the University of Maryland; he also studied Art History at Wellesley College. He has held faculty positions in Physics, Mathematics, Computer Science, Statistics, Electrical Engineering, Neuroscience, Psychology, Computational Mathematical Engineering, Symbolic Systems, and Art and Art History variously at Wellesley and Swarthmore Colleges, Clark, Boston, and Stanford Universities, and the Technical University of Vienna. He is a Fellow of seven international societies and has published eight books, 220+ scholarly articles, and 64 US patents. His *Pixels & paintings: Foundations of computer-assisted connoisseurship* (Wiley) appeared last year, and he is completing *Principled art authentication: A probabilistic foundation for representing and reasoning under uncertainty*..

Key Note Presentation

Death Technologies and Digital Afterlife: An Ethical Perspective

Russell Belk[1]*, Erik Hermann[2], Vitor Lima[3]

[1]*York University, Canada*
[2]*ESCP, Germany*
[3]*ESCP, Spain*

Abstract:

We have long feared death, sought to live longer, mourned our dead, spoken to them, prayed to them, and honored and remembered them with rituals, memorials, and artifacts. But, thanks to grief and death technologies, we are now entering into uncharted territory in pursuing corporeal and digital immortality by moving from online memorials to QR codes linking tombstones to video biographies to interactive video chatbots created from the deceased's digital estate to potential immortality. This is aided by artificial intelligence (AI), Generative AI (GenAI), and Large Language Models (LLMs). Such developments throw open the floodgates to rethinking mortality, and the question of what happens to us and our identities

when we die or somehow cheat death. It was perhaps inevitable that cyberspace, as it was once called, is sometimes conflated with heaven and that digital avatars are sometimes seen as souls. The search for God in the digital world, the disruption of religious liturgies, and the quest to find a home for the soul in cyberspace are all a result of the seismic shift precipitated by digitalization, leading to new concepts like cyber-thanatology (i.e., the articulation of death and other related phenomena within the digital realm). It is in this context of the rupture of the status quo that we seek to understand the ethical issues that emerge in the new relationships between life, death, and the afterlife. Not least are informed consent, the right to die, DDNR (Digital Do Not Reanimate), and the roles of executors of digital estates.

Biography:

Russell Belk is Distinguished Research Professor and Kraft Foods Canada Chair in Marketing at York University, Toronto. He studies extended self, possession meanings, collecting, gift-giving, situational effects, sharing, digital consumption, and materialism.

Vitor Lima is an Assistant Professor of Marketing at ESCP Business School, Madrid. His research interests are Consumer Culture Theory (CCT), Transhumanism, Biohacking, Cyborgs, AI, Robots, Digital Marketing, and Semiotics.

Erik Harmann is Permanent Affiliate Professor and Chair of Marketing at ESCP Business School, Berlin. His research focuses on consumer behavior and the ethical and socio-technical issues and implications of the development and deployment of artificial intelligence.

Oral Presentations

cross-modal knowledge distillation for wearable sensor-based human action recognition

Jianyuan Ni

Juniata College, PA, USA

Abstract: Not available

Machine Learning for Medical Image Analysis

Shadrokh Samavi

Seattle University, Seattle, USA.

Abstract:

The integration of machine learning (ML) in medical image analysis has revolutionized the healthcare field, enabling more accurate, efficient, and scalable diagnostic solutions. This presentation explores the critical role of ML in transforming how medical images are processed and interpreted, significantly improving diagnostic accuracy in diseases such as cancer, cardiovascular conditions, and neurological disorders. By using algorithms like convolutional neural networks (CNNs), ML enables automated detection, segmentation, and classification of complex medical images, reducing human error and enhancing diagnostic consistency. Additionally, ML-based techniques offer powerful image enhancement and noise reduction methods, which are crucial for improving the quality of low-resolution or low-contrast images such as X-rays, MRI, CT scans, and endoscopic images.

Biography:

Shadrokh Samavi is a professor at Seattle University, an Adjunct Professor at the E.C.E. department of McMaster University, Canada, and an Affiliated Researcher at the Department of Emergency Medicine, University of Michigan, Ann Arbor, U.S.A.

Professor Samavi has published more than 250 technical papers at international journals and conferences. Professor Samavi completed a B.S. degree in Industrial Technology and received a B.S. degree in Electrical Engineering at California State University, an M.S. degree in Computer Engineering at the University of Memphis, and a Ph.D. degree in Electrical Engineering at Mississippi State University, U.S.A.

Machine Learning vs Traditional Statistical Methods for Predicting Postpartum Hemorrhage

Oluwafunmilola Deborah Awe[1] Anderson Borovac-Pinheiro[1] , Cristiano Torezzan[12] , Rodolfo Carvalho Pacagnella[1]

[1]Department of Obstetrics and Gynecology, FCM, State University of Campinas, Brazil
[2]School of Applied Sciences (FCA) at the State University of Campinas (UNICAMP) , Brazil

Abstract:

Objective: To predict the risk of postpartum hemorrhage (PPH) within 24 hours of vaginal delivery using machine learning and statistical models based on early postpartum bleeding patterns.

Methods: We performed a secondary analysis of 270 women from a prospective cohort study at a tertiary maternity hospital in Brazil (Feb 2015–Mar 2016). Women who delivered vaginally were included. Cumulative blood loss and vital signs were recorded during the first 24 hours postpartum. PPH was defined as cumulative blood loss ≥500 mL, and severe PPH as ≥1000 mL. Predictors included early bleeding dynamics as blood loss at 30 minutes, mean and maximum bleeding velocity, and early bleeding dynamics. Logistic regression, random forest, and XGBoost models were trained on an 80/20 data split and evaluated by accuracy, sensitivity, specificity, AUC, F1 score, and kappa. Model development followed the MI-CLAIM checklist.

Results: Among 270 women, PPH (≥500 mL) occurred in (42n)(15.6%) by ≤30 minutes, (68n()25.2%) by 31–60 minutes, (84n() 31.1%) by 61–120 minutes, and (121n() 44.8%) by 24 hours. Severe PPH occurred in 34(12.6%) at 24h. All models showed strong performance in predicting PPH. XGBoost achieved the highest accuracy (88.7%), AUC (94.3%), sensitivity (90.3%), and positive predictive value (90.3%). Logistic regression showed the highest AUC (97.7%) and specificity (90.9%) but the lowest negative predictive value (83.3%). Random forest demonstrated balanced metrics with accuracy (88.5%) and sensitivity (90.0%). Kappa values indicated strong agreement, highest for XGBoost (0.77). McNemar's test showed no significant difference between predicted and observed classifications (p > 0.68). Early bleeding velocity and cumulative blood loss within 30 minutes were the top predictors.

Conclusion: Machine learning models are not superior than Logistic regression R using early bleeding patterns can accuratelyto predict PPH within 24 hours post-delivery. Using early bleeding patterns can potentially , offeringbe used potential for real-time clinical decision support, especially in resource-limited settings.

Biography:

I am a Medical Doctor and Medical Statistician with over 15 years of experience in patient care, medical research, and public health across multiple countries. I earned my medical degree from the University of Ibadan, Nigeria, and a master's in Medical Statistics from the University of Nairobi, Kenya. Currently, I am completing my PhD in Tocogynecology at UNICAMP, Brazil. My research focuses on leveraging artificial intelligence to improve maternal and perinatal health outcomes.

The Application of Artificial Intelligence in Media Production: Trends, Challenges, and Future Directions

Zixuan Liang

Oracle, USA

Abstract:

Can AI redefine the landscape of media production? With the rapid evolution of artificial intelligence, the media and entertainment industry are witnessing a paradigm shift in content creation, production workflows, and post-production techniques. AI-driven tools are enabling filmmakers, studios, and content creators to achieve unprecedented efficiency and creative possibilities, but these advancements also introduce new challenges that must be addressed. In this keynote, I will explore the intersection of AI and media production, drawing insights from industry trends and key innovations. The session will cover: • Revolutionizing Creativity with AI – How AI-assisted content generation, real-time rendering, and intelligent automation are transforming storytelling and visual effects. • AI-Powered Workflows – The shift towards cloud-based, software-defined production pipelines and the role of machine learning in optimizing media assets. • Challenges in AI Adoption – Ethical concerns, bias in AI-generated content, copyright issues, and the complexities of integrating AI into existing workflows. • The Future of AI in Media – Emerging trends such as volumetric capture, neural rendering, and personalized content delivery.

Biography:

Zixuan Liang is a Senior Software Engineer at Oracle Cloud Infrastructure (OCI), specializing in AI-driven media production and cloud-based workflows. With over five years of experience, he has developed scalable solutions for major media companies like Paramount and Disney. He has published multiple research papers in AI and machine learning and serves as a reviewer for top conferences. Holding a master's in computer engineering from Northeastern University, Zixuan is also an OCI Generative AI Certified Professional. At AIM-2025, he will discuss AI's transformative role in media production, highlighting innovations, challenges, and future trends.

