



## **Final Technical Program**

21st International Conference on  
**Intelligent Systems Design and Applications (ISDA'21)**

21st International Conference on  
**Hybrid Intelligent Systems (HIS'21)**

17th International Conference on  
**Information Assurance and Security (IAS'21)**

13th International Conference on  
**Soft Computing and Pattern Recognition (SoCPaR'21)**

13th World Congress on  
**Nature and Biologically Inspired Computing (NaBIC'21)**

12th International Conference on  
**Innovations in Bio-Inspired Computing and Applications (IBICA'21)**

11th World Congress on  
**Information and Communication Technologies (WICT'21)**

**MIR Labs Doctoral Symposium (DS 2021)**

**December 13-17, 2021**

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**Online Program Overview (All times are listed in GMT)**

<b>Event</b>	<b>December</b>	<b>Time</b>
<b>Conference Opening Ceremony</b>	13	08:45 - 09:00
<b>Plenary Talk 1</b> <i>Yukio Ohsawa, The University of Tokyo, Japan</i>	13	09:00 - 10:00
<b>ISDA: Session 1</b>	13	10:00 - 12:00
<b>ISDA: Session 2</b>	13	12:00 - 14:00
<b>ISDA: Session 3</b>	13	14:00 - 16:00
<b>ISDA: Session 4</b>	13	16:00 - 17:00
<b>ISDA: Session 5</b>	14	08:00 - 10:00
<b>HIS: Session 1</b>	14	10:00 - 12:00
<b>Plenary Talk 2</b> <i>Juergen Branke, University of Warwick, United Kingdom</i>	14	12:00 - 13:00
<b>Plenary Talk 3</b> <i>Cengiz Toklu, Beykent University, Turkey</i>	14	13:00 - 14:00
<b>Plenary Talk 4</b> <i>Günther Raidl, Technische Universität Wien, Austria</i>	14	14:00 - 15:00
<b>Plenary Talk 5</b> <i>Kalyanmoy Deb, Michigan State University, USA</i>	14	15:00 - 16:00
<b>HIS: Session 2</b>	14	16:00 - 17:30
<b>IAS: Session 1</b>	15	08:00 - 10:00
<b>Plenary Talk 6</b> <i>Oscar Cordon, University of Granada, Spain</i>	15	10:00 - 11:00
<b>SoCPaR: Session 1</b>	15	11:00 - 13:00
<b>Plenary Talk 7</b> <i>Andries Engelbrecht, University of Stellenbosch, South Africa</i>	15	13:00 - 14:00
<b>Plenary Talk 8</b> <i>Antônio de Padua Braga, Federal University of Minas Gerais, Brazil</i>	15	14:00 - 15:00
<b>SoCPaR: Session 2</b>	15	15:00 - 17:00
<b>NaBIC: Session 1</b>	16	09:00 - 10:30
<b>IBICA: Session 1</b>	16	10:30 - 13:00
<b>Plenary Talk 9</b> <i>Frédéric Guinand, Le Havre Normandy University, France</i>	16	13:00 - 14:00
<b>Plenary Talk 10</b> <i>Marco Dorigo, Université Libre de Bruxelles, Belgium</i>	16	14:00 - 15:00
<b>WICT: Session 1</b>	17	09:00 - 11:00
<b>WICT: Session 2</b>	17	11:00 - 13:00
Doctoral Symposium: DS 2021	17	13:00 – 16:00
<b>Conference Closing Ceremony</b>	17	16:00

**Offline Paper Presentation Schedule (All times are listed in GMT)**

<b>Event</b>	<b>December</b>	<b>Time</b>
<b>ISDA</b>	13	09:00 - 16:00
<b>HIS</b>	14	09:00 - 16:00
<b>IAS</b>	14	09:00 - 16:00
<b>SoCPaR</b>	15	09:00 - 16:00
<b>NaBIC</b>	15	09:00 - 16:00
<b>IBICA</b>	16	09:00 - 16:00
<b>WICT</b>	16	09:00 - 16:00

**December 13, 2021 – Monday**

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**08:45 - 09:00 GMT:** Conference Opening Ceremony

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**09:00 – 10:00 GMT:**

**Plenary 1:** Yukio Ohsawa, The University of Tokyo, Japan

**Title:** Elicitation of Feature Concepts as Data Federative Innovation Literacy

**Chairs:** Hanne Thomas and Dalia Kriksciuniene

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**December 13, 2021 – Monday**

**10:00 – 12:00 GMT**

**ISDA 2021: Session 1**

**Chairs: Catarina Reis, Portugal**

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- 7     Open-Ended Automatic Programming Through Combinatorial Evolution  
*Sebastian Fix, Thomas Probst, Oliver Ruggli, Thomas Hanne and Patrik Christen*
- 8     Deep Face Mask Detection: Prevention and Mitigation of COVID-19  
*Sahar Dammak, Hazar Mliki and Emna Fendri*
- 9     Extracting Emotion and Sentiment Quotient of Viral Information over Twitter Data  
*Pawan Kumar, Reiben Eappen Reji and Vikram Singh*
- 16    Thoracic Disease Chest Radiographic Image Dataset: A Comprehensive Review  
*Priyanka Malhotra, Sheifali Gupta, Atef Zaguia and Deepika Koundal*
- 35    Centrifugal Pump Fault Diagnosis Using Discriminative Factor-Based Features Selection and K-Nearest Neighbors  
*Zahoor Ahmad, Md Junayed Hasan and Jong-Myon Kim*
- 38    Transfer Learning with 2D Vibration Images for Fault Diagnosis of Bearings under Variable Speed  
*Zahoor Ahmad, Md Junayed Hasan and Jong-Myon Kim*
- 40    Performance evaluation of microservices featuring different implementation patterns  
*Leandro Costa and António N. Ribeiro*
- 45    Imbalanced Learning for Robust Moving Object Classification in Video Surveillance Applications  
*Rania Rebai Boukhriss, Ikram Chaabane, Radhouane Guermazi, Emna Fendri and Mohamed Hammami*



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**December 13, 2021 - Monday**  
**12:00 – 14:00 GMT**  
**ISDA 2021: Session 2**  
**Chairs: João Ferreira, Portugal**

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- 62 Automated Cattle Classification and Counting using Hybridized Mask R-CNN and YOLOv3 Algorithms  
*Devi Priya R, Devisurya V, Anitha N, Kalaivaani N, Keerthana P and Adharsh Kumar E*
- 50 Evidential Spammers and Group Spammers Detection  
*Malika Ben Khalifa, Zied Elouedi and Eric Lefevre*
- 53 Optimization of Artificial Neural Network: A bat algorithm-based approach  
*Tarun Kumar Gupta and Khalid Raza*
- 54 ResD Hybrid Model Based on Resnet18 and Densenet121 for Early Alzheimer Disease Classification  
*Modupe Odusami, Rytis Maskeliunas, Robertas Damaševičius and Sanjay Misra*
- 55 Quantum Ordering Points To Identify the Clustering Structure and Application to Emergency Transportation  
*Habiba Drias, Yassine Drias, Lydia Sonia Bendimerad, Naila Aziza Houacine, Djaafar Zouache and Ilyes Khennak*
- 59 Lower Limb Movement Recognition Using EMG Signals  
*Sali Issa and Adel Rohamn Khaled*
- 66 Improving Speech Emotion Recognition system using spectral and prosodic features  
*Adil Chakhtouna, Sara Sekkate and Abdellah Adib*
- 67 Spare Parts Sales Forecasting for Mining Equipment: Methods Analysis and Evaluation  
*Egor Nikitin, Alexey Kashevnik and Nikolay Shilov*
- 68 Data-centric Approach to Hepatitis C Virus Severity Prediction  
*Aniket Sharma, Ashok Arora, Anuj Gupta and Pramod Kumar Singh*
- 69 Automatic Crack Detection with Calculus of Variations  
*Erika Pellegrino and Tania Stathaki*



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**December 13, 2021 - Monday**

