

CSCI 2021 BOOK of ABSTRACTS

The 2021 World Congress in Computer Science, Computer Engineering,
and Applied Computing
CSCE 2021

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Note that the titles of papers, the authors' names and the abstracts that appear in this book ("Book of Abstracts") were extracted from the papers that were submitted to the EVALUATION web portal (i.e., extracted from the first draft submissions). The official published proceedings/book will have any and all changes/revisions that authors may have done.

KEYNOTE ADDRESSES:
(The Keynote lectures are open to all participants)

CONGRESS WELCOME REMARKS:

Dr. Hamid R. Arabnia
Chair, Steering Committee & Coordinator
University of Georgia, USA; Editor-in-Chief, The Journal of Supercomputing

CSCE Congress Keynote:

THE COMING PROBLEM OF SELF-AWARE ROBOTS
Dr. James Crowder
Engineering Fellow at Colorado Engineering, Inc., USA
(Formerly at Raytheon Technologies, USA)

SAM & CSCE Keynote:

CYBER SECURITY- PRIVACY - HOW CAN I PROTECT MYSELF IN CYBER SPACE? CAN I GET SOME PRIVACY, PLEASE?
Prof. Levent Ertaul
Department of Computer Science, California State University, East Bay, California, USA

SAM & CSCE Keynote:

ZERO-TRUST: SECURING THE NEW PERIMETER
Dr. Nader Nassar
Program Director & Senior Technical Staff member, IBM CIO, Assured Identity & Cyber Ops Organization;
Master Inventor at IBM; IBM, USA

ICDATA & CSCE Keynote:

BADGES & NEURAL NETWORKS: IMPROVING LAW ENFORCEMENT WITH AI
Andrew Johnston
Consultant with Mitiga, CEO and Co-Founder of Recluse Laboratories;
Adjunct Professor at Fordham University, USA

CSCE (ON-LINE) Keynote:

ENHANCING SECURITY OF COMMUNICATION NETWORKS WITH RANDOM NEURAL NETWORKS
Prof. Erol Gelenbe
FIEEE FACM FIET FRSS FIFIP; Professor,
Institute of Theoretical and Applied Informatics (IITIS-PAN),
Polish Academy of Sciences;
Coordinator (PI) of the 5M Euro H2020 SerIoT Research and Innovation project of the European Union;
Inventor of the random neural network and the eponymous G-networks.
Fellow of the National Academy of Technologies of France and of the Science Academies of Belgium, Hungary, Poland and Turkey

ICDATA (ON-LINE) Keynote:

DATA SCIENCE: THE FRONTIER OF DIGITAL ECONOMY
Dr. Peter Geczy
National Institute of Advanced Industrial Science and Technology (AIST), Japan

Bioinformatics Metadata Extraction for Machine Learning Analysis

*Zachary Tom, Wendy Lee
San Jose State University, San Jose, California, USA*

Abstract: Sequencing errors in conventional NGS workflows are key confounding factors for detecting mutations. Various steps of the workflow are tracked in the sequencing metadata, such as sample handling and library preparation, and these steps can introduce artifacts that affect the accuracy of calling rare mutations. This metadata is often scarce and challenging to filter and extract. This paper presents SRAMetadataX, a new tool that enables researchers to easily extract crucial metadata from NCBI SRA submissions. The tool was used to find sequencing runs that utilized various enrichment processes. Potential sequencing artifacts were identified, and machine learning models were trained on the data to determine a relationship between metadata and artifacts.

The Information and Complexity Analysis of COVID-19 RNA Sequence

*Shijun Tang
Department of Math and Science, Alvernia University, Reading, Pennsylvania, USA*

Abstract: In this paper, we analyse one COVID-19 RNA sequence via utilizing the LZ complexity method and Shannon information entropy. LZ complexity of a DNA/RNA sequence can be used in extraction of the useful information from complicated DNA/RNA sequence and in modern structural analysis of complete genomes. LZ complexity of a DNA/RNA sequence can also be used to find new motifs/patterns and mutations which have important biological functions. The special structure and patterns in the studied RNA would have a great significance for the clinic diagnosis and treatment of COVID-19 and some similar diseases (e.g. SARS).

The Role of Background Colour in Pollen Recognition Task using CNN

*Fernando C. Monteiro, Cristina M. Pinto, Jose Rufino
Research Centre in Digitalization and Intelligent Robotics (CeDRI), Instituto Politecnico de Braganca,
Campus de Santa Apolonia, Braganca, Portugal*

Abstract: Pollen recognition is a crucial but challenging task in addressing a variety of questions like pollination or palaeobotany, but also for other fields of research, e.g., allergology, melissopalynology or forensics. State-of-the-art methods mainly use deep learning CNNs for pollen recognition, however, we observe that existing published approaches use original images without study the possible biased recognition due to pollen's background colour. In this paper, we evaluate the DenseNet model trained with original images and with segmented images (remove background) and analyse network's predictive performance under these conditions using a cross evaluation approach. An accuracy of 97.4% was achieved that represents one of the best successes rate when weighted with the number of taxa of any attempt at automated pollen analysis currently documented in the literature. From these results, we confirm the existence of background specific influence in the recognition task.

Towards Genomics Data-Based Disease Prediction with Graph Neural Networks

*Laura Hernandez-Lorenzo, Vanesa Pytel, Jordi A. Matias-Guiu, Jorge Matias-Guiu, Jose L. Ayala
Department of Computer Architecture and Automation, Complutense University of Madrid, Madrid, Spain;
Department of Neurology, Hospital Clinico San Carlos, San Carlos Institute for Health Research (IdiSSC),
Complutense University of Madrid. Madrid, Spain*

Abstract: The study of genomics data, and specially genomic variants, is relevant in neurodegenerative diseases to contribute to an early diagnosis, being an affordable source of biomolecular data and a relatively non-invasive technique. This work presents a comprehensive methodology for the integration of genetic variants into different types