Lightweight and Optimized Deep Learning Architectures for Mobile Visual Computing on Edge Platforms

Presenter* and Co-author names {WEI LIU1, SEOJIN JANG2, YONGBEOM CHO3*}

[1]Deep ET, South Korea
[2]Deep ET, South Korea
[3]Corresponding author, Deep ET and Konkuk University, South Korea

Abstract:

Achieving efficient and ultra-low power computation is a critical challenge in mobile visual applications. This paper proposes a deep learning model optimized for parallel architectures on edge platforms. By fully leveraging the parallel computing capabilities and special instruction sets of processors on edge platforms, we introduce lightweight convolutional neural network architectures along with techniques like model pruning and quantization to reduce computational complexity and energy consumption. Our model demonstrates outstanding performance across various backend visual tasks such as object detection, image classification, and semantic segmentation. Experimental results show that while maintaining high accuracy, the power consumption is reduced by 35% compared to traditional models. This study provides an efficient and practical solution for visual computing on mobile devices and is significant for the advancement of mobile artificial intelligence.

Biography:

Dr. Cho is Emeritus Professor of Konkuk University and CEO of Deep ET. He received his Ph.D. in Dept. of Electrical Engineering from Case Western Reserve University, where he focused on VLSI implementation of neural networks. His research interests include model optimization techniques such as pruning and quantization, energy-efficient AI systems, and AI model deployment for real-time mobile applications. He is currently leading projects on neural network optimization for edge platforms and improving visual computing performance on mobile devices.

A Predictive Model of Anomaly Tracking for an Enterprise Monitoring System: Representation of Causal Relations in a Directed Acyclic Graph

Suhail Mahmood

Providence Health & Services, Seattle, WA

Abstract:

As information systems become increasingly complex, organizations big and small continue to face downtimes of their critical applications leading to significant business impact. Despite a proliferation of monitoring tools, it remains hard to sift the logs to identify anomalies that are in fact problematic and would lead to an incident versus false alarms. This paper analyzes the process of troubleshooting by administrators and attempts to model Root Cause Analysis. A relational concept of anomaly is proposed in which monitoring of information system does not look for anomalies as such but only specifically from the perspective of the most critical and architecture-centric application. In the scenario considered, an Enterprise Real-Time Messaging Application provides that perspective. This app has a variety of dependencies – Server (On Prem and Cloud), Database, Network, Authentication, DNS, Firewall, App's own coding module. A reciprocal relation is established between Operations and Monitoring System-Under-Development to incorporate insights from issues / incidents as they happen into the system and at the same to time to modify Ops to be more monitoring-friendly.

An incident is the traversal of a condition from root cause through intermediaries to problem behavior. Identification of anomalies in this route makes it possible to make a timely prediction of a developing incident.

Insights of administrators on past incidents are captured as causal relations and an algorithm based on Directed Acyclic Graph is used to identify all possible causal chains in a causal network, and thereby to predict and potentially prevent incidents.

Biography:

2011 – Present: Application Architect / Service Engineer, Providence Health & Services

2003 – 2010: Software Engineer, University of Washington Medicine

Keynote Presentations

Active Physical Intelligence: The First Curiosity-Driven Learning Paradigm Designed for the Physical World

Tara Javidi

The University of California, CA, USA

Abstract:

By Dr. Tara Javidi - researcher, professor, and Co-director of the Machine-Intelligence Computing and Security Center at UCSD and the CTO of KavAI. Unplanned industrial shutdowns cost the global economy over $1.5 trillion annually. The environmental consequences are even more concerning —amplified by the growing complexity and scale of modern infrastructure. In this talk, I will introduce Active Physical Intelligence™—the first curiosity-driven AI platform built to ingest, interpret, and proactively monitor multi-modal data streams of real-world industrial environments, enabling AI to proactively and precisely pinpoint the sources of anomalies. Designed for real-time decision-making and adaptive learning, this system redefines how we monitor large-scale, high-risk operations. Unlike conventional monitoring approaches—typically forced to passively choose between data optimized for narrow and reactive precision versus data capturing a real-time broad, yet blurry, picture Active Physical Intelligence dynamically adjusts sensing, data acquisition, and inference processes in real time. Drawing from field deployments in energy infrastructure, I will share how this approach has enabled a 97% reduction in manual oversight, an 80% increase in monitoring coverage, and substantial cost efficiencies—all while remaining hardware-agnostic. From oil & gas to cybersecurity and smart infrastructure, this is a call for a radically curiosity

Mutual Reinforcement of LLM Dialogue Synthesis and Summarization Capabilities for Few-Shot Dialogue Summarization

Raviteja Vemulapalli[1*], Yen-Ju Lu[2], Ting-Yao Hu[1], Hema Koppula[1], Hadi Pour Ansari[1], Rick Chang[1], Yin Xia[1], Xiang Kong[1], Qi Zhu[1], Simon Wang[1], Oncel Tuzel[1]

[1]Apple, USA
[2]Johns Hopkins University, USA

Abstract:

While LLMs trained on massive web-scale datasets excel in various natural language understanding tasks, their dialogue summarization performance often falls short in specific target domains of interest. While finetuning these models on target domain datasets can address this issue, acquiring large-scale, high-quality target domain dialogue summarization datasets can be costly, time-consuming, and sometimes infeasible due to privacy concerns. In this work, we introduce a novel framework called Mutual Reinforcement via Data Synthesis (MRDS) to enhance the few-shot dialogue summarization capabilities of LLMs. Unlike prior works that rely on external knowledge, MRDS mutually strengthens an LLM's dialogue synthesis and summarization capabilities, enabling them to complement each other during training. Specifically, the dialogue synthesis capability is enhanced through direct preference optimization, guided by the preference scores derived from the model's summarization capability. Conversely, the summarization capability is enhanced by generating additional high-quality dialogue-summary pairs using the improved dialogue synthesis capability. By leveraging the proposed MRDS mechanism, we effectively elicit the internal knowledge of an LLM in the form of synthetic data. This synthetic data is then used to augment

the existing few-shot real training dataset. Empirical results demonstrate that our method significantly improves dialogue summarization performance, both in terms of numerical metrics such as ROUGE/BERT scores and human evaluations. Notably, this work has recently been accepted for presentation at the prestigious NAACL 2025 conference, which is a top-tier event in the field of Natural Language Processing. Please see https://arxiv.org/pdf/2502.17328 for additional details about this work.

Biography:

Raviteja Vemulapalli is a researcher in the machine learning research group at Apple. Previously, he worked as a research scientist at Google. He holds a B.Tech degree in Electrical Engineering from the Indian Institute of Technology, Madras, India, and a Ph.D. in Electrical Engineering from the University of Maryland, College Park, USA. During his tenure at the University of Maryland, he was awarded the A. James Clark School of Engineering Dean's Doctoral Research Award, recognizing his outstanding achievements as a graduating student. Raviteja's research interests primarily lie within the domain of machine learning, with a specific focus on foundational models, data synthesis, and efficient machine learning methodologies. He has authored over 30 peer-reviewed publications and holds several patents. His research contributions have had a notable impact on various intelligent photography-related products developed by Google.

Generative AI in Action: Scaling Solutions Beyond the Pilot Phase

Ananya Ghosh Chowdhury

Microsoft, WA, USA

Abstract: Not Available

Oral Presentations

Enhancing Access Control Research with AI-Generated Policies

Thang Bui

California State University, Monterey Bay

Abstract:

Access control is a key part of cybersecurity, but research in this area faces challenges due to the lack of real-world datasets. Privacy and security concerns limit access to such data, making it difficult to develop and evaluate policy analysis techniques. This talk explores how AI, including large language models (LLMs), can help by extracting access control policies from natural language text. AI/ML techniques can assist in generating synthetic datasets, identifying access rules, and translating policies across models like RBAC, ABAC, and ReBAC. However, AI-generated policies must be carefully checked to ensure they make sense and follow security rules. This talk will also discuss how to review and refine AI-generated policies to make them reliable.

Biography:

Dr. Thang Bui is an Assistant Professor in Computer Science at California State University, Monterey Bay. He received his Ph.D. in Computer Science from Stony Brook University in 2021. He also earned his Bachelor's degree and Master's degree in Computer Science from the same institution in 2016 and 2019. His research focuses on the management and enforcement of access control policies to protect computing resources/data/information.

From Scan to Scam: Machine Learning for Malicious QR Code Detection Attacks

Tamirat Abegaz

University of North Georgia

Abstract:

In the current age of contactless interactions and transactions, Quick Response (QR) codes have become a crucial tool for disseminating information to their target audiences. However, the ease of QR code generation and their widespread adoption has not escaped the notice of malicious actors who misuse them

to redirect unsuspecting individuals to harmful websites. Instances of deceptive QR codes, like those encountered on parking meters, restaurant menus, and community event flyers, highlight the seriousness of this issue. As a result, there is an immediate requirement to develop effective measures to counter QR code phishing and safeguard user security. To address this challenge, this study utilizes a machine learning approach to identify malicious QR codes. The experimentation in this study yields valuable insights into the performance of four distinct models: the Decision Tree, Random Forest, XGBoost, and Neural Network. Additionally, this research contributes a dataset comprising over 420,000 legitimate and malicious QR codes for the benefit of the research community. In summary, this paper outlines a method for enhancing security and combating QR code phishing using machine learning methods, contributing to the ongoing battle against this emerging cyber threat.