**14:00 – 16:00 GMT**

**ISDA 2021: Session 3**

**Chairs:** Pasquale Ardimento, Italy and Lilly Sheeba, India

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- 83 Summary Generation using Natural Language Processing Techniques and Cosine Similarity  
*Sayantan Pal, Maiga Chang and Maria Fernandez Iriarte*
- 85 Enhanced Prediction of Chronic Kidney Disease using Feature Selection and Boosted Classifiers  
*Ibomoiye Domor Mienye, George Obaido, Kehinde Aruleba and Oluwaseun Alexander Dada*
- 96 Implementation of the Business Process Model and Notation in the Modelling of Patient's Clinical Workflow in Oncology  
*Nassim Bout, Rachid Khazaz, Ali Azougaghe, Mounia Abik, Mohamed El-Hfid and Hicham Belhadaoui*
- 102 Innovative learning technologies as support to clinical reasoning in medical sciences: the case of the "FEDERICO II" University  
*Oscar Tamburis, Fabrizio L. Ricci, Fabrizio Consorti, Fabrizio Pecoraro and Daniela Luzi*
- 112 Real time tracking of traffic signs for autonomous driving using monocular camera images  
*Sneha Hegde and Srividhya Kannan*
- 119 Comparative Evaluation of Genetic Operators in Cartesian Genetic Programming  
*Abdul Manzir and Khalid Raza*
- 128 Designing Scalable Intrusion Detection Systems with Stacking based Ensemble Learning  
*Sujan Reddy A, Akashdeep S, Sowmya Kamath S and Bhawana Rudra*
- 136 Role of Machine Learning in Authorship Attribution with Select Stylometric Features  
*Sumit Gupta, Tapas Kumar Patra and Chitrita Chaudhuri*
- 205 A Survey on SLA management using Blockchain based Smart Contracts  
*Nawel Hamdi, Chiraz El Hog, Raoudha Ben Djemaa and Layth Sliman*





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**December 13, 2021 - Monday**

**16:00 – 17:00 GMT**

**ISDA 2021: Session 4**

**Chairs:** Patrick Hung, Canada and Nuno Bettencourt, Portugal

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- 138 COVID Detection using Chest X-Ray and Transfer Learning  
*Saksham Jain, Nidhi Sindhwani, Rohit Anand and Ramani Kannan*
- 148 Twitter People's Opinions Analysis during Covid-19 Quarantine using Machine Learning and Deep Learning Models  
*Wafa Alotaibi, Faye Alomary and Raouia Mokni*
- 149 Estimation and Aggregation Method of Open Data Sources for Road Accident Analysis  
*Sergey Savosin and Nikolay Teslya*
- 153 A Hybrid Approach for an Interpretable and Explainable Intrusion Detection System  
*Tiago Dias, Nuno Oliveira, Norberto Sousa, Isabel Praça and Orlando Sousa*
- 155 An IoT Based Home Automation System VIA Hotspot  
*Raihan Uddin*
- 187 Comparative study on deep learning methods for apple ripeness estimation on tree  
*Raja Hamza and Mohamed Chtourou*



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**December 14, 2021 - Tuesday**

**08:00 – 10:00 GMT**

**ISDA 2021: Session 5**

**Chairs:** Gabriella Casalino, Italy and João Ferreira, Portugal

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- 188 Neuro-Fuzzy Systems for Learning Analytics  
*Gabriella Casalino, Giovanna Castellano and Gianluca Zaza*
- 156 Genomic Variant Annotation Tools and Techniques: A Comprehensive Review  
*Prajna Hebbar and Sowmya Kamath*
- 158 Towards a Historical Ontology for Arabic Language: Investigation and future directions  
*Ahlem Rhayem, Rim Laatar, Chafik Aloulou and Lamia Hadrich Belguith*
- 159 Optimized Evidential AIRS with Feature Selection and Genetic Algorithm  
*Rihab Abdelkhalek and Zied Elouedi*
- 165 Supporting reusability in the Scrum process  
*Bhiri Oumayma, Sayeb Khaoula and Ayachi Ghannouchi Sonia*
- 168 Academic Venue Recommendation based on Refined Cross Domain  
*Abir Zawali and Imen Boukhris*
- 184 A Fuzzy Logic Based Optimal Network System for the Delivery of Medical Goods via Drones and Land Transport in Remote Areas  
*Shio Gai Quek, Ganeshsree Selvachandran, Rohana Sham, Ching Sin Siau, Mohd Hanif Mohd Ramli and Noorsiah Ahmad*



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**December 14, 2021 - Tuesday**

**10:00 – 12:00 GMT**

**HIS 2021: Session 1**

**Chairs:** Oscar Castillo, Mexico and Devi Priya, India

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- 30 A Hybrid deep learning algorithm combining Faster R-CNN with Region Proposal Network for Cotton leaf disease detection  
*Devi Priya R, Devisurya V, Anitha N, Dharani J, Geetha B and Kirithika R V*
- 4 Analysis of Twitter User's Sentiment Against Covid-19 Vaccination Using the Lexicon Based Method  
*Yohanes Alvinika, Wahyu Prasetyo and Paulus Mudjihartono*
- 12 Privacy Preservation Technique based on Sensitivity Levels for Multiple Numerical Sensitive Overlapped Attributes  
*Nidhi M Chourey and Rashmi Soni*
- 14 Feature Ranking Based Carrot Disease Recognition Using MIFS Method  
*Al Amin Biswas, Md. Sabab Zulfiker, Aditya Rajbongshi, Md. Jueal Mia and Anup Majumder*
- 20 An Optimized Data Replication algorithms in Mobile Edge Computing Systems to reduce Latency in Internet of Things  
*Saranya N, Geetha K and Rajan C*
- 26 Spam Filtering of Mobile SMS using CNN--LSTM based Deep Learning Model  
*Syed Md. Minhaz Hossain, Jayed Akbar Sumon, Anik Sen, Md. Iftaker Alam, Khaleque Md. Aashiq Kamal and Iqbal H. Sarker*
- 28 Combating Depression through the Neural Analysis of Web Behavior  
*Siddharth Srivatsa, Aditya Singh and Pramod Kumar Singh*
- 39 Comparison of image pre-processing for classifying diabetic retinopathy using convolutional neural networks  
*Rodrigo Cordero-Martinez, Daniela Sanchez and Patricia Melin*
- 40 RAMP for the Capacitated Single Allocation p-Hub Location Problem  
*Telmo Matos*
- =====

**December 14, 2021 - Tuesday**

**12:00 – 13:00 GMT:**

**Plenary 2:** Juergen Branke, University of Warwick, Coventry, United Kingdom

**Title:** Learning to optimise – optimal learning

**Chairs:** Artūras Kaklauskas

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**December 14, 2021 - Tuesday**

**13:00 – 14:00 GMT:**

**Plenary 3:** Cengiz Toklu, Beykent University, Istanbul, Turkey

**Title:** Hybrid Algorithms. Applications to Structural Mechanics

**Chairs:** Tzung-Pei Hong and Shynu PG

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**December 14, 2021 - Tuesday**

**14:00 – 15:00 GMT:**

**Plenary 4:** Günther Raidl, Technische Universität Wien, Austria

**Title:** Combinatorial Optimization Meets (Reinforcement) Learning

**Chairs:** Shynu PG

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**December 14, 2021 - Tuesday**

**15:00 – 16:00 GMT:**

**Plenary 5:** Kalyanmoy Deb, Michigan State University, East Lansing, Michigan, USA

**Title:** Customized Evolutionary Optimization for Practical Problem Solving

**Chairs:** Andries Engelbrecht and Kingsley Okoye

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**December 14, 2021 - Tuesday**

**16:00 – 17:30 GMT**

**HIS 2021: Session 2**

**Chairs:** Christen Patrik, Germany and Rupesh Kumar Dewang, India

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- 53 AutIS: Artificial Intelligent Based Automated Interviewing System  
*Rupesh Kumar Dewang, Arpit Gupta, Anisha Kumari, Ritik Raj, Akanksha Gupta, Raj Nath Shah, Tanmay Jaiswal and Arvind Mewada*
- 41 Predicting Stock Market Movement Employing Data Filtration and Gradient Boost Algorithm  
*Anjali Verma and Rashmi Soni*
- 66 An Advanced Deep Learning approach for Nickel price prediction model evading Outliers using Enhanced Multikernel LSTM  
*Barani Shaju and Valliammal N*
- 45 Sailfish optimizer algorithm to solve the traveling salesman problem  
*Khaoula Cherrat, Morad Bouzidi and Mohammed Essaid Riffi*
- 46 Convolutional Neural Network Design using a Particle Swarm Optimization for Face Recognition  
*Patricia Melin, Daniela Sanchez, Martha Pulido and Oscar Castillo*
- 50 Speech Enhancement using Generative Adversarial Network (GAN)  
*Mahmudul Huq and Rytis Maskeliunas*
- 54 The Pandemic Impact on Organizations Security and Resiliency: The Workflow Satisfiability Problem  
*Monsef Boughrou, Hanan El Bakkali and Asmaa El Kandoussi*
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**December 15, 2021 - Wednesday**

**08:00 – 10:00 GMT**

**IAS 2021: Session 1**

**Chairs:** Yamin Li, Japan and Rania Rebai Boukhriss, Tunisia

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- 1 Teaching Encryption Algorithms with Serious Games  
*Milena Boss, Lukas Kunz, Jasmin Wüthrich and Thomas Hanne*
  
  - 6 PLS Algorithm for deciding on buying Innisfree cosmetics: Evidence from Vietnam  
*Nguyen Ngan and Bui Khoi*
  
