

Seminar Series on Advanced Computation for Data Science (AC-DS)

DATES: April 9-10, 2021

Friday, April 9th

Time	Title	Speaker
9:00 - 9:30	Welcome and Introduction	Dr. Robert Prezant, SCSU Provost Dr. Alaa Sheta
9:30 - 10:30	<u>Keynote:</u> Open Code Biometric Tap Pad for Smartphones	Dr. Md Shafaeat Hossain
10:45-11:45	Intelligent Data Analysis in the Construction Industry	Dr. Peter Rauch
11:45 - 1:00	<i>Lunch Break</i>	
1:00-2:00	Applications of Advanced Computation in Data Science	Nisreen Cain
2:00-3:00	Deep Learning: The Artificial Intelligence Renaissance	Dr. Tarik Islam
3:00-4:00	Object Detection Using Deep Learning with Emotion Detection Showcase	Dr. Walid Ali
4:00-4:30	New SCSU Programs & Day's Wrap-up	

Saturday, April 10th

Time	Topic	Speaker
9:00 - 10:00	<u>Keynote:</u> Optimization Problems and Algorithms	Dr. Seyedali Mirjalili
10:00-11:00	Digital Data in Healthcare: Advanced Applications and Challenges	Dr. Hossam Faris
11:00-12:00	Putting Science in Agile Data Science	Dr. Juan J. Merelo Guervós
12:00-12:30	Closing Remarks	

Seminar Series on AC-DS

Friday, April 9th

Keynote: Dr. Md Shafaeat Hossain



Title: Open Code Biometric Tap Pad for Smartphones

Abstract:

Poor security practices among smartphone users, such as the use of simple, easily guessed passcodes for logins, are a result of the effort required to memorize stronger ones. We devised a concept of “open code” biometric tap pad to authenticate smartphone users, which eliminates the need to memorize secret codes. A biometric tap pad consists of a grid of buttons each labeled with a unique digit. The user attempting to log into the phone will tap these buttons in each sequence. He/she will not memorize this tap sequence. Instead, the sequence will be displayed on the screen. The focus here is on how the user types the sequence. This typing behavior is used for authentication. An open code biometric tap pad has several advantages, such as (1) users do not need to memorize passcodes, (2) manufacturers do not need to include extra sensors, and (3) onlookers have no chance to practice shoulder-surfing. We performed a rigorous experiment to prove the effectiveness of open code biometric tap pad in smartphone security. Our experimental results show significant promise of open code biometric tap pads as a solution to the problem of weak smartphone security practices used by a large segment of the population.

Short biography:

Dr. Md Shafaeat Hossain is an Associate Professor of Computer Science at Southern Connecticut State University (SCSU), New Haven, Connecticut, USA. He was born in Dhaka, Bangladesh in 1982. He received a B.S. degree in Computer Science and Engineering from the University of Dhaka, Bangladesh in 2007. He received an M.S. degree in Computer Science, an M.S. degree in Mathematics, and a Ph.D. degree in Computational Analysis and Modeling from Louisiana Tech University, Ruston, Louisiana, USA in 2014. His research interests include machine learning, smartphone security, and biometrics. He directs the Machine Learning and Biometrics Lab at SCSU. He is a Member of IEEE.

Prof. Peter Rausch



Title: Intelligent Data Analysis in the Construction Industry

Abstract:

Due to technical progress in construction and the widespread use of connected sensors huge amounts of data can be collected on-site. The combination of this data with other data derived from different data sources, like ERP systems, and its analyses contribute to valuable business insights, increased efficiency, and, finally, higher profits. This talk will provide an overview of the entire pipeline from data collection to analysis and the delivery of results. Furthermore, possible challenges and their solutions from a practitioner's point of view will be mentioned. After a brief overview of possible technical set-ups, data processing will be explained and selected examples for analyses will be given. Finally, it will be shown how companies and their stakeholders can benefit from intelligent analyses. An outlook on future developments concludes the presentation.

Short biography:

Peter Rausch is Professor of Information Systems at the Nuremberg Institute of Technology - Georg Simon Ohm and has published many papers, articles, and book chapters. Peter's current research activities are focused on AI technologies, Data Analyses and Fuzzy Theory. He holds a Ph.D. in Business Administration from Frankfurt University, Germany, and has spent several years working in the fields of software development, business process optimization, and consulting. As a Program Manager, he was the head of process and tool management in the Sales Support Department of Sun Microsystems, Germany. Later, he was responsible for an integration environment that was part of an industry solution at a German software company. Since 2004, Peter has been a Professor of Information Systems. In December 2011, he received the Best Poster Award from the SGAI International Conference on Artificial Intelligence, Cambridge, UK for his contribution as co-author of a paper on "Quality Management of Manufacturing Processes". Three years later, he returned to the SGAI International Conference on AI as a keynote speaker on a subject in the field of construction entitled "Horizon 2121 - The AI-Revolution Has Just Begun". He is also co-editor of the book "Business Intelligence and Performance Management - Theory, Systems, and Industrial Applications" published by Springer. He has more than 20 years of experience in Information Systems, Business Intelligence, Data Analyses, AI, and Fuzzy Logic. Also, he can look back on just as many years of experience in research and industry projects.