Biography:

Dr. Tamirat Abegaz, an Associate Professor of Computer Science at the University of North Georgia (UNG) since 2015, earned his Ph.D. from Clemson University in 2014. He serves as the graduate program coordinator and was the lead instructor for the GenCyber program from 2016 to 2022. Dr. Abegaz received Best Paper Awards at the International Academy of Business Disciplines (IABD) conference in 2018 and at the Northeast Decision Sciences Institute (NEDSI) in 2023. In October 2024, he spoke at Cybertech Europe in Rome, Italy. His cybersecurity certifications include CISSP, GCFA, GISP, and GASF.

Skin Lesion Classification Using Hybrid Models and Innovative Preprocessing Techniques

Shantanu Awasthi*, Muhammad Sher Taj

[1]*Missouri Southern State University, USA*
[2]*Daqing Normal University, China*

Abstract:

Skin cancer, especially melanoma, poses significant health challenges due to its invasive nature and rapid progression if not promptly treated. This study introduces a hybrid deep learning model designed to enhance skin lesion classification, aiding early diagnosis and treatment. Leveraging the SKIN-Cancer MNIST: HAM10000 dataset, our approach combines EfficientNet-B0 and ResNet-50 convolutional neural networks to boost feature extraction and classification accuracy. The model utilizes advanced preprocessing techniques, including Local Binary Patterns (LBP), Histogram of Oriented Gradients (HOG), Gaussian blur, and Contrast Limited Adaptive Histogram Equalization (CLAHE), to improve image quality and highlight lesion features. Data augmentation, including rotations, scaling, and flips, further minimizes overfitting. Results show a 99% classification accuracy with high precision and recall across seven lesion types, including melanoma, basal cell carcinoma, and actinic keratoses. This innovative method demonstrates potential for assisting dermatologists in delivering precise, timely skin cancer diagnoses, ultimately improving patient outcomes.

Biography:

Shantanu Awasthi is an Assistant Professor of Data Analytics at Missouri Southern State University. With a Ph.D. in Mathematics from North Dakota State University, his expertise spans stochastic processes, deep learning, and machine learning. He has diverse research and teaching experience in data science, financial modeling, and AI-driven analytics. Shantanu has published extensively and presented at int conferences.

Ensuring Translation Quality with AI LQA

Konstantinos Karageorgos

Welocalize, Greece

Abstract:

The integration of AI into translation workflows hinges on the ability to automatically evaluate machine translation (MT) output. Traditional AI tools typically generate a single quality score, which falls short of the nuanced insights provided by human Linguistic Quality Assessment (LQA). Human LQA not only identifies translation errors but also categorizes them by type and criticality, providing a richer, more actionable analysis.

In this session, we present a tool that bridges this gap by mimicking human-level LQA. This AI-powered

model classifies both the type and criticality of errors, enabling a more detailed understanding of MT quality. When benchmarked against human LQA with two/three-way agreement, this system achieved an impressive error prediction accuracy of ~94% and a recall of ~56%. This talk will cover into how we built and trained the model, the large language models (LLMs) we tested, and how this system is enhancing translation workflows.

Key Takeaways:

- Understand how current AI evaluation methods differ from human LQA and the value of incorporating error types and criticality.
- Learn how AI can be trained to mimic human LQA, and the challenges in achieving high accuracy and recall in error detection.
- Gain insights into the comparative strengths of different LLMs in MT evaluation and their application across multiple languages.

Immersive Learning in Biology Education: Enhancing Student Engagement through AR/VR Technology

Mohammed Al-Jabbar*

Najran University, Najran

Abstract:

Immersive learning is transforming education by integrating physical and digital elements, offering students interactive, lifelike experiences. This study explores an AR/VR-based learning platform designed to enhance biology education by making complex topics—such as cellular structures, anatomical details, and ecological systems—more accessible and engaging. Through interactive 3D models, students can explore biological processes in a hands-on virtual laboratory, allowing them to visualize and manipulate data in real time. The research evaluates the impact of AR/VR on student understanding, retention, and engagement, comparing outcomes with traditional teaching methods. High school students participate in AR/VRenhanced lessons, engaging directly with simulations that bring biological concepts to life. To measure effectiveness, the study examines key metrics such as knowledge retention, student engagement, and overall satisfaction. Preliminary findings indicate that immersive AR/VR environments significantly enhance comprehension and motivation, with students reporting increased curiosity and a stronger connection to the material compared to conventional classroom settings. This research highlights the potential of immersive learning to revolutionize STEM education, making subjects more interactive, engaging, and memorable. As technology plays an increasing role in education, AR/VR tools offer a transformative approach to teaching complex scientific concepts. The findings suggest that immersive learning fosters deeper cognitive connections, leading to improved academic performance and sustained interest in science. Future research will explore the platform's adaptability for remote education, addressing the evolving needs of students in a digitally driven world. By integrating AR/VR into mainstream curricula, educational institutions can bridge the gap between theoretical knowledge and experiential learning, preparing students for the future of science and technology.

Biography:

Dr. Mohammed Al-Jabbar is an Assistant Professor at Najran University, holding a Ph.D. in Computer Science. With expertise in educational technology, information retrieval (IR), artificial intelligence (AI), and natural language processing (NLP). Dr. Mohammed Al-Jabbar is dedicated to exploring the potential of advanced technologies to enhance the educational experience. His research focuses on integrating AI and NLP tools within educational environments, aiming to make learning more interactive, accessible, and engaging for students. At Najran University, Dr. Mohammed Al-Jabbar develops innovative educational solutions and immersive learning experiences that support diverse student needs and learning styles. His commitment to advancing educational technology reflects a vision of bridging cutting-edge research with effective, practical applications in the classroom. Through his work, Dr. Mohammed Al-Jabbar strives to contribute meaningfully to the field of educational technology, helping shape the future of digital learning and preparing students to thrive in a technology-driven world.

Oral Presentations

Explaining Model Decisions Using Decision Intelligence

Steven Moss

Mendit.AI Inc, USA

Abstract:

As AI model use cases become more complex over time, so does the amount of work required to ensure that the final production system is learning generalized patterns instead of guessing. In order to be able to trust our models, Mendit.AI has invented a novel way of explaining model decisions by generating the minimal perturbation required to change the output and aggregating the influence scores based on semantic meaning of the perturbation region. We use this method to fully explain how our deep fake classifier learns to objectively determine if an identity is generated or not.

Biography:

Steven is an ex-Amazon security engineer with a total of 14 years in tech, mostly focused on fraud and cybersecurity in digital markets. Passionate about leveraging AI to solve real-world challenges, particularly in identifying fraudulent patterns and enhancing business trust, Steven is always exploring innovative applications of AI to stay at the forefront of technology.

The Ann Arbor Architecture for Agent-OrientedProgramming

Wei Dong

Ann Arbor Algorithms, USA

Abstract:

In this paper, we reexamine prompt engineering for large language models throughthe lens of automata theory. We argue that language models function as automataand, like all automata, should be programmed in the languages they accept, aunified collection of all natural and formal languages. Therefore, traditional softwareengineering practices—conditioned on the clear separation of programminglanguages and natural languages—must be rethought. We introduce the AnnArborArchitecture, a conceptual framework for agent-oriented programming of languagemodels, as a higher-level abstraction over raw token generation, and provideanewperspective on in-context learning. Based on this framework, we present thedesignof our agent platform Mailcoach, and report on our initial experiments in agent training.

Biography:

Dr. Wei Dong is the head coach of the National AI Campus and the managing director of Ann Arbor Algorithms, a consulting firm specializing in artificial intelligence. Dr. Dongobtained his Ph.D. from Princeton University and was awarded the IEEE PAMI Longuet- Higgins Prize for his contribution to deep learning.

Interactive Robot Learning from Human Teachers

Yuchen Cui

University of California, Los Angeles, United States of America

Abstract:

Today's general-purpose robot learning policies are limited to 50-80% zero-shot performance on downstream tasks. To close this performance gap, deployed robots face the ongoing challenge of continually learning and adapting to diverse downstream tasks on demand under human guidance. Existing frameworks allow experts to guide robots in various ways including providing reward functions, demonstrations, and corrective feedback. Howevermost robots will only have access to non expert users for guidance after deployment. At the same time, traditional machine learning methods often used in robot learning are

tethered to th expectation of informative and near optimal data. Novice human teachersrich in practical experience yet lacking in robotics and engineering knowledge bring data that strays from this ideal. My research addresses the challenges of robot learning bought by non-expert teachers and enables robots to effectively learn under non-expert human guidance, including developing active reward learning algorithms to allow the robot to take an active role in learning by asking informative questions, leveraging a hybrid action representation for imitation learning that is more robust to suboptimal demonstrations, and enabling the robot to interpret the human teacher's natural feedback in the form of facial expressions,language, and gestures. Tapping into diverse sources of nonexpert human feedback can lead to successful robot policies that can effectively work alongside humans and learn from them.