  - 9 Detecting Vulnerabilities Using Open Source Intelligence  
*S. Jai Balaji and Karmel A*
  
  - 10 Shift-Sub Modular Multiplication Algorithm and Hardware Implementation for RSA Cryptography  
*Yamin Li and Wanming Chu*
  
  - 11 Lightweight Cryptography for Resource Constrained Devices  
*Shraddha Hiremath, Bhagyashree Kinnal, Heera Wali, Nalini Iyer and Vishal Pattanshetti*
  
  - 13 Tampering Localization using Divergence in First Digit Probability Distribution  
*Archana Mire*
  
  - 17 Analyzing Tongue Images to Predict the Organ Affected  
*Disha Wankhede, Shashwat Pandit, Nitin Metangale, Rutik Patre, Soham Kulkarni and Khan Arif Minaj*
  
  - 20 Protection Guidelines for Blockchain based Digital Identity  
*Akshay Pillai, Vishal Saraswat and Arunkumar V. R.*
  
  - 22 Role of Blockchain in the Healthcare Sector: Challenges, Opportunities and its Uses in Covid-19 Pandemic  
*Senthil Kumar Arumugam and Aarti Mehta Sharma*
- =====

**December 15, 2021 - Wednesday**

**10:00 – 11:00 GMT:**

**Plenary 6:** Oscar Cordon, University of Granada, Spain

**Title:** Hybrid Intelligent Systems for Forensic Anthropology and Human Identification

**Chairs:** Artūras Kaklauskas and Varun Menon

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**December 15, 2021 - Wednesday**

**11:00 – 13:00 GMT**

**SoCPaR 2021: Session 1**

**Chairs:** Deepika Koundal, India

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- 06 Synchronized Conceptual Representations in Unsupervised Generative Learning  
*Serge Dolgikh*
- 08 The Xoshiro+ Pseudorandom Number Generator in a Computer Chess Program  
*Tim Schären, Thomas Hanne and Rolf Dornberger*
- 09 IISCAN: Index-based Incremental Structural Clustering Technique for Billion-edge graphs  
*Santhosh Kumar D K and Demian Antony D'Mello*
- 16 Stance Detection on Vietnamese Social Media  
*Oanh Tran, Trang Dao and Yen Dang*
- 23 An efficient Deep Self-Learning Artificial Orca Algorithm for Solving Ambulance Dispatching and Calls Covering Problem  
*Lydia Sonia Bendimerad and Habiba Drias*
- 24 Knee Abnormality Diagnosis Based on Electromyography Signals  
*Sali Issa and Adel Rohamn Khaled*
- 25 Enhanced LPQ based two novel Blur invariant Face descriptors in Light variations  
*Shekhar Karanwal and Manoj Diwakar*
- 36 Blockchain Based Fictitious Detection in Social Media  
*Iswarya Gururajan, Priyanga Subbiah, Ranjani Sampatkumar, Rengaraj Alias Muralidharan R and Lakshmi Kanthan Narayanan*
- 42 Data Warehousing and Mining for Climate Change: Application to the Maghreb Region  
*Yassine Drias, Habiba Drias and Ilyes Khennak*
- 31 Automated Diagnosis of Diseases Using Integrated Machine Learning Approaches  
*M V Sunena Rose and N V Sobhana*
- 48 A Machine Learning Approach for Steel Surface Textural Defect Classification based on Wavelet Scattering Features and PCA  
*Philomina Simon and Uma Vijayasundaram*
- =====

**December 15, 2021 - Wednesday**

**13:00 – 14:00 GMT:**

**Plenary 7:** Andries Engelbrecht, University of Stellenbosch, South Africa

**Title:** Set-based Particle Swarm Optimization Approach to Portfolio Optimization

**Chairs:** Dalia Kriksciuniene and Anu Bajaj

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**December 15, 2021 - Wednesday**

**14:00 – 15:00 GMT:**

**Plenary 8:** Antônio de Padua Braga, Federal University of Minas Gerais, Brazil

**Title:** Large margin classification with graph-based models

**Chairs:** Varun Menon and Aswathy SU

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**December 15, 2021 - Wednesday**

**15:00 – 17:00 GMT**

**SoCPaR 2021: Session 2**

**Chairs:** Giuseppe Coviello, Italy and Abdultaofeek Abayomi, South Africa

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- 72 Binary Emotion Classification of Music using Deep Neural Networks  
*Revathy V R and Anitha S. Pillai*
- 73 An experimental study for monitoring the changes in the brain stroke images using Image Similarity Measures  
*Maruthi R, Anitha S. Pillai and Bindu Menon*
- 81 Design & Implementation of Edge Detection Algorithms using FPGA  
*Nikita Patil and Satyadhyan Chickerur*
- 41 Cost Optimization of Hybrid Renewable Energy System Based on Nature-inspired Search Method  
*Israel E. Agbehadji, Abdultaofeek Abayomi, Richard C. Millham, Samuel O. Frimpong and Jason J. Jung*
- 1 Performance enhancement of Action Recognition System using Inception V3 model  
*Juan Mark Deen, Jessica Sarah Deen and Amisha Michael Danny*
- 55 Implementation of Structural Topic Modelling for Abstract Mining from CORD - 19  
*Jeyasree Skm, Vijayasree G and Geetha R*
- 62 Support Vector Machines for Control of Multimodal Processes  
*Martin Macas, Diem Huong Nguyen and Charlotte Panušková*
- 65 Analysis of Contrast and Luminous Enhancement Algorithms on Colour Retinal Fundus Images  
*Olubunmi Omobola Sule*
- 70 Learning Students' Intents for Better Conversations  
*Oanh Tran, Thuong Hoai and Linh Ta*
- 76 Hybrid Encoder-Decoder Model for Retinal Blood Vessels Segmentation.  
*Olubunmi Omobola Sule*
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**December 16, 2021 - Thursday**

**09:00 – 10:30 GMT**

**NaBIC 2021: Session 1**

**Chairs:** André Santos, Portugal and Ankit Gupta, India

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- 3 A Simplified Vowel-like Speech Detection Method and its FPGA Implementation  
*Sarmila Garnaik, Shasanka Sekhar Rout and Kabiraj Sethi*
  
  - 5 A Genetic Algorithm to Solve the Order Picking Problem in a Warehouse with Systematic Item Distribution  
*Etienne Frey, Marco Orefice, Thomas Hanne and Rolf Dornberger*
  
  - 10 Pre and Post operative Brain Tumor segmentation and classification for Prolonged survival  
*Sobha Xavier P, Raju G and Aswathy S U*
  
  - 12 Swarm Intelligent approaches for ambulance dispatching and emergency calls covering: Application to COVID-19 spread in Saudi Arabia.  
*Lydia Sonia Bendimerad, Naila Aziza Houacine and Habiba Drias*
  
  - 20 Path Planning Techniques for Mobile Robots: A Review  
*Prases Kumar Mohanty, Anand Kumar Singh, Amit Kumar and Manjeet Kumar Mahto*
  
  - 21 Multi Sensor Underwater Image fusion using Modified Filter Bank Reconstruction Model  
*Devika Sarath and Sucharitha M*
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**December 16, 2021 - Thursday**

**10:30 – 13:00 GMT**

**IBICA 2021: Session 1**

**Chairs:** Nidhi Sindhwani, India and Shankru Guggari, India

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- 2 BIC Algorithm for Heineken Brand Awareness in Vietnam Market  
*Nguyen Ngan and Bui Khoi*
- 4 Comparison of Ant Colony Optimization Algorithms for Small-Sized Travelling Salesman Problems  
*Arcsuta Subaskaran, Marc Krähemann, Thomas Hanne and Rolf Dornberger*
- 6 Tamilnadu Omnibus travels evaluation using TOPSIS and fuzzy TOPSIS methods  
*Vadivel S M, Sunil Kumar Jauhar, A H Sequeira and Chandana V*
- 7 A Hybrid Feature Extraction Method using SeaLion Optimization for Meningioma Detection from MRI Brain Image  
*Aswathy S U, Divya Stephen, Bibin Vincent and Prajoon P*
- 9 A survey on Arrhythmia disease detection using Deep Learning methods  
*Lufiya George C, Jyothi Thomas and Aswathy S.U*
- 13 Comparison of Different Machine Learning Methods to Detect Fake News  
*Tanishka Badhe, Janhavi Borde, Vaishnavi Thakur, Bhagyashree Waghmare and Anagha Chaudhari*
- 16 A Markov Model for Improving the Performance of COVID-19 Contact Tracing App  
*Abdessamad Bellouch, Ahmed Boujnoui, Abdellah Zaaloul, Abdelkrim Haqiq and Aboul Ella Hassanien*
- 19 A Comparative Study of Three LoRa Collision Resolution Schemes: A Markov Model-based Approach  
*Abdellah Amzil, Abdessamad Bellouch, Ahmed Boujnoui, Mohamed Hanini and Abdellah Zaaloul*
- 22 Data Prediction Modeling Wireless Sensor Networks: A Machine Learning Approach  
*Khushboo Jain, Manali Gupta and Ajith Abraham*
- 26 Improving 3D Plankton Image Classification with C3D2 Architecture and Context Metadata  
*Nassima Benammar, Haithem Kahil, Anas Titah, Facundo M. Calcagno, Amna Abidi and Mouna Ben Mabrouk*
- 30 A Review on MOEA and Metaheuristics for Feature-Selection  
*Duarte Coelho, Ana Madureira, Ivo Pereira and Ramiro Gonçalves*
- 31 Detection and Classification of Age-Related Macular Degeneration using Integration of DenseNet169 and Convolutional Neural Network  
*Ajesh F and Ajith Abraham*
- 35 Detection of Social distance and intimation system for Covid-19  
*Anandamurugan S, Saravana Kumar M and Prashanth E G*