Nisreen Cain



Title: Applications of Advanced Computation in Data Science

Abstract:

In recent years, terms like data science, artificial intelligence, and machine learning have had a constant presence in mainstream media. At times with controversial opinions or harsh judgements. The fact is that these fields have existed for a long time. So, what's the fuss all about now? In this talk we will explore some real-world applications of computational data science and how these concepts and algorithms are applied in cyber intelligence and security as well as other domains. We will cover topics from data gathering and enrichment, to applying machine learning and AI to augment and analyze data, and how that helps us understand and discover the world around us. Bring your curiosity to explore what it means to really apply knowledge to data in this digital age.

Short biography:

Nisreen Cain is the Senior Vice President of Engineering at Babel Street (www.babelstreet.com), the world's data-to-knowledge platform, a real-time search web application with advanced analytics delivering enhanced geographical and multilingual features. At Babel Street, Nisreen builds collaborative initiatives to develop and maintain existing tools and help innovation to further the capabilities of Babel Street's mission.

Nisreen began her career in academia, moving from theoretical research in computer science into a more applied approach where she focused on building large data analytical applications. During her time at the National Strategic Planning & Analysis Research Center, Nisreen led diverse teams to conceptualize, build, and deliver large-data web-based analytics centered around advancing Mississippi's educational systems and workforce. These high-value applications integrated data from several state agencies to facilitate fact-driven decisions on local and state levels. Two such contributions are the MS Lifetracks initiative (www.lifetracks.ms.gov), and MS Works (www.mississippiworks.org). As a published researcher, Nisreen has several peer-reviewed publications in the areas of high-performance computing, computer security, algorithms, and user experience.

Dr. Mohammad Tarik Islam



Title: Deep Learning: The Artificial Intelligence Renaissance

Abstract:

Artificial intelligence (AI) has transformed our lives in many ways. In the past decade, we have seen unprecedented advances in technologies pertaining to autonomous vehicles, drug discovery, human-computer interaction, digital marketing, and numerous other areas. The central catalyst is this progress has been deep learning—a branch of modern machine learning based on artificial neural networks. It has become the de facto standard data-driven approach for solving problems arising in a variety of domains, such as computer vision, natural language processing, medical science, and more. In this talk, I will give an overview of some of the most transformative deep learning algorithms and their recent applications in astronomy, medical science, and computer vision. Specifically, I will explain the concepts relevant to convolutional neural networks (CNNs) and Generative Adversarial Networks (GANs) and how they have been applied in classifying galaxy clusters by focusing on certain parts of the astronomy images, predicting if a person has diabetes by analyzing only her/his retinal images, and generating images that are almost impossible to distinguish from real photographs.

Short biography:

Mohammad Tariqul Islam joined the faculty of the Computer Science Department at Southern Connecticut State University as an assistant professor in Fall 2016. He received a bachelor's in computer science and engineering from Bangladesh University of Engineering and Technology in 2006, and a master's and a Ph.D. in computer science from The University of Kentucky in 2014 and 2016, respectively. Dr. Islam's work focuses on the application of machine learning in computer vision and medical science, with an emphasis on deep learning-based approaches. His most recent research activities include developing deep learning-based algorithms for image geo-localization, video understanding, DNA/RNA analysis, and more. His research has been published at notable peer-reviewed conferences and journals, such as the International Conference on Image Processing, the International Conference on Bioinformatics and Biomedicine, Computer Vision and Pattern Recognition, IEEE Access, etc.

Prof. Walid Ahmed



Title: Object Detection Using Deep Learning with Emotion Detection showcase

Abstract:

Object Detection is a one of the interesting challenges of computer vision. Not only the object should be classified to a certain class but also its exact location is determined within a frame. A straightforward way to accomplish this is to apply a sliding window on the frame and applying the classifier at each given location of the sliding window. Unfortunately, this technique is not practical as it will be exhaustive in time thus difficult to apply in real time even when using a simple classifier that uses HoG features. A more practical approach is achieved using Deep Learning. Deep learning-based object detectors do end-to-end object detection. In this talk we will cover a conceptual understanding of object Detection with overview of benchmark Object Detection Frameworks like Faster-RCNN and YoLo. Usage of object detection in Emotion Detection will be presented in a practical showcase.