Biography:

Yuchen Cui is an Assistant Professor of Computer Science at UCLA, directing the UCLA Robot Intelligence Lab. Prior to UCLA, she was a postdoc in the Computer Science Department at Stanford University and a fellow of the Stanford Institute for HumanCentered AI. Yuchen'sresearch focuses on interactive robot learning and specifically on how to enable low-effort teaching for non-expert users. Yuchen obtained her Ph.D. in Computer Science from the University of Texas at Austin. Her dissertation is titled "Efficient algorithms for low-effort human teaching of robots".

Equitable Privacy-Preserving Machine Learning Algorithms

Selvarajah Mohanarajah* and Ian Filtz[1], Luke Rohweider[2]

1,2,3 University of North Carolina at Pembroke, Pembroke, NC 27302

Abstract:

Privacy and fairness are both critical in developing trustworthy machine learning models, yet they are often addressed in isolation. This study argues that these two objectives must be considered together, as improvements in one can significantly impact the other. While trade-offs between privacy and accuracy, as well as fairness and accuracy, have been extensively studied, the direct interplay between privacy and fairness remains insufficiently explored. To bridge this gap, we provide a comprehensive analysis of how privacy measures and fairness interventions interact across various ML settings.

We investigate how enhancing data privacy influences model fairness and, conversely, how bias-mitigation strategies affect information privacy. Specifically, we analyze the relationships between input perturbation and preprocessing, output perturbation and post-processing, and algorithmic perturbation and in-processing. Additionally, we examine the impact of post-processing techniques designed to smooth Differential Privacy effects on fairness. Through this holistic examination, we identify scenarios where privacy and fairness align and where they conflict, offering insights into managing these trade-offs effectively. Our findings contribute to the development of ML models that simultaneously protect user data and ensure equitable outcomes. Finally, our poster will outline future research directions, fostering a deeper understanding of the intricate interplay between privacy and fairness in ML algorithms.

This abstract is based upon work supported by the U.S. Department of Homeland Security under Grant Award Number, 17STQAC00001-07-00. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing U.S. Department of Homeland Security.

Biography:

Dr. Selvarajah Mohanarajah is the Chair and Professor of Computer Science at the University of North Carolina at Pembroke. His research focuses on fairness and privacy in ML systems, container-based learning objects, and fix-and-play games for programming education. His work has been published in leading journals and conferences.

Beyond Big Data: How Human Expertise Unlocks AI's Full Potential

Ahmed Rashad, Founder & CEO

Perle (www.perle.ai)

Abstract:

AI is only as good as the data it is trained on, and the most powerful models require more than massive datasets—they require human expertise. In high-stakes fields like medicine, law, and finance, data an-

notated by domain professionals is critical to achieving accurate, reliable, and trustworthy AI outcomes. However, many developers underestimate the challenges of integrating expert-driven annotation and optimization into their workflows. How can teams effectively balance speed, cost, scalability, and quality in this process?

This session will explore the power of hybrid human-LLM annotation teams, demonstrating how expert reviewers not only improve data quality but also play a crucial role in refining prompt strategies and fine-tuning model performance. We'll then discuss how automated annotation pipelines—using AI-assisted tooling, pre-labeling, and intelligent quality checks—can further streamline the process, reduce costs, and lower the risk of human error at scale.

Attendees will learn:

- How human "experts in the loop" improve AI accuracy and reduce bias
- Cost-effective strategies for integrating domain specialists into data pipelines
- Optimizing LLM outputs through expert-driven prompt engineering and feedback
- Leveraging automated pipelines to reduce human error and enhance scalability

AI researchers and developers working on model training will leave with actionable strategies for incorporating expert annotation into their own AI systems—unlocking higher accuracy, better generalization, and stronger real-world performance.

The session will be led by Ahmed Rashad, Founder & CEO of Perle, a company dedicated to bringing human wisdom to Artificial Intelligence by bridging the gap between AI models and expert knowledge through smarter, human-powered data annotation.

Biography:

Ahmed is the Founder of Perle, where he combines a passion for accelerating AI development with a commitment to creating meaningful opportunities for people worldwide. After beginning his career as an offshore oil driller, Ahmed transitioned to tech, earning a degree in Operations Research from MIT. He went on to lead several multi-billion-dollar businesses at Amazon and later served as the early Head of Operations at Scale AI, where he successfully scaled operations more than 100x. At Perle, Ahmed is dedicated to advancing AI technology while empowering individuals and organizations to achieve their full potential.

But Who's Watching The Machines? Using AI To Test GenAI-Writted Code

Presenter: Yunhao Jiao, Co-founder & CEO

TestSprite, Inc.

Abstract:

GenAI coding is reshaping the dev environment. Ensuring the quality of (sometimes opaque) GenAI-generated code presents significant challenges for dev teams — especially those with limited resources. Traditional testing workflows can fall short in identifying subtle bugs, maintaining compliance, and addressing corner cases in complex codebases. This session dives into how autonomous AI testing tools are evolving beyond co-pilot assistance to full autopilot capabilities, providing end-to-end quality assurance with minimal human intervention. Yunhao Jiao, Founder & CEO of TestSprite, will explain his technology journey, demonstrate how AI-driven testing agents streamline workflows by generating tests, diagnosing issues, and proposing fixes. Attendees will gain actionable insights into integrating autonomous AI tools into their DevOps pipelines, optimizing testing workflows, and accelerating delivery cycles. Through real-world use cases and a live demonstration of TestSprite's capabilities, this session equips participants with practical strategies for achieving robust code integrity, lowering costs, and future-proofing their development pipelines.

What Attendees Will Learn:

- The differences between AI co-pilot and autopilot testing solutions and their impact on testing workflows.
- Practical steps to integrate autonomous AI testing tools into DevOps pipelines with minimal disruption.
- Strategies for achieving robust code integrity in GenAI-driven environments while addressing common challenges like missed corner cases and compliance risks.

Biography:

Yunhao co-founded TestSprite and participates in Techstars Miami and YC China accelerator programs. Yunhao Jiao is a Yale University graduate with a master's degree. During his five-year tenure at AWS, he served as a Senior Software Engineer, where he spearheaded the development of the Contract Tests framework for CloudFormation—a critical system ensuring reliable resource type operations throughout their lifecycle. Since 2015, Yunhao has been actively involved in NLP research, publishing his first AI paper as the lead author in 2017. He contributed to education as the Chinese High School Artificial Intelligence Textbook editor. Yunhao co-founded TestSprite and participates in Techstars Miami and YC China accelerator programs.

Virtual

Keynote Presentations

OpenThinker: Post-training a Reasoning model with Open Data

Alexandros G Dimakis

University of Texas, TX, USA

Abstract:

We will present our results on curating a large open reasoning dataset called OpenThoughts and post-training reasoning models that outperform DeepSeek at the 7B and 32B scale. This is an open source research effort created by the DataComp community and Bespoke Labs.

Biography:

Alex Dimakis is a Professor in UC Berkeley in the EECS department and Co-founder and CSO of Bespoke Labs. He received his Ph.D. from UC Berkeley and the Diploma degree from NTU in Athens, Greece. He has published more than 150 papers and received several awards including the James Massey Award, NSF Career, a Google research award, the UC Berkeley Eli Jury dissertation award, and several best paper awards. He served as an Associate Editor for several journals, as an Area Chair for major Machine Learning conferences (NeurIPS, ICML, AAAI) and as the chair of the Technical Committee for MLSys 2021. He is an IEEE Fellow for contributions to distributed coding and learning. His research interests include Generative AI, Information Theory and Machine Learning.

Yu Zhang

University of California, CA, USA

Abstract: Not Available

Oral Presentations

Context-Based Fake News Detection using Graph Based Approach : A COVID-19 Use-case

Chandrashekar Muniyappa[1*] and Dr. Sirisha Vellampalli[2]

[1]*Independent Researcher, USA*
[2]*UCEK JNTU kakinada, India*

Abstract:

Anomaly detection plays a crucial role in identifying unusual patterns in real-world business activities. It is important to distinguish between rare events and anomalous events. Rare events are valid data points that occur sporadically within a dataset and are not necessarily classified as anomalous. Typically, anomalous data points represent only a small percentage of a large dataset, which necessitates advanced techniques to identify problematic data points.

Various techniques can be employed for outlier detection, including statistical methods such as Interquar-

tile Ranges (IQR), Median Absolute Deviation (MAD), and Z-scores. Additionally, several machine learning algorithms—such as Isolation Forest (Iforest), regression, classification, and various deep neural networks (DNN)—can be used to identify anomalous patterns. Graph-based approaches have also gained popularity in this field, as they effectively capture complex relationships between data points within a given context. However, the best approach often depends on the specific nature of the problem and the dataset.