44 Deep Neural Network Model for Automatic Detection of Citrus Fruit and Leaf Disease  
*Deva Dharshini Balakrishnan, Ayesha Howla J and Ranjith T*

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**December 16, 2021 - Thursday**

**13:00 – 14:00 GMT:**

**Plenary 9:** Frédéric Guinand, Le Havre Normandy University, France

**Title:** Swarms of Unmanned Aerial Vehicles

**Chairs:** Anu VR and Anu Bajaj

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**December 16, 2021 - Thursday**

**14:00 – 15:00 GMT:**

**Plenary 10:** Marco Dorigo, Université Libre de Bruxelles, Belgium

**Title:** Improving controllability, robustness and security of robot swarms

**Chair:** Ana Maria Madureira

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**December 17, 2021 - Friday**

**09:00 – 11:00 GMT**

**WICT 2021: Session 1**

**Chair: Hanne Thomas, Switzerland**

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- 6     Kubernetes for Fog Computing - Limitations and Research Scope  
*Abdeen Omer*
  
- 8     Design and Simulation of 2.4GHz Microstrip Parallel Coupled Line Low pass Filter for Wireless Communication System  
*Shamsuddeen Yusuf, Shuaibu Musa Adam, Adamu Idris, Vijayakumar Nanjappan, David Afolabi and Ka Lok Man*
  
- 15    A new Cascade-hybrid Recommender System approach for the Retail Market  
*Miguel Ângelo Rebelo, Duarte Coelho, Ivo Pereira and Fábio Fernandes*
  
- 16    A novel Deep Neural Network based approach for Alzheimer's disease classification using Brain Magnetic Resonance Imaging (MRI)  
*Ruhul Amin Hazarika, Debdatta Kandar and Arnab Kumar Maji*
  
- 17    Classification of Cognitive Ability from multichannel EEG Signals using Support Vector Machine  
*Nilima Salankar*
  
- 18    Heterogeneous DBSCAN for emergency call management: A case study of COVID-19 calls based on hospitals distribution in Saudi Arabia.  
*Naila Aziza Houacine, Lydia Sonia Bendimerad and Habiba Drias*
  
- 40    Computer Graphics Rendering Survey: From Rasterization and Ray Tracing to Deep Learning  
*Houssam Halmaoui and Abdelkrim Haqiq*
  
- 41    A Sentiment-Based Approach to Predict Learners' Perceptions towards YouTube Educational Videos  
*Rdouan Faizi*
  
- 44    A Modified Feature Optimization Approach with Convolutional Neural Network for Apple Leaf Disease Detection  
*Vagisha Sharma, Amandeep Verma and Neelam Goel*



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**December 17, 2021 - Friday**

**11:00 – 13:00 GMT**

**WICT 2021: Session 2**

**Chairs:** André Santos, Portugal and Mahendra Kanojia, India

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- 48 Mitigating Security problems in Fog Computing System  
*Shruti Shruti and Shalli Rani*
- 45 Ontology based knowledge visualization for domestic violence cases  
*Tanaya Das, Abhishek Roy and Arun Majumdar*
- 51 Non-invasive flexible electromagnetic sensor for potassium level monitoring in sweat  
*Gianvito Mevoli, Claudio Maria Lamacchia and Luciano Mescia*
- 54 Wireless Sensor Networks Time Synchronization Algorithms and Protocols Message Complexity Comparison: the small-size star-topology case  
*Giuseppe Coviello, Gianfranco Avitabile and Antonello Florio*
- 57 Automatic Modulation Recognition Models Based on Transfer Learning and Simulated Radio Signals in AWGN Channels  
*Jamiu R. Olasina, Emmanuel Adetiba, Abdultaofeek Abayomi, Obiseye Obiyemi, Surendra Thakur and Sibusiso Moyo*
- 30 Educational Workflow Model for Effective and Quality Management of E-Learning Systems Design and Development: A Conceptual Framework  
*Kingsley Okoye*
- 61 Dynamic modelling of a thermal solar heating system  
*José Boaventura and Judite Ferreira*
- 62 A Review of Unpredictable Renewable Energy Sources through Electric Vehicles on Islands  
*Juliana Chavez, João Soares, Zita Vale, Bruno Canizes and Sérgio Ramos*
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**December 17, 2021 - Friday**

**13:00 – 16:00 GMT**

**Doctoral Symposium**

**Chairs:** Giovanna Castellano, Italy; Katarzyna Kaczmarek-Majer, Poland and  
Gennaro Vessio, Italy

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**December 17, 2021 - Friday**

**16:00 GMT – Conference Closing Ceremony**

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## ISDA 2021- OFFLINE PRESENTATIONS

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- 14 Maintaining Scalability in Blockchain  
*Anova A Pandey and Amit Kumar Tyagi*
- 22 Batch normalization and dropout regularization in training deep neural networks with label noise  
*Andrzej Rusiecki*
- 23 Intelligent Software Engineering: The Significance of Artificial Intelligence Techniques in Enhancing Software Development Lifecycle Processes  
*Vaishnavi Kulkarni, Anurag Kolhe and Jay Kulkarni*
- 25 Honey Bee Queen Presence Detection from Audio Field Recordings using Summarized Spectrogram and Convolutional Neural Networks  
*Agnieszka Orlowska, Dominique Fourer, Jean-Paul Gavini and Dominique Cassou-Ribehart*
- 27 Formal Verification Techniques: A Comparative Analysis for Critical System Design  
*Rahul Karmakar*
- 28 Investigating Drug Peddling in Nigeria using a machine learning approach  
*Oluwafemi Samson Balogun, Sunday Adewale Olaleye, Mazhar Moshin, Keijo Haataja, Xiao-Zhi Gao and Pekka Toivanen*
- 31 Selective Information Control and Layer-wise Partial Collective Compression for Multi-Layered Neural Networks  
*Ryotaro Kamimura*
- 34 Semantic Representation Driven by A Musculoskeletal Ontology for Bone Tumors Diagnosis  
*Mayssa Bensalah, Atef Boujelben, Yosr Hentati, Mouna Baklouti and Mohamed Abid*
- 41 Lifetime Optimization of Sensor Networks with Mobile Sink and Solar Energy Supply  
*Mehdi Achour and Amin Boufaied*
- 43 Counting Vehicle by Axes with High-precision in Brazilian Roads with Deep Learning Methods  
*Adson Santos, Carmelo J. A. Bastos-Filho and Alexandre Magno Andrade Maciel*
- 46 Mining Frequently Traveled Routes during COVID-19  
*George Obaido, Kehinde Aruleba, Oluwaseun Alexander Dada and Ibomoiye Domor Mienye*
- 47 Analysis of Performance Improvement for Speaker Verification by Combining Feature Vectors of LPC Spectral Envelope, MFCC and pLPC Pole Distribution  
*Haruki Shigeta, Kodai Komatsu, Shun Oyabu, Kazuya Matsuo and Shuichi Kurogi*
- 48 CASTA: Clinical Assessment System for Tuberculosis Analysis  
*Ramisetty Kavya, Jonathan Samuel, Gunjan Parihar, Y Suba Joyce, Y. Bakthasingh Lazarus, Subhrakanta Panda and Jabez Christopher*
- 49 Bearing Fault Classification of Induction Motor using Statistical features and Machine Learning Algorithms  
*Rafia Toma and Jong-Myon Kim*