Short biography:

Dr. Walid Ahmed is a professional engineer with a Ph.D. in Electrical Engineering. He has worked as a full-time professor mainly teaching programming courses such as Java, Python and Web programming. Dr. Ahmed currently works in the industry as a senior machine learning engineer and is an expert in machine learning, Deep Learning and Computer vision. He has two patents and more than 40 published research in the field of intelligent systems.

Seminar Series on AC-DS

Saturday, April 10th

Keynote: Prof. Seyedali Mirjalili



Title: Optimization Problems and Algorithms

Abstract:

Over the last two decades, nature-inspired stochastic optimization techniques have been widely used to solve a variety of problems in both science and industry. Despite the popularity and impact of such methods, optimization of real-world problems involves addressing many difficulties such as local solutions, multiple objectives, constraints, expensive objective function, noisy objective function, dynamic search space, uncertainties, etc. In this talk, the state-of-the-art and recent advances in addressing such difficulties during optimization will be briefly presented.

Short biography:

A/Professor Seyedali Mirjalili is the director of the Centre for Artificial Intelligence Research and Optimization at Torrens University Australia. He is internationally recognized for his advances in Swarm Intelligence and Optimization, including the first set of algorithms from a synthetic intelligence standpoint – a radical departure from how natural systems is typically understood – and a systematic design framework to reliably benchmark, evaluate, and propose computationally cheap robust optimization algorithms. He has published over 200 publications with over 28,000 citations and an H-index of 58. As the most cited researcher in Robust Optimization, he is in the list of 1% highly cited researchers and named as one of the most influential researchers in the world by Web of Science in 2019 and 2020. A/Prof. Mirjalili is a senior member of IEEE (Institute of Electrical and Electronic Engineers) and an associate editor of several leading AI journals including Neurocomputing, Applied Soft Computing, Advances in Engineering Software, Applied Intelligence, and IEEE Access. His research interests include Robust Optimization, Engineering Optimization, Multi-objective Optimization, Swarm Intelligence, Evolutionary Algorithms, and Artificial Neural Networks. He is working on the application of multi-objective and robust meta-heuristic optimization techniques as well.

Prof. Hossam Faris



Title: Digital Data in Healthcare: Advanced Applications and Challenges

Abstract:

The massive increase of digital data in healthcare has revolutionized the potential of artificial intelligence and machine learning in improving patients' health. Therefore, many applications of ML and AI have emerged in the medical field in general, and telehealth. These applications have been developed as new products, improving existing products or improving operational effectiveness. As a director of data science in Altibbi, Prof. Faris will present in this talk the journey of Altibbi (the largest digital health provider in the MENA region) in designing, implementing, and deploying different types of ML models for leveraging the quality of telemedicine services which include intelligent supportive diagnostic models, classification of medical consultations, automatic quality assessment of medical consultations over voice calls, and others.

Short biography:

Hossam Faris is a full professor at King Abdullah II School for Information Technology/ The University of Jordan (Jordan) and the School of Computing & Informatics/ Al Hussein Technical University. Prof. Faris is also the director of data science at Altibbi (the largest digital health provider in the MENA region). He received his BA, M.Sc. degrees (with excellent rates) in Computer Science from Yarmouk University and Al-Balqa Applied University in 2004 and 2008 respectively in Jordan. Since then, he has been awarded a full-time competition-based Ph.D. scholarship from the Italian Ministry of Education and Research to pursue his Ph.D. degrees in e-Business at the University of Salento, Italy, where he obtained his Ph.D. degree in 2011. In 2016, he worked as a Postdoctoral researcher with the GeNeura team at the Information and Communication Technologies Research Center (CITIC), University of Granada (Spain). His research interests include Applied Machine Learning, Evolutionary Computation, Knowledge Systems, and Data mining.

Prof. Juan J. Merelo Guervós



Title: Putting Science in Agile Data Science

Abstract:

In software development cycles, the adjective agile encompasses a series of methodologies that put the client first and focus on continuous improvement following a series of best practices, as opposed to isolated phases with a low amount of feedback and very long development cycles that were common until the late nineties (and have not been eliminated). Since "data science" is now a term that has been enveloped in the broader software engineering arena, "agile data science" was a low-hanging fruit, and simply includes data science as a mainstream software engineering discipline. However, these processes have not fed back to the main machine learning/data science/artificial intelligence trunk. Processes in science are still lacking true industrial-standard best practices, without putting an emphasis on fast development cycles or, for that matter, quality assurance. In this talk, we will try to draw parallelisms between the world of agile software development and the world of academia, with an emphasis on data science. We will explain how concepts like MLOps can benefit the academic world, reducing stress, streamlining planning, and making science more open and democratic.

Short biography:

JJ Merelo received a degree and PhD in Physics from the University of Granada. He has been working since 1988 as a professor, eventually, since 2009, as a full professor at that University. He is a strong supporter of open science and free software, being part of the Raku Steering Council since 2020. His main research interests are in parallel computing, complex systems, and machine learning and computational intelligence.