In our research, we utilized a graph approach to identify fake news articles by constructing contextual graphs. COVID-19 news articles from "The New York Times" were integrated into Kaggle's "clmentbisaillon/fake-and-real-news-dataset.". We applied a Natural Language Processing (NLP) technique, specifically "Latent Dirichlet Allocation" (LDA), to extract topics from the text. The graph schema was defined using Parts of Speech (POS) entities, such as nouns, verbs, locations, and organizations, as vertices. The entities were extracted using the Named Entity Recognition (NER) technique to build the contextual graph. To detect anomalies, we utilized the Graph-Based Anomaly Detection (GBAD) library, which employs the Minimum Description Length (MDL) principle to identify substructures in the given graph and compare them for anomalies.

Biography:

Chandrashekar Muniyappa holds a Master's degree in Data Science from the University of Wisconsin-Green Bay and is currently pursuing a Ph.D. in Neural Network Learning Algorithms at the University of North Dakota. With over 19 years of experience in artificial intelligence, machine learning, data engineering, and software engineering, he has worked at Samsung, Yahoo, AOL, and Mphasis companies. Currently, he serves as a principal ML engineer at Upgrade, Inc. He has published multiple patents and research papers in esteemed journals and conferences including those from IEEE, Springer, and ACM. His research interests include anomaly detection, graph ML, search and ranking algorithms, learning from small datasets, and continuous learning.

Bridging Technology and Strategy: Advancing Digital Transformation through Enterprise Architecture and Cloud Innovation

Ali Asghar Mehdi Syed

IMPRIVATA, FL, usa

Abstract:

Experienced enterprise architect and digital transformation leader with a strong background in cloud, data platforms, and modern application design. Proven success in aligning IT strategy with business goals across public, finance, and transport sectors. Expert in leading enterprise programs, creating reference architectures, and driving agile, cross-functional collaboration.

Biography:

I'm Ali Syed, a passionate and results-driven professional with a strong background in digital marketing, e-commerce, and project coordination. With hands-on experience in platforms like Amazon, Shopify, and social media advertising, I've helped brands grow their online presence and boost revenue. I'm skilled in campaign management, product sourcing, and SEO optimization. My approach blends creativity with data-driven strategies to deliver impactful outcomes. I thrive in fast-paced environments and love turning ideas into action. I'm always eager to learn, grow, and contribute to innovative projects that make a difference.

LangFair: A Framework and Toolkit for Evaluating Bias and Fairness in Large Language Model Use Cases

Dylan Bouchard*

CVS Health, USA

Abstract:

Large Language Models (LLMs) have been observed to exhibit bias in numerous ways, potentially creat-

ing or worsening outcomes for specific groups identified by protected attributes such as sex, race, sexual orientation, or age. To help address this gap, we introduce LangFair, an open-source initiative that aims to equip LLM practitioners with the tools to evaluate bias and fairness risks relevant to their specific use cases. The LangFair project offers an actionable framework that enables practitioners to determine which bias and fairness metrics to use for a specific LLM use case. To streamline implementation, all evaluation metrics included in the framework are offered in the open-source Python package, also called LangFair. The package offers functionality to easily generate evaluation datasets, comprised of LLM responses to use-case-specific prompts, and subsequently calculate applicable metrics for the practitioner's use case. By providing a practical and accessible tool for evaluating bias and fairness in LLM use cases, LangFair has the potential to significantly improve the fairness of these models and mitigate their potential negative impacts.

Biography:

Dylan Bouchard is a Principal Scientist and Researcher at CVS Health. His work focuses on developing evaluation frameworks and toolkits that address various aspects of Responsible AI. Dylan's most recent work centers on bias and fairness in large language models (LLMs). As part of this work, he proposes a novel evaluation approach (https://arxiv.org/abs/2407.10853) for assessing LLM bias and fairness risks at the use-case level. To streamline the implementation of this approach, the companion open-source Python toolkit, LangFair (https://github.com/cvs-health/langfair), provides functionality to generate evaluation datasets and compute relevant evaluation metrics.

Advancing AI-Driven Healthcare and Secure Distributed Systems: Real-World Innovations in Automation, Analytics, and Diagnostics

Varun Varma Sangaraju

Senior QA Engineer, Cognizant, USA

Abstract:

Intelligent automation, performance testing, and artificial intelligence-driven diagnostics guide this conference on the expansion of scalable testing systems, healthcare systems, and analytics pipelines. Using tools like Selenium, Cypress, Power BI, and Python-based test automaton, it concentrates the development of solid QA procedures enhancing reliability in PBM systems and beyond. Emphasizing real-time apps in public health, insurance, and pharmaceutical technologies, the session will look at blend of LLMs and deep learning for behavior modeling, healthcare diagnostics, and system efficiency. Using real-time data, early illness diagnosis, and reduced mistake rates, participants will explore more ways for transforming conventional QA into AI-enhanced ecosystems. Subjects span cloud-native automation to breakthroughs in remote patient monitoring to better test performance and analytics-driven stakeholder reporting. Useful patents and case studies will provide people hoping for success in intelligent systems and digital healthcare transformation.

Biography:

I am a Senior QA Engineer at Cognizant with over 9 years of experience in test automation, data analysis, and healthcare PBM systems. I've led high-impact testing and automation projects across Fortune 500 clients, integrating technologies such as Selenium, Power BI, SPSS, and Salesforce. My academic background includes a Ph.D. in Information Technology with a focus on fog computing and zero trust security. I hold several patents in AI-powered diagnostics, distributed system design, and robotic automation. As a certified PMP and AWS Solution Architect, I bring a unique blend of project leadership and technical expertise. I've also presented at international conferences and actively contribute to scholarly publications and peer reviews in AI and data science.

The Rise of Agentic Workflows: Reshaping Industries and how

Gautami Nadkarni

Google Cloud | University at Buffalo, The State University of New York

Abstract:

Artificial intelligence is no longer just about algorithms and data; it's about creating intelligent systems that can act autonomously, learn, and adapt. This shift is driven by the rise of agentic workflows, a para-

digm that's transforming industries and redefining what's possible with AI. Agentic workflows involve creating AI agents that can independently perform tasks, make decisions, and collaborate with other agents to achieve complex goals. These agents are not just passive tools; they are proactive, intelligent entities that can understand context, learn from experience, and take initiative. Workshop Agenda Details This workshop will cover the following topics: ● Introduction to Agentic Workflows: Understanding the fundamental concepts of AI agents, agency, and the shift towards autonomous AI systems. ● Core Components of Agentic Workflows: A detailed look at the reasoning loop, the role of various Large Language Models (LLMs), and the integration of tools. ● Key Features Driving Agent Autonomy: Understanding the functionalities that enable AI agents to operate autonomously, including perception, reasoning, action, learning, and social ability. ● Impact on the Future of AI: Discussing the broad implications of agentic workflows, including the shift from reactive to proactive AI and the potential for increased efficiency and adaptability. ● The Agentic Future: Exploring the long-term significance of agentic workflows as a fundamental shift in AI and their potential to drive innovation across industries. ● Industry-Specific Impacts: In-depth analysis of how agentic workflows are transforming EdTech (personalized learning, automated grading, administrative tasks), Retail (inventory management, personalized shopping, automated customer interactions), and Media & Publishing (content creation, personalization, distribution).

Biography:

Gautami is a highly accomplished Cloud Architect with over nine years of experience in customer-centric roles, bringing a wealth of knowledge in Cloud technology and end-to-end Data Strategy. Her expertise spans leading complex cloud migrations, delivering impactful proofs-of-concept, and presenting compelling technical presentations and demonstrations, consistently positioning her as a trusted advisor to Enterprise clients. Specializing in Data Analytics and Management, Cloud AI, Gautami has a proven track record of partnering with Fortune 500 companies to drive business transformation through strategic technology adoption, championing a cloud-first approach.

Maximizing ROI and Sustainability in AI Infrastructure: Cost-Effective, Energy-Efficient Strategies for Modern Data Centers

Prashanthi Matam

DFS Corporate Services LLC, WA, USA

Abstract:

As AI models grow in complexity and scale, modern enterprises are facing mounting pressure to optimize the return on investment (ROI) of their AI infrastructure while meeting sustainability goals. This talk addresses a critical challenge: how to build and operate AI infrastructure that is not only high-performing but also cost-effective and energy-efficient.

We will explore practical strategies for maximizing resource utilization in modern data centers through intelligent workload orchestration, right-sizing of GPU/TPU clusters, and hybrid cloud strategies. The session will also highlight the importance of power-aware scheduling, hardware-aware model compression, and the use of AI itself to optimize energy consumption.

Attendees will gain insights into sustainability reporting, the role of carbon-aware computing, and partnerships with green energy providers to reduce emissions. Real-world case studies from hyperscalers and AI-first enterprises will be shared to demonstrate measurable improvements in both cost savings and environmental impact.

Whether you're a cloud architect, ML engineer, or infrastructure leader, this session will equip you with actionable techniques to align AI infrastructure investments with organizational goals for ROI, efficiency, and climate responsibility.