- 51 NLP for Product Safety Risk Assessment: Towards consistency evaluations of human expert panels  
*Michael Hellwig, Steffen Finck, Thomas Mootz, Florian Rein and Andreas Ehe*
- 52 Augmented Reality for Fire Evacuation Research: An A'WOT Analysis  
*El Mostafa Bourhim*
- 56 Patterns for improving business processes: defined pattern categorization  
*Nesrine Missaoui and Sonia Ayachi Ghannouchi*
- 57 SAX-preprocessing technique for characters recognition using Gyroscope data  
*Mariem Taktak and Slim Triki*
- 61 A Model of Compactness-Homogeneity for Territorial Design  
*Beatriz Bernábe Loranca, Carlos Guillén, Erika Granillo and Rogelio González Velazquez*
- 63 UTextNet : A UNet based Arbitrary shaped Scene Text Detector  
*Veronica Naosekpam, Sushant Aggarwal and Nilkanta Sahu*
- 64 VSim-AV: A virtual simulation platform for autonomous vehicles  
*Leila Meftah and Rafik Braham*
- 65 Image segmentation using matrix-variate Lindley distributions  
*Mouna Zitouni and Mariem Tounsi*
- 70 Deep Squeeze and Excitation-Densely Connected Convolutional Network with cGAN for Alzheimer's disease early detection  
*Rahma Kadri, Mohamed Tmar, Bassem Bouaziz and Faiez Gargouri*
- 72 Recognition of person using ECG signals based on single heartbeat  
*Sihem Hamza and Yassine Ben Ayed*
- 73 Semantic Segmentation of Dog's Femur and Acetabulum Bones with Deep Transfer Learning in X-ray Images  
*D. E. Moreira da Silva, Vitor Filipe, Pedro Franco-Gonçalo, Bruno Colaço, Sofia Alves-Pimenta, Mário Ginja and Lio Gonçalves*
- 80 Automatic microservices identification from association rules of Business Process  
*Malak Saidi, Mohamed Daoud, Anis Tissaoui, Sabri Abdelouahed, Djamel Benslimane and Sami Faiz*
- 81 Toward a configurable Things composition language for the SloT  
*Soura Boulaares, Salma Sassi, Djamel Benslimane, Sami Faiz and Zakaria Maamar*
- 82 Comparison of Different Processing Methods of Joint Coordinates Features for Gesture Recognition with a RNN in the MSRC-12  
*Júlia Peixoto, Daniel Welfer, Anselmo Rafael Cukla and Daniel Fernando Tello Gamarra*
- 84 An approach for constructing a simulation model for dynamic analysis of Information Security System  
*Ivan Gaidarski and Pavlin Kutinchev*
- 86 An Adaptive-Backstepping Digital Twin-Based Approach for Bearing Crack Size Identification Using Acoustic Emission Signals  
*Farzin Piltan and Jong-Myon Kim*
- 87 Implementation-Oriented Feature Selection in UNSW-NB15 Intrusion Detection Dataset  
*Mohammed M. Alani*
- 92 Augmented Reality SDK's : A Comparative Study

*El Mostafa Bourhim and Aziz Akhiate*

- 95 Hybrid Neural Network for Hyperspectral Satellite Image Classification (HNN)  
*Maissa Hamouda and Med Salim Bouhlel*
- 99 Mobile Cloud Computing: Issues, Applications and Scope in COVID-19  
*Hariket Sukesh Kumar Sheth and Amit Kumar Tyagi*
- 101 Designing a Humanitarian Supply Chain for Pre and Post Disaster Planning with Transshipment and Considering Perishability of Products  
*Faeze Haghighoo, Ali Navaei, Amir Aghsami, Faroborz Jolai and Ajith Abraham*
- 103 Convolutional Neural Networks (CNN) Model for Mobile Brand Sentiment Analysis  
*Hamidah Jantan and Puteri Ika Shazereen Ibrahim*
- 105 How knowledge-driven class generalization affects classical machine learning algorithms for mono-label supervised classification  
*Houcemeddine Turki, Mohamed Ali Hadj Taieb and Mohamed Ben Aouicha*
- 106 Deep Residual Network for autonomous vehicles obstacle avoidance  
*Leila Haj Meftah and Rafik Braham*
- 107 Modeling Travelers behavior using fsQCA  
*Oumayma Labti and Ez-Zohra Belkadi*
- 108 AHP Approach for selecting adequate Big Data Analytics Platform  
*Naima El Haoud and Oumaima Hali*
- 109 Combining Bert representation and POS tagger for Arabic Word Sense Disambiguation  
*Rakia Saidi and Fethi Jarray*
- 110 Detection of Lung Cancer from CT images using Image Processing  
*Lilly Sheeba S and Gethsia Judin L*
- 111 An overview of IoT-based architecture model for Smart Home Systems  
*Odambo Djumanazarov, Antti Väänänen, Keijo Haataja and Pekka Toivanen*
- 113 Metaheuristic methods for water distribution network considering routing decision  
*Ahmad Hakimi, Reza Mahdizadeh, Hossein Shokri Garjan, Amir Khiabani and Ajith Abraham*
- 114 Prediction of Moroccan Stock Price Based on Machine Learning Algorithms  
*Abdelhadi Ifleh and Mounime Elkabbouri*
- 116 R-DCNN Based Automatic Recognition of Indian Sign Language  
*Subhashini S, Revathi S and Shanthini S*
- 117 VReason Grasp: An Ordered Grasp based on Physical Intuition in Stacking Objects  
*Xiang Ji, Qiushu Chen, Tao Xiong, Tianyu Xiong and Huiliang Shang*
- 120 Prediction of credibility of Football Player Rating using Data Analytics  
*Manaswita Datta and Bhawana Rudra*
- 121 DDoS Attack Detection on IoT Devices using Machine Learning Techniques  
*Sunil Kumar, Rohith Kumar Sahu and Bhawana Rudra*
- 122 Functionality and Architecture for a Platform for Independent Learners: KEPLAIR  
*Stefano Ferilli, Domenico Redavid, Davide Di Pierro and Liza Loop*
- 123 Aircraft Conflict Resolution using Convolutional Neural Network on Trajectory Image  
*Md Siddiqur Rahman, Laurent Lapasset and Josiane Mothe*

- 124 Evaluation of Techniques For predicting a BUILD UP of a Seizure  
*Abir Hadriche, Ichrak Behy, Amira Hajjej and Nawel Jmail*
- 125 A Real-time Stereoscopic Images Rectification and Matching Algorithm Based on Python  
*Elmehdi Adil, Mohammed Mikou and Ahmed Mouhsen*
- 126 Named Entities as a Metadata Resource for Indexing and Searching Information  
*Flávio Izo, Elias Oliveira and Claudine Badué*
- 127 Brazilian Mercosur License Plate Detection and Recognition Using Haar Cascade and Tesseract OCR on Synthetic Imagery  
*Cyro Sabóia and Pedro Pedrosa Rebouças Filho*
- 131 Retrofitting Stormwater Harvest System in Dispersing Reliable Water Supply in a Climate-Smart City  
*Bwija Mukome, Muhammed Seyam and Oseni Taiwo Amoo*
- 132 Predicting and Analysis the Bitcoin Price using various Forecasting Model  
*Roopa Devi E.M, Shanthakumari R, Rajadevi R, Dinesh Kumar S, Dinesh A and Keerthana M*
- 133 Improved Sentence Similarity Measurement in the Medical Field based on Syntactico-Semantic Knowledge  
*Wafa Wali and Bilel Gargouri*
- 134 Analysis of the Brazilian artisanal cheese market from the perspective of social networks  
*Thalys Nogueira, Vitor A. Mouro, Kenna B. Siqueira and Priscila V. Z. C. Goliatt*
- 135 PONY: Predicting an Object's Next\_location using YOLO  
*Aris Ignacio and Julian Antonio Laspoña*
- 139 ECFAR: A Rule-based Collaborative Filtering System Dealing with Evidential Data  
*Nassim Bahri, Mohamed Anis Bach Tobji and Boutheina Ben Yaghlane*
- 140 Enhancing photography management through automatically extracted metadata  
*Diogo Freitas, Tiago Machado, Paula Viana and Pedro Carvalho*
- 141 A Machine Learning Framework for House Price Estimation  
*Adebayoso Awnaike, Dr Seyed Ali Ghorashi and Dr Rawad Hammad*
- 142 A Dedicated Temporal Erasable-Itemset Mining Algorithm  
*Tzung-Pei Hong, Hao Chang, Shu-Min Li and Yu-Chuan Tsai*
- 143 Denoising Hyperspectral Imageries with Split-Bregman Iteration Scheme  
*Satwinder Kaur, Bhawna Goyal and Ayush Dogra*
- 144 iWAD: An improved Wormhole Attack Detection System for Wireless Sensor Network  
*Virendra Dani, Radha Shinde and Ayesha Mandloi*
- 157 Age estimation and gender recognition using biometric modality  
*Amal Abbas, Randa Boukhris and Yassine Ben Ayed*
- 160 Predicting the movement intention and controlling the grip of a myoelectrical active prosthetic arm  
*Jonatan Dellagostin, Anselmo Cukla, Fábio Bisogno, Raul Sales, Gregório Salvador and Lucas Strapazzon*
- 161 An evolutionary approach for critical node detection in hypergraphs. A case study of an inflation economic network.  
*Noémi Gaskó, Mihai Suciú, Rodica Ioana Lung and Tamás Képes*