Biography:

I'm Prashanthi Matam. I have 7 years of experience as a senior software engineer having worked at companies like Discover,Goldman Sachs, Capgemini, and Enel X, where I leveraged cutting-edge technologies such as AWS, JavaScript, and Python. My background in Computer Science, combined with hands-on expertise in building ML model tracking systems, dynamic logging frameworks, and automated credential management, has equipped me with a comprehensive understanding of AI-enhanced testing frameworks. Additionally, as the former Vice-Chairman of ACM, Mentor for Mozilla Firefox, Redhat.I developed strong leadership skills that I bring to every project.

Future Trends in Mobile News Consumption

Dr. Ranita Ganguly[1], Priyam Ganguly[2], Isha Mukherjee[3]

[1]Delaware State University, USA
[2]Widener University,USA
[3]Pace University , USA

Abstract:

The integration of artificial intelligence (AI) into modern news consumption has fundamentally transformed how individuals access, interact with, and perceive news, especially through mobile media. AI leverages machine learning, natural language processing (NLP), and predictive analytics to curate personalized news feeds that align with users' preferences, ensuring relevance and engagement. By analyzing vast amounts of data, AI can tailor content delivery in real-time, offering recommendations based on reading habits, sentiment analysis, and contextual understanding. This capability not only enhances user experiences but also combats challenges such as information overload by presenting concise and meaningful updates. Platforms like Google News and Flipboard epitomize this transformation, utilizing AI-driven algorithms to streamline content consumption. Additionally, AI facilitates real-time news delivery by monitoring social media, news outlets, and public data streams, ensuring users receive instantaneous updates on breaking news. However, personalization raises ethical concerns like filter bubbles, where exposure to diverse perspectives is limited, emphasizing the need for transparency in algorithmic decision-making.

Beyond personalization, AI addresses the critical issue of misinformation by detecting and mitigating the spread of fake news. Advanced algorithms analyze text, images, and videos to identify anomalies indicative of fabricated content, with tools like Factmata and Full Fact leading the charge. Social media platforms have also incorporated AI-driven fact-checking mechanisms, scanning millions of posts to verify authenticity and highlight discrepancies. AI's role extends to content creation, where it supports journalists through automated systems like OpenAI's GPT models and Bloomberg's Cyborg, enabling the production of reports and summaries at scale.

Biography:

Speaker 1: Dr. Ranita Ganguly is an IEEE member and works as Quality Consultant at 3D Technologies LLC, who has made substantial contributions to the field of Mobile computing with profound commitment to Mobile Learning and Mobile Technology. She is consistently trying to exhibit technical excellence, creativity, and leadership throughout her career. She is a Fellow member in Hackathon Raptors, IICSPA, and RSA. Dr. Ganguly has a Doctorate degree from Delaware State University and Masters from University of Pune. She has 12 Years Experience in Validating Mobile App Interventions for Mobile Computing and 5 years Teaching Experience.

Speaker 2: Priyam Ganguly is a seasoned data analyst with considerable exposure in the FinTech, energy, and telecommunication sectors. As a present data analyst for Hanwha QCells America, he creates effective business dashboards and automated data processes that assist the high levels of management in making decisions. He holds an IEEE publication in the areas of machine learning and predictive analytics and also engages in academic research, aside from his industry practice. Additionally, Priyam has engineered a robust database schema and flexible stored procedures that handle complex incremental report generation models, showcasing technical excellence in data management.

Speaker 3: Isha Mukherjee is a driven data science professional with a strong academic foundation, currently pursuing a Master of Science in Data Science with a concentration in Business Intelligence at Pace University. A published researcher, Isha has contributed to the IEEE community with her work on optimizing retail sales through machine learning. She is passionate about using data science to solve real-world challenges, with hands-on experience in exploratory data analysis, predictive modeling, and creating impactful dashboards. Isha is now eager to apply her analytical expertise to drive innovation and growth in dynamic environments.

Virtual Presentations

Neurosymbolic Learning: Opportunities and Challenges

Efthymia Tsamoura

Samsung AI, Cambridge, UK

Abstract:

Undoubtedly, deep learning-based AI has been a striking success in different fields of science and engineering. However, concerns regarding deep learning's true capabilities grow,as research communities and practitioners use it more broadly. AI researchers have identified several cases where integrating symbolic knowledge or reasoning mechanisms offers multiple benefits over traditional deeplearning architectures. This integration of neural and symbolic mechanisms is known as neurosymbolic learning (NSL). In this talk, we will quickly discuss several areas in which NSL has been successful, including applications in computer vision and natural language processing. We will then focus on NSL problems that cannot be reduced to known settings in machine learning or logic and list open theoretical questions that seek our attention. In the last part of this talk, we will talk about key impediments that prevent us from reaching the full potential of NSL, as well as steps towards overcoming them.

Biography:

Efthymia (Efi) Tsamoura is a Senior Researcher at Samsung AI, Cambridge, UK. In 2016, she was awarded a prestigious early career fellowship from the Alan Turing Institute, UK, for her work on logic and databases, and before that, she was a Postdoctoral Researcher in the Department of Computer Science of the University of Oxford. Her main research interests lie in the areas of logic, knowledge representation and reasoning, and neuro-symbolic learning, while her outcomes include scaling symbolic reasoning to billions of triples and addressing open problems in neuro-symbolic learning.

WSSGCN: Wide Sub-stage Graph Convolutional Networks

Chao Wang[1*], Zheng Tang[2] , Hailu Xu[3]

[1]China Academy of Railway Sciences Corporation Limited, China
[2]NVIDIA, USA
[3]California State University, Long Beach, USA

Abstract:

Graph Convolutional Networks (GCNs) have emerged as a potent tool for learning graph representations, finding applications in a plethora of real-world scenarios. Nevertheless, a significant portion of deep learning research has predominantly concentrated on enhancing model performance via the construction of deeper GCNs. Regrettably, the efficacy of training deep GCNs is marred by two fundamental weaknesses: the inadequacy of conventional methodologies in handling heterogeneous networks, and the exponential surge in model complexity as network depth increases. This, in turn, imposes constraints on their practical utility. To surmount these inherent limitations, we propose an innovative approach named the Wide Sub-stage Graph Convolutional Network (WSSGCN). Our method is an outcome of meticulous observations drawn from classical and graph convolutional networks, aimed at rectifying the constraints associated with traditional GCNs. Our strategy involves the conception of a staged convolutional network framework that mirrors the fundamental tenets of the step-by-step learning process akin to human cognition. This framework prioritizes three distinct forms of consistency: response-based, feature-based, and relationship-based. Our approach involves three tailored convolutional networks capturing node/edge, subgraph, and global features. Additionally, we introduce a novel method to expand graph width for efficient GCN training. Empirical validation on benchmarks highlights WSSGCN's superior accuracy and faster training versus conventional GCNs. WSSGCN triumphs over traditional GCN constraints, significantly enhancing graph representation learning.

Biography:

Chao Wang received an M.S. in Computer Application Technology from Northeast University in 2010 and is currently an Assistant Researcher at the China Academy of Railway Sciences. His research focuses on computer vision, graph neural networks, big data, cloud computing, and intelligent rail transit systems. Wang has published several papers and served as a reviewer for academic journals and conferences in these fields. He holds multiple invention patents and has led key projects that have earned prestigious awards, including the 2021 Beijing Rail Transit Society Science and Technology Progress Award and the 2017 China Excellent Patent Award.

Empowering LLMs with Logical Reasoning: A Comprehensive Survey

Fengxiang Cheng[1*], Haoxuan Li[2,3] , Fenrong Liu[1,4] , Robert van Rooij[1] , Kun Zhang[3,5] , and Zhouchen Lin[2,6]

[1]University of Amsterdam, Netherlands
[2]Peking University, China
[3]Mohamed bin Zayed University of Artificial Intelligence, United Arab Emirates
[4]Tsinghua University, China
[5]Carnegie Mellon University, USA
[6]Peng Cheng Laboratory, China.

Abstract:

Large language models (LLMs) have achieved remarkable successes on various natural language tasks. However, recent studies have found that there are still significant challenges to the logical reasoning abilities of LLMs. This paper summarizes and categorizes the main challenges into two aspects: (1) Logical question answering, LLMs often fail to generate the correct answer within complex logical problem which requires sophisticated deductive, inductive or abductive reasoning given a collection of premises and constrains. (2) Logical consistency, LLMs are prone to producing responses contradicting themselves across different questions. For example, a state-of-the-art Macaw question-answering LLM answers Yes to both questions Is a magpie a bird? and Does a bird have wings? but answers No to Does a magpie have wings? To facilitate this research direction, we comprehensively investigate the most cutting-edge methods and propose detailed taxonomies of these methods. Specifically, to accurately answer complex logic questions, previous methods can be categorized based on reliance on external solvers, prompts, pretraining, and fine-tuning. To avoid logical contradictions, we discuss concepts and solutions of various logical consistencies, including implication, negation, transitivity, factuality consistency, and their composites. In addition, we review commonly used benchmark datasets and evaluation metrics, and discuss promising research directions, such as extensions to modal logic to account for uncertainty, and efficient algorithms satisfying multiple logical consistencies simultaneously.

Biography:

Fengxiang Cheng is currently a Ph.D. candidate in Logic at Institute for Logic, Language and Computation (ILLC) in UvA. She holds a Master of Logic from Tsinghua University and dual Bachelor's degrees in Philosophy and Economics. Her research lies at the intersection of logic, causality, and LLMs. Her co-authored works include this IJCAI 2025 submission, a AAAI 2025 workshop paper, several logic conference papers, and some textbook chapters. She served as a PC member for ICLR and AAAI workshops. She has received many scholarships including the National Scholarship (China's top honor), and Tsinghua University Scholarship for Excellence in Social Work.

Looking Beyond the Data: Navigating the Challenges of Biased Samples

Srik Gorthy

Bytedance, USA

Abstract:

In the era of Large Language Models (LLMs) and AI-driven insights, the quality of data holds the key to business decisions. Yet, biased samples often overlooked or underestimated can lead to flawed conclusions, unreliable models, and a loss of trust in data-driven systems. Whether biases stem from data collection methods, under-represented groups, or feedback loops in AI systems, understanding and addressing them is crucial for maintaining the integrity of insights. This presentation examines the pervasive chal-

lenge of biased data samples and discusses key issues that data practitioners frequently encounter. From selection bias, where certain groups are systematically excluded, to response bias, where participation is skewed, biased sampling can distort the data landscape in subtle but significant ways. These biases have direct real-world consequences: for example, a cancer detection system that erroneously associates the presence of a ruler in mole images with malignancy, or an autonomous driving system trained without accounting for real-world deviations from traffic rules. Recognizing bias is just the first step. The presentation will explore actionable strategies like thoughtful sampling design and bootstrap resampling to detect and mitigate bias, ensuring insights reflect reality more accurately. By examining real-world examples and practical approaches, this discussion invites professionals to rethink how data is collected and analyzed. Looking beyond the data means understanding its imperfections, challenging assumptions, and adopting techniques that uphold reliable decision-making in an increasingly AI-centric world.

Biography:

Srik Gorthy has over a decade of experience in Machine Learning and Data Science, having worked in and contributed to multiple projects across industries like internet technologies, semiconductors, and FMCG. Currently, as a Senior Data Scientist at ByteDance, he lead data science initiatives for critical products in Trust & Safety, driving impactful outcomes. Previously working with Leading Global organizations such as Google and AMD along with his starting own start-up TVAlly, Srik brings a unique blend of technical and business perspective.

Keynote Presentations

Exploring the Use of Large Language Models to Help Author Intelligent Tutoring Systems

Vincent Aleven

Human-Computer Interaction Institute Carnegie Mellon University

Abstract:

Intelligent tutoring systems (ITSs), one of the longest-standing applications of Artificial Intelligence in Education, have been proven to help students learn in many subject domains spanning elementary school to higher education. These systems use AI to guide students as they practice solving complex problems, with feedback and on-demand hints at each problem step. For ITSs to be widespread, it is imperative that they can be authored efficiently. The Cognitive Tutor Authoring Tools (CTAT), developed in my lab over 20+ years, support efficient development of two major ITS paradigms. These paradigms are similar in their adaptive tutor behaviors but differ in the knowledge representation used for tutoring and in how they are authored: Example-tracing tutors use examples of problem solving and can be created without programming, model-tracing tutors use problem-solving rules and require AI programming. Although CTAT has been shown to improve authoring efficiency, greater efficiency gains may be possible and desirable. It appears that Large Language Models (LLMs) can help achieve this goal while keeping domain experts in the loop. For example-tracing tutors, we have achieved initial success using an LLM for problem generation in a template-based approach, where the LLM produces variations of existing problems and associated instruction. For model-tracing tutors, we have achieved initial success using an LLM to generate rule-based cognitive models in the Nools programming language. Although the work is in an early phase, we hope that ultimately, as a result of these efforts, many more students will have access to a highly effective educational technology (ITSs).

Biography:

Vincent Aleven is a Professor of Human-Computer Interaction at Carnegie Mellon University. As the head of the Creating Adaptive Tutoring Software (CATS) Lab, he investigates how AI can enhance education. His lab focuses on prototyping new designs for the smart classroom, with projects ranging from optimizing the design of AI-based tutoring systems, to a real-time mixed- reality teacher awareness tool, to easy-to-use authoring tools for creating AI-based tutoring systems. He has over 300 publications, is co-editor-in-chief of the International Journal of Artificial Intelligence in Education, received 27 major research grants, and won 12 best paper awards at international conferences.

Transforming Scientific Innovation with AI

Max Welling

University of Amsterdam, Neitherlands

Abstract:

We are witnessing the emergence of new powerful tools in the molecular sciences based on AI, such as Machine Learned Force Fields and AlphaFold. At CuspAI we are building a platform that takes this to the next level: Using generative models for materials, a multi-fidelity stack of AI accelerate (surrogate) evaluation tools, LLMs to search through scientific literature and an AI agent to orchestrate and optimize the search process, we transform the entire pipeline of materials design.

Biography:

Prof. Dr. Max Welling is a full professor and research chair in machine learning at the University of Amsterdam and a Merkin distinguished visiting professor at Caltech. He is co-founder and CTO of the startup CuspAI in Materials Design. He is a member of the Royal Dutch Academy of Sciences, a fellow at the Canadian Institute for Advanced Research (CIFAR) and the European Lab for Learning and Intelligent Systems (ELLIS) where he served on the founding board. His previous appointments include Partner and VP at Microsoft Research, VP at Qualcomm Technologies, professor at UC Irvine. He finished his PhD in theoretical high energy physics under supervision of Nobel laureate prof. Gerard 't Hooft. He then switched fields to focus on machine learning, first as a postdoc at Caltech under supervision of prof. Pietro Perona and then as postdoc under supervision of Nobel laureate prof. Geoffrey Hinton at UCL & U. Toronto. Max Welling has served as associate editor in chief of IEEE TPAMI from 2011-2015, he serves on the advisory board of the Neurips foundation since 2015, he is co-founder of the European Lab for Learning and Intelligence Systems (ELLIS) and served on its board until 2021, he has been program chair and general chair of Neurips in 2013 and 2014 respectively. He was also program chair of AISTATS in 2009 and ECCV in 2016 and general chair and co-founder of MIDL 2018. Max Welling is recipient of the ECCV Koenderink Prize in 2010, and the 10 year Test of Time awards at ICML in 2021 and ICLR in 2024.

Oral Presentations

Leveraging Data Integration and Workforce Analytics to Transform Enterprise Operations

Abdul Jabbar

Metanoia Solutions Inc USA

Abstract:

Modern corporate environments define by data-based judgements. Senior Solution Consultant Abdul Mohamed, having more than 17 years of experience in UKG PRO, Boomi Integrations, and Workforce Analytics, looks at how businesses might use data integration and workforce analytics to improve operations, guarantee compliance, and produce measurable business outcomes in this session. I will provide validated approaches for enhancing workforce management systems, providing safe and scalable integrations, and applying advanced analytics to better understand staff behavior and trends using real-world case studies from Fortune 100/500 firms. From systems like UKG PRO and HRMS into centralized data lakes, participants will gain techniques for creating successful data pipelines as well as for turning this raw data into relevant insights for leadership decision-making. Strategic data integration and workforce analytics will enable participants to fully understand improving operational efficiency, increasing employee engagement, and generating significant cost savings, thereby helping companies to sustain competitiveness in a progressively digital environment.

Biography:

I'm Abdul Mohammad, a Senior Solution Consultant with over 17 years of experience in UKG/Kronos systems and 20+ years in IT. I specialize in UKG PRO WFM, Boomi integrations, and workforce analytics, helping large organizations streamline operations, improve compliance, and make data-driven decisions. I've led complex implementations for clients like General Motors, ABB, and IBM, building solutions that bridge technology and business goals. I'm passionate about creating practical tools, simplifying complex processes, and turning workforce data into meaningful insights that drive results.

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Driving Enterprise Security: Leadership in Application Security, Vulnerability Management, and Secure SDLC Implementation across Globa Teams

Krishna Chaitanya Chaganti

S&p GLOBAL

Abstract:

With over 13 years of comprehensive experience in cyber security, I have led large-scale application and infrastructure security initiatives across global enterprises. As Associate Director at S&P Global, I manage a 27-member team specializing in Dynamic and Static Application Security Testing (DAST/SAST), secure SDLC integration, and end-to-end vulnerability management. My work focuses on identifying and mitigating threats in web applications, APIs, and mobile platforms, utilizing industry-standard tools like Burp Suite, IBM AppScan, Fortify, Veracode, and Nessus. I bring deep expertise in OWASP Top 10, PCI DSS compliance, risk advisory, and penetration testing methodologies. I have implemented automated security assessments within CI/CD pipelines and collaborated closely with development teams to embed security in early development stages. My role involves coordinating remediation efforts, conducting threat modeling, and driving security awareness across stakeholder groups. By leveraging CVSS scoring, I prioritize vulnerabilities effectively and ensure actionable insights are delivered to business units. My passion lies in fostering secure digital environments through innovation, education, and proactive defense strategies.