- 162 A Modified Technique based on GOMASHIO Method for Mobile Nodes Localization in a WSN  
*Omnia Mezghani*
- 163 Attitude Prediction of in-service Teachers towards Blended Learning using Machine Learning during COVID-19 pandemic  
*Pooja Manghirmalani Mishra, Rabiya Saboowala and Niketa Gandhi*
- 164 Driver Behavior Analysis: Abnormal Driving Detection Using MLP Classifier Applied to Outdoor Camera Images  
*Victor Gomes de Oliveira, Pedro Pedrosa Rebouças Filho and Elias Teodoro da Silva Junior*
- 166 Arabic Automatic Essay Scoring Systems: An Overview Study  
*Rim Aroua Machhout, Chiraz Ben Othmane Zribi and Saoussen Mathlouthi Bouzid*
- 167 Energy-Efficient Khalimsky-Based Routing Approach for K-Hop Clustered Wireless Multimedia Sensor networks (WMSNs)  
*Mahmoud Mezghani*
- 169 Typology of Data Inputs Imperfection in Collective Memory Model  
*Haithem Kharfia, Fatma Ghorbel and Bilel Gargouri*
- 170 How latest Computer Science Research copes with COVID-19?  
*Leila Bayoudhi, Najla Sassi and Wassim Jaziri*
- 173 Using machine learning approaches to identify exercise activities from a triple-synchronous biomedical sensor  
*Yohan Mahajan, Jahnavi Pinnamraju, John L. Burns, Judy W. Gichoya and Saptarshi Purkayastha*
- 174 Intelligent Image Captioning approach with novel Ensembled Recurrent Neural Network Model  
*Agilandeswari L, Kuhoo Sharma and Saurabh Srivastava*
- 175 Analysis of six different GP-tree neighborhood structures  
*Souhir Elleuch and Bassem Jarboui*
- 176 Ensemble Learning for Data-driven Diagnosis of Polycystic Ovary Syndrome  
*Subrato Bharati, Prajoy Podder, M. Rubaiyat Hossain Mondal, V. B. Surya Prasath and Niketa Gandhi*
- 177 Tree Species Detection using MobileNet  
*Agilandeswari L, Aayush Jha and Dhruv Gupta*
- 180 Dimensional Reduction Methods Comparison for Clustering Results of Indonesian Language Text Documents  
*Siti Inayah Rizki Hasanah and Muhammad Ihsan Jambak*
- 181 Gun model classification based on fired cartridge case head images with Siamese Networks  
*Sérgio Valentim, Tiago Fonseca, João Ferreira, Tomás Brandão, Ricardo Ribeiro and Stefan Nae*
- 183 Image-based Android Malware Detection Models using Static and Dynamic Features  
*Hemant Rathore, B Raja Narasimhan, Sanjay K. Sahay and Mohit Sewak*
- 186 The Menu Planning Problem: A Systematic Literature Review  
*Dorra Kallel, Ines Kanoun and Diala Dhoub*
- 189 Prediction of COVID-19 Active Cases using Polynomial Regression and ARIMA Models  
*Neji Neily, Boulbaba Ben Ammar and Habib M. Kammoun*
- 192 Comparative model selection for land use and land cover classification using EuroSAT dataset

using Machine Learning  
*Agilandeewari L, Suri Koushmitha and Yerru Nanda Krishna Arun*

- 193 A dynamic Rain Detecting Car Wiper  
*Andebetum Roland, John Wejin and Sanjay Misra*
- 195 Crude Oil Price Prediction Using Particle Swarm Optimization and Classification Algorithms  
*Emmanuel Abidemi Adeniyi, Babatunde Gbadamosi, Joseph Bamidele Awotunde, Sanjay Misra*
- 197 Thyroid Disease Detection using Voting based ensemble classifier  
*Agilandeewari L, Ishita Khatri and Jagruta Advani*
- 199 A Cross-Entropy Based Feature Selection Method for Binary Valued Data Classification  
*Zhipeng Wang and Qiuming Zhu*
- 204 Effective Music Suggestion using Facial Recognition  
*Ponselvakumar A P, Anandamurugan S, Logeswaran K, Suganneshan M, Zubair A and Gokula Kannan L*

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## HIS 2021 – OFFLINE PRESENTATIONS

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- 2 YOLOv5 Based Deep Convolutional Neural Networks for Vehicle Recognition in Smart University Campus  
*Hoang Thi Huong Tra and Ha Duyen Trung*
- 7 Dual Connectivity Handoff Analysis for ENDC C/U-plane Split NSA NR5G Networks.  
*Vamshi S and Sanjay Dhar Roy*
- 9 Blockchain Integrated Machine Learning for Training Autonomous Cars  
*Dhurv Agarwal, Amit Kumar Tyagi, Terrance Frederick Fernandez and Rohit Bansal*
- 17 Designing Knowledge-Based Systems for COVID-19 Diagnosis  
*Rana Fawzi, Mahmoud Ghazy and Lydia Rizkallah*
- 22 Prediction of malnutrition among pregnant women and infants in tribal areas of Tamil Nadu using classification algorithms  
*Anitha N, Devi Priya R, Rajadevi R, Madhumitha G, Arunkumar A and Nadha M.A*
- 27 A Convenient Method & Design for Constructing an IoT-based Smart Automated Sanitization System  
*Md. Sayeduzzaman, Md. Samiul Islam Borno, Khadija Yeasmin Fariya and Md. Tamim Ahmed Khan*
- 31 Bitcoin Value Prediction  
*Sangeetha R G, Hemanth C, Naman Arora, Karan Singh and Vithika Mulye*
- 32 Automatic Algorithm Multi-Configuration Applied to an Optimization Algorithm  
*Weerapan Sae-Dan, Marie-Eléonore Kessaci, Nadarajen Veerapen and Laetitia Jourdan*
- 33 Credit Card fraud Detection using Machine Learning and Predictive Models: Comparative Study  
*Sejal Zambare, Mrunali Yewale, Sakshi Tendulkar, Atharv Sontakke and Anagha Chaudhari*
- 38 An intelligent and efficient safe driving system  
*Islam Elleuch*
- 47 Machine Learning-Based Precipitation Prediction Using Cloud Properties  
*Abdulaziz Tunde Yakubu, Abdultaofeek Abayomi and Naven Chetty*
- 48 Performance Analysis of the New Filtering Algorithm with Kalman on Indoor Positioning System  
*Lucas Susanto and Tohari Ahmad*
- 49 Credit Card Fraud Detection using K-Means Combined with Supervised Learning  
*Shreyans Jain, Nishant Verma, Rashid Ahmed, Aman Tayal and Hemant Rathore*
- 51 Sentiment Analysis of IMDb Movie Reviews: A Comparative Analysis of Feature Selection and Feature Extraction Techniques  
*Gahina Karak, Shubham Mishra, Arkadyuti Bandyopadhyay, Pavirala Ranga Sai Rohith and Hemant Rathore*
- 52 Implementing an Arabic Question Answering System using Conceptual Graphs

*Wided Bakari, Mabrouka Ben Sghaier and Mahmoud Neji*

- 55 An Ensemble approach for predicting Intraocular diseases using Immune Mediator Levels  
*Roopa Devi E.M, Rajadevi R, Priyadharsini M.V, Praveen E and Sethuraj S*
- 57 Progressive Guidance Categorization Using Transformer-Based Deep Neural Network Architecture  
*Tanjim Taharat Aurpa, Md Shoaib Ahmed, Rifat Sadik, Sabbir Anwar, Md Abdul Mazid Adnan and Md Musfique Anwar*
- 58 GIS Mapping and Assessment of Water Quality Index based on Fuzzy Logic applied to groundwater in Jafrabad Taluka, Marathawada Region  
*Sarita Wagh, Pradip Paithane and Dr.S.N. Patil*
- 60 Topic Oriented Hate Speech Detection  
*Raihan Jamil, Mohammad Abdullah Al Nayeem Khan and Md Musfique Anwar*
- 61 Alzheimer's disease detection using DeepECA-ResNet101 network with DCGAN  
*Rahma Kadri, Mohamed Tmar, Bassem Bouaziz and Faiez Gargouri*
- 62 Automatic Microservices Identification Across Structural Dependency  
*Malak Saidi, Anis Tissaoui, Djamel Benslimane and Sami Faiz*
- 63 Managing the conditions for project success: an approach using k-means clustering  
*Luciano Azevedo de Souza and Helder Gomes Costa*
- 64 Intrusion Detection System based on Machine and Deep Learning Models: A Comparative and Exhaustive Study  
*Hemlatha Pandey, Tejal Lalitkumar Karnavat, Mandadapu Naga Sai Sandilya, Shashwat Katiyar and Hemant Rathore*
- 65 FaMaDAS – Face Mask Detection and Alert System for COVID 19 Outbreaks  
*Virendra Dani, Nishi Gandhi, Mridula Geed, Prakrati Dashore and Naina Pandey*
- 67 A Multiple Fuzzy C-Means Ensemble Cluster Forest for Big Data  
*Ines Lahmar, Aida Zaier, Mohamed Yahia and Ridha Bouallegue*
- 68 A Real-Time Sentimental Analysis on e-Commerce sites in Nigeria using Machine Learning  
*Miriam Shaba, Andeboutom Roland, John Simon, Sanjay Misra*
- 69 Artificial Intelligence based System for Bank Loan Fraud Prediction  
*Joseph Bamidele Awotunde and Sanjay Misra*
- 70 Comparing the Performance of various Supervised Machine Learning Techniques for early Detection of Breast Cancer  
*Moses Kazeem Abiodun, Sanjay Misra, Joseph Bamidele Awotunde, Akor Joshua and Jonathan Oluranti*
- 71 Psychotherapeutic Tool for Addressing Depression in Teenagers through Video Games  
*Oluwasefunmi Arogundade, Adeniyi Akanni, Sanjay Misra, Abiodun Mustapha, Kayode Ogunremi, Akashat Agrawal and Jonathan Oluranti*

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- 7 Blockchain: A Compendium on Contemporary Privacy Preservation Approaches and its Manifestation in Varied Realms  
*Leda Kamal and Jeberson Retnaraj*
  - 12 Privacy Preserving Data Mining Technique to Secure Distributed Client Data  
*Virendra Dani, Surbhi Kushwah, Priyanka Kokate and Swapnil Waghela*
  - 14 Impact of optimizers on a CNN architecture for anti-spoofing goal  
*Dassine Djebara, Abdelmalek Mallek and Wahida Handouzi*
  - 16 Big Data: towards a collaborative security system at the service of data quality  
*Mohamed Talha and Anas Abou El Kalam*
  - 18 Non-Invertible Cancellable Template for Fingerprint Biometric  
*Ilaiah Kavati*
  - 19 Smart Contract based Next-Generation Public Key Infrastructure (PKI) using Permissionless Blockchain  
*Aswani Devi Aguru, Dr. Suresh Babu E and Dr. Ilaiah Kavati*
  - 21 Improved Interpolation-based Reversible Audio Data Hiding using Sample Dispersion and Value Shifting  
*Yoga Samudra and Tohari Ahmad*
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## SoCPaR 2021 - OFFLINE PRESENTATIONS

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- 2 Prediction of User Overall Gratification in Indian Tourism Domain on Hotel classes and Trip-Types  
*Venkata Murali Krishna Chinta, Appa Rao G, Bala Brahmeswara Kadaru and K V Sagar*
- 10 Using A Data Mining Approach to Detect Automobile Insurance Fraud  
*Mabrouka Salmi and Dalia Atif*
- 11 Arabic fricative consonants characterization according to places of articulation  
*Youssef Elfahm, Badia Mounir, Ilham Mounir, Laila Elmaazouzi and Abdelmajid Farchi*
- 17 Autonomous Vehicle Localization Using Camera and GPS  
*Nalini C Iyer, Prabha C Nissimagoudar, Akash Kulkarni and Aditya Okade*
- 18 EMG-CapsNet: ELU Multiplication Gate Capsule Network for complex images  
*Omaima El Alaoui-Elfels and Taoufiq Gadi*
- 19 Privacy Preserving kNN Spatial Query using Voronoi Diagram  
*Abdullah Alamoodi, Eva Habeeb, Ibrahim Kamel and Zaher Al Aghbari*
- 21 Analysis of Feature Selection Method for 3D Molecular Structure of Amphetamine-Type Stimulants (ATS) Drugs  
*Phoebe Knight, Azah Kamilah Muda and Satrya Fajri Pratama*
- 26 Classification of Fungi infected Annona Squamosa Plant using CNN Architectures  
*Sukanya Gaikwad, Shivanand Rumma and Mallikarjun Hangarge*
- 29 Multi Pedestrian Tracking and Person Re-Identification  
*Prabha C Nissimagoudar, Nalini C Iyer and Sneha Mallapur*
- 30 Prediction of Violence against Adolescent Girls using Machine Learning Techniques  
*Pooja Manghirmalani Mishra and Sushil Kulkarni*
- 32 Investigation of Results using Various Databases and Algorithms for Music Player using Speech Emotion Recognition  
*Shrikala Deshmukh, Preeti Gupta and Prashant Mane*
- 33 Securing Surveillance Data Using Incremental Cryptography  
*Lissiyas Antony and Sobhana N V*
- 37 Comparison of triangular meshes using shape functions and MSA  
*Nikola Pajerová*
- 38 AI methods used for real-time clean fraud detection in instant payment  
*Marouane Ait Said and Abdelmajid Hajami*
- 39 Predicting Taxi Travel Time using Machine Learning Techniques considering Weekend and Holidays  
*Bholanath Roy and Dillip Rout*

- 40 Modeling Effect of Lockdowns and Other Effects on India Covid-19 Infections Using SEIR Model and Machine Learning  
*Sathiyarayanan Sampath and Joy Bose*
- 49 A novel Emoji based Deep Super Learner (EDSL) for sentiment classification  
*Geetika Vashisht, Manisha Jailia and Vishesh Goyal*
- 51 A Detailed Review of Recent Advancements in Assistive Technologies for Blind People  
*Boddupalli Hemanth Sri Sai and Manikandan V M*
- 54 Addressing sustainable supply chain network using Stackelberg game  
*Reza Mahdizadeh, Iman Pourbaba, Nazanin Fozooni and Ajith Abraham*
- 58 Forecasting of COVID-19 cases in INDIA using ARIMA and AR Time-Series algorithm  
*Dilip Prajapati and Mahendra Kanojia*
- 59 Quality Evaluation of Cloud Services using MCDM Techniques: A Comparative Analysis  
*Monika Dhanda and Om Prakash Sangwan*
- 63 Detecting near duplicate dataset  
*Marc Chevallier, Nicoleta Rogovschi, Faouzi Boufares, Nistor Grozavu and Charly Clairmont*
- 64 On-demand Data Analytics Support for Hemorrhagic Stroke Patients using Wearable IoT Device and Fog Computing Technology  
*Samson Abosedede, Adebayo Adetunmbi and Oluwafemi Sarumi*
- 66 Improving Amphetamine-type Stimulants Drug Classification using Binary Whale Optimization Algorithm as Relevant Descriptors Selection Technique  
*Norfadzlia Mohd Yusof, Azah Kamilah Muda, Satria Fajri Pratama and Ajith Abraham*
- 67 Smart Gloves Controller for Drones using Raspberry PI & NODEMCU  
*Kritik Bangera and Mahendra Kanojia*
- 68 Machine Learning and Image Processing Techniques for Covid-19 Detection: A Review  
*Neeraj Appari, Mahendra Kanojia and Kritik Bangera*
- 69 Early Stage Diabetes Risk Prediction via Machine Learning  
*Qasem Abu Al-Haija, Mahmoud Smadi and Osama Al-Bataineh*
- 71 A review on using predictive analytics to determine the severity of Anaphylaxis  
*Reesha P U and Jisha Jose Panackal*
- 74 A Novel Educational Video Retrieval System based on the Textual Information  
*Ravi Srihitha, Shikha Chauhan, Yadlapalli Sai Harshini, Jagruth K and Manikandan V M*
- 75 Enhancing Epidemiological Surveillance Systems Using Dynamic Modeling: A Scoping Review  
*Adegboyega Adebayo, Oluwafemi Sarumi and Olumide Obe*
- 77 Improve Classifiers Accuracy using Probabilistic Based Association Approach for Efficient Pattern Generation  
*L Kiran Kumar Reddy, Singamsheety Phanikumar and Naresh Kumar*
- 78 Skin Cancer Detection Using Transfer Learning and Ensemble Modelling – An Assessment  
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## Plenary Speakers – Abstract and Biographies



**Speaker 1:** Antônio de Padua Braga, Federal University of Minas Gerais, Brazil

**Title:** Large margin classification with graph-based models

**Abstract:** Autonomous learning systems have been the subject of attention of the machine learning community in recent years. The need for methods that are capable of learning and computing in the edge has demanded models that are less computational intensive and less dependent on user interaction and on large computational systems to run optimization algorithms. Classification methods often require trade-off between objective functions related to model fitness to data and to the complexity of the problem. It has been usually treated with multi-objective or constrained optimization approaches, and trade-off accomplished according to user-defined hyperparameters, e.g. regularization. Distance-based classification methods require less user interaction to set parameters, since they are based on a pre-established metric and on the structure of the training data, however, margin maximization and separation surface smoothing need also to be treated. This presentation will describe geometrical approaches for obtaining large margin classifiers which are less user dependent and more feasible to embedded systems implementations. The methods aim at exploring the geometrical properties of the dataset considering only the structure of a Gabriel graph, which represents pattern relations according to a given distance metric. Once the graph is generated, structural support vectors (analogous to SVM's support vectors) are obtained in order to yield the final large margin solution. All parameters of the methods are extracted from the graph or according to graph properties, so autonomous learning can be accomplished considering that the final classifier is fully extracted from the graph. Present topics of research include treating scalability issues associated to the learning set size and exploring further graph properties to set implicit regularization of the separating surface.