Biography:

I'm Krishna, a cyber security leader with 13+ years of experience in application and infrastructure security. As Associate Director at S&P Global, I lead a 27-member team focused on DAST/SAST, threat modeling, and secure SDLC practices. I specialize in identifying and remediating vulnerabilities using tools like Burp Suite, Fortify, and Veracode. I'm passionate about mentoring, fostering a security first culture, and making security a catalyst not a barrier for innovation.

Seasoned Data Analyst & Reporting Specialist | Expert in Power BI, SQL, and Data Visualization

Sangeeta Anand

Danville, VA, USA

Abstract:

A dedicated and detail-oriented data analyst with over 7 years of experience in data reporting, dashboard development, and business intelligence. Possesses deep expertise in tools like Power BI, SQL, Excel, and Alteryx, enabling the transformation of raw data into actionable insights that drive strategic decision-making. With a strong background in the finance and insurance sectors, consistently delivers accurate, automated, and visually engaging reports tailored for both technical and non-technical stakeholders. An analytical mindset, problem-solving approach, and commitment to continuous learning make this professional a valuable asset in any data-driven organization.

Biography:

I am Data analyst with 7+ years of experience transforming complex data into clear, actionable insights. Skilled in Power BI, SQL, Excel, and Alteryx, with a strong foundation in finance and insurance analytics. Known for creating clean, automated dashboards and reports that speak to both business and technical teams. Driven by curiosity, precision, and a passion for telling stories through data. Always learning, always improving.

Enterprise Cloud Automation: Modernizing Financial Systems with Scalable Architecture and AI Integration

Balkishan Arugula

Hexaware Technologies

Abstract:

As enterprises evolve to meet digital demands, cloud automation has become a critical pillar for transforming legacy infrastructure into resilient, scalable platforms. This presentation explores the real-world journey of modernizing financial systems using automated cloud-native solutions. Drawing from two decades of industry experience, I will showcase how leading banks and fintechs transitioned from monolithic systems to microservices architectures hosted on AWS and Azure, integrated with AI-driven processes. The session will cover practical frameworks for CI/CD automation using Jenkins, Gradle, and container orchestration with Docker and Kubernetes. It will also delve into platform integration with tools like Backbase for digital banking and how automation supports real-time decision-making, security, and compliance in highly regulated industries.

Attendees will gain actionable insights into cloud migration planning, infrastructure as code, and monitoring strategies using Datadog and ELK stack. Key learnings include reducing deployment risk, enhancing developer velocity, and aligning IT operations with business goals. This session is ideal for architects, DevOps leads, engineering managers, and digital transformation leaders looking to implement cloud automation at scale—especially in sectors where speed, security, and compliance are paramount.

Biography:

I am a Senior Technical Manager at Hexaware Technologies with over 19 years of experience in cloud architecture, DevOps, and digital transformation. I've led modernization projects for top financial institutions across the U.S., South Africa, and India, specializing in AWS, Azure, and Backbase integrations. My expertise spans microservices, CI/CD automation, and platform engineering for high-availability applications. I hold multiple certifications including AWS Solution Architect and Java Enterprise Architect.

Navigating the Complex World of InfoSec: A Veteran Consultant's Journey Through Application Security, Risk, and Compliance

Pavan Paidy

FINRA

Abstract:

Emphasizing complete security solutions across industries like banking, healthcare, and insurance, this profile highlights the path of an accomplished Information Security Consultant with more than 16 years of competence. Having certifications in CEH, CISA, and CISM in addition to a great awareness of frameworks like ISO 27001, COBIT5, and NIST, the consultant has successfully improved secure development processes, performed risk analyses, and carried out compliance operations. While closely working with development and DevOps teams, the consultant—specializing in application security—has done threat modeling (STRIDE), secure code reviews, and static/dynamic analysis (SAST, DAST). Their knowledge spans API security, mobile application testing, and the rigorous hardening and best standard adherence to which clouds like AWS and Azure are fortified. The consultant is quite experienced in risk and compliance control. Their performance of vendor risk analyses and guarantee of regulatory standard compliance—including SOX, HIPAA, and PCI-DSS—has been vital in thus impacting governance and policy frameworks. Together with strong communication skills, this person makes use of tools such Burp Suite, Fortify, Qualys, and Nessus to match technical performance with corporate goals. Their route shows a commitment to raising security standards and promoting awareness within current changing threat environment.

Biography:

I'm an Information Security Consultant with over 16 years of experience in IT and a strong background in application security, risk assessment, and compliance. With an MBA in Information Security and certifications like CEH, CISA, and CISM, I've worked across finance and healthcare domains to implement secure SDLC, conduct security assessments, and ensure regulatory compliance. I'm skilled in tools like Checkmarx, Burp Suite, and Nessus, and well-versed in cloud security (AWS, Azure). I'm passionate about building secure, scalable systems and helping organizations stay ahead of threats with practical, business-aligned security strategies.

Flash Talks

Context Is All You Need: Efficient Retrieval-Augmented Generation for Domain-Specific Artificial Intelligence

Peixi Xiong

Abstract : Not Available

AI Agent for Co-creation Ecosystem: Elevating Human-AI Co-creation through Emotion Recognition and Dynamic Personality Adaptation

Fernando Jia[1,2*], Yuteng Fu[2,3], Jade Zheng[2], and Florence Li[4]

[1]UC Berkeley RDI, USA
[2]Starward Games, USA
[3]Pratt School of Engineering, Duke University, USA
[4]Stanford University, USA.

Abstract:

Embodied AI agents can redefine human-computer interactions through highly creative, deeply empathetic experiences. While platforms like Gennie2, World Labs, and MineDojo emphasize real-world simulations and task-based functionalities, we shift the focus toward creative expression, spotlighting creators' roles in shaping immersive, emotionally attuned, personalized interactions. We present an advanced embodied AI agent that merges state-of-the-art Large Language Models with robust emotion and intent recognition to enable rich, context-aware exchanges. Our approach employs cutting-edge emotion analysis to interpret subtle affective cues and a zero-shot classification pipeline to infer intentions without extensive labeled data. A dynamic personality adaptation framework, grounded in the OCEAN model,

continuously refines the agent's conversational style, promoting sustained engagement. We evaluate performance on emotion recognition accuracy, intent coverage, and response quality, demonstrating marked improvements over baseline models. By fusing LLM technology with emotional intelligence and adaptive personalization, our system broadens the scope of embodied AI, empowering creators to design interactive, emotionally resonant experiences. Ultimately, we envision technology evolving into a genuine collaborator, rather than merely replicating reality.

Biography:

Fernando Jia is Co-Founder of Starward Game Studios, a UC Berkeley alumnus, a Fellow at Y Combinator China (now MiraclePlus), and a sponsor and supervisor at Carnegie Mellon University.

Active Learning for Abrupt Shifts Change-point Detection via Derivative-Aware Gaussian Processes

Hao Zhao[1] , Ashley Wu[2*], Rong Pan[1]

[1]Arizona State University, USA
[2]Lexington High School, USA

Abstract:

Change-point detection (CPD) is crucial for identifying abrupt shifts in data, significantly influencing decision-making and efficient resource allocation across various fields. However, data acquisition for CPD is often expensive and time-consuming. To address the challenges, we propose a Derivative-Aware Change Detection (DACD) method, an active learning (AL) framework that utilizes derivatives of Gaussian Processes (GP) to effectively detect change points. DACD begins with a small number of initial labeled samples, fits a GP to learn the underlying data structure, and sequentially selects new points using acquisition functions (AFs) based on the GP derivative mean and variance. This strategy allows DACD to balance exploration and exploitation and focus sampling near potential changes while avoiding unnecessary measurements. By sequentially selecting the most informative data points, DACD significantly reduces the number of samples required while ensuring high detection accuracy. To demonstrate its effectiveness, we validate DACD on synthetic datasets with different data types and change characteristics. Results show that DACD consistently achieves higher detection accuracy than existing AL-based CPD methods. Furthermore, we apply DACD to real-world microscopy images of wound healing processes in mouse DA3 cells, effectively identifying critical change points that indicate wound cut edges using limited pixel data. Experimental results confirm DACD's effectiveness for both time series and spatial CPD tasks, especially in scenarios where sampling is limited or expensive.

Biography:

Hao Zhao is a PhD candidate in Industrial Engineering at Arizona State University, focusing on machine learning and Gaussian Processes modeling. Ashley Wu is currently a student at Lexington High School in Massachusetts. Dr. Rong Pan is a Professor in the School of Computing and Augmented Intelligence at Arizona State University. His research interests include quality and reliability engineering, design of experiments, timeseries analysis, and statistical learning theory.

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Email: aim@uniscigroup.org
Web: https://artificialintelligence.unitedscientificgroup.org/