**Biography:** Antonio de Padua Braga is a Professor at Department of Electronics Engineering at Federal University of Minas Gerais, Brazil. He has been working in the field of Artificial Neural Networks since the early 1990s, when he obtained his PhD from Imperial College London for his work on storage capacity of recurrent binary neural networks. Since then he has co-authored many books, book-chapters, journal and conference papers and has supervised many postgraduate students. He was a Visiting Professor at University of Alberta (Canada), and also at Université Paris-Est (France). As a research leader he has received many grants from Brazilian research agencies and from private companies. He has also served as Associate Editor of international journals as IEEE Transactions on Neural Networks and Learning Systems, Neural Processing Letters and Engineering Applications of Artificial Intelligence.





**Speaker 2:** Juergen Branke, University of Warwick, Coventry, United Kingdom

**Title:** Learning to optimise – optimal learning

**Abstract:** This talk discusses the relationship between machine learning and optimisation. It demonstrates that many machine learning problems are actually optimization problems, and could benefit from advances in operational research. On the other hand, the latest challenges in optimisation, such as parameter tuning, algorithm selection, Hyper heuristics or handling of uncertainty are actually closely related to machine learning. Furthermore, recent algorithmic developments such as Bayesian Optimisation very much blur the boundary between machine learning and optimisation, as they explicitly combine learning about the search space with optimisation.

**Biography:** Juergen Branke is Professor of Operational Research and Systems at the University of Warwick (UK). He has been working in the area of metaheuristics for over 25 years, and applied them to a wide variety of problems, including optimisation under uncertainty, dynamically changing optimisation problems, and multi-objective optimisation. Juergen has published almost 200 papers in international peer-reviewed journals and conferences. He is Editor of the ACM Transactions on Evolutionary Learning and Optimization, Area Editor of the Journal of Heuristics and the Journal on Multi-Criteria Decision Analysis, as well as Associate Editor of IEEE Transactions on Evolutionary Computation and the Evolutionary Computation Journal.



**Speaker 3:** Oscar Cordon, University of Granada, Spain

**Title:** Hybrid Intelligent Systems for Forensic Anthropology and Human Identification

**Abstract:** Skeleton-based forensic identification methods carried out by anthropologists, odontologists, and pathologists represent the first step in every human identification (ID) process and the victim's last chance for identification when DNA or fingerprints cannot be applied. They include methods as biological profiling (BP), comparative radiography (CR), craniofacial superimposition (CFS), and comparison of dental records. BP involves the study of skeletal remains to find characteristic traits (age, sex, stature, and ancestry) that support determining the identity of the individual. It plays a crucial role in narrowing the range of potential matches during the process of ID, prior to the corroboration by any ID technique. CR considers the ante-mortem (AM) and post-mortem (PM) comparison of different bones and cavities (skull frontal sinuses, clavicles, patellae, ...) which have been reported as useful for positive identification based on their individuality and uniqueness. CFS aims to overlay a skull with some AM images of a candidate in order to determine if they correspond to the same person. However, practitioners still follow an observational paradigm using subjective methods introduced many decades ago; namely, oral description and written documentation of the findings obtained and the manual and visual comparison of AM and PM data. Designing systematic, automatic and trustworthy methods to support the forensic anthropologist when applying BP, CFS and CR, avoiding the use of subjective, error-prone and time-consuming manual procedures, is mandatory to enhance forensic ID. The use of hybrid intelligent systems (in particular evolutionary algorithms, fuzzy sets and deep learning), computer vision (3D-2D image registration and image processing), and explainable machine learning is a natural way to achieve this aim. This plenary talk is devoted to present three hybrid intelligent systems for CFS, CR, and skeleton-based age-at-death assessment developed in collaboration with the University of Granada's Physical Anthropology Lab within a fifteen years long research project. One of those systems is protected by an international patent, exploited by Panacea Cooperative Research, and is under commercialization in different countries.

**Biography:** Oscar Cordon was the Founder and a Leader of the Virtual Learning Center (2001-05) and the Vice President of Digital University (2015-19) with the University of Granada (UGR). He was one of the Founding Researchers with the European Centre for Soft Computing (2006-11), being contracted as Distinguished Affiliated Researcher until December 2015. He is currently a Professor with the UGR. He has been, for >25 years, an internationally recognized contributor to Research and Development Programs in fundamentals and real-world applications of computational intelligence. He has published >390 peer-reviewed scientific publications, including a research book on Genetic Fuzzy Systems (with >1400 citations in Google Scholar) and 113 JCR-SCI-indexed journal papers (67 in Q1 and 38 in D1), advised 20 Ph.D. dissertations, and coordinated 38 research projects and contracts (with an overall amount of >9M€). From June 2021, his publications had received 5439 citations (H-index=39), being included in the 1% of most-cited researchers in the world (source: Web of Science), with 14850 citations and H-index=58 in Google Scholar. He also has a granted international patent on an intelligent system for forensic identification commercialized in Mexico and South Africa. He received the UGR Young Researcher Career Award (2004), the IEEE Computational Intelligence Society (CIS) Outstanding Early Career Award (2011, the first such award conferred), the IFSA Award for Outstanding Applications of Fuzzy Technology (2011), the National Award on Computer Science ARITMEL by the Spanish Computer Science Scientific Society (2014), the IEEE Fellow (2018), the IFSA Fellowship (2019), and the Recognition for Scientific Career and Promotion of Artificial Intelligence by the Spanish

Association for Artificial Intelligence (2020). He was a member of the High-Level Expert Group that developed the Spanish R&D Strategy for Artificial Intelligence by the Spanish Ministry of Science, Innovation and Universities (2018-19). He is currently or was Associate Editor of 19 international journals. He was recognized as an Outstanding Associate Editor of IEEE Transactions on Fuzzy Systems (2008) and of IEEE Transactions on Evolutionary Computation (2019). Since 2004, he has taken many different representative positions with EUSFLAT and the IEEE Computational Intelligence Society.

His current research lines are on artificial intelligence for forensic identification (with the UGR Physical Anthropology lab and several international forensic labs and security forces) and agent-based modeling and social network analysis for marketing (with ROD Brand Consultants in projects for CAPSA, Mercedes, Jaguar-Land Rover, El Corte Inglés, Telefónica, Samsung, Coca Cola Europe, Cola Cao, WiZink, ...).



**Speaker 4:** Kalyanmoy Deb, Michigan State University, USA

**Title:** Customized Evolutionary Optimization for Practical Problem Solving

**Abstract:** Evolutionary optimization methods are increasingly being used for practical problem-solving tasks. It has been well established that no one optimization algorithm will be best for all problems. Even after many decades of studies, not much attention is placed in choosing or developing an appropriate optimization algorithm for a problem. In this lecture, we highlight the importance of developing a "customized" algorithm for routinely solving a problem class, rather than borrowing a standalone generalized optimization algorithm for every problem. Evolutionary optimization methods provide an ideal platform for developing a customized procedure. We shall support our argument by presenting a number of case studies involving single and multi-objective optimization problems from practice.

**Biography:** Kalyanmoy Deb is University Distinguished Professor and Koenig Endowed Chair Professor at Department of Electrical and Computer Engineering in Michigan State University, USA. Prof. Deb's research interests are in evolutionary optimization and their application in multi-criterion optimization, modeling, and machine learning. He was awarded IEEE Evolutionary Computation Pioneer Award for his sustained work in EMO, Infosys Prize, TWAS Prize in Engineering Sciences, CajAstur Mamdani Prize, Distinguished Alumni Award from IIT Kharagpur, Edgeworth-Pareto award, Bhatnagar Prize in Engineering Sciences, and Bessel Research award from Germany. He is fellow of IEEE and ASME. He has published over 575 research papers with Google Scholar citation of over 190,000 with h-index 127.



**Speaker 5:** Andries Engelbrecht, University of Stellenbosch, South Africa

**Title:** Multi-guide Particle Swarm Optimization for Multi- and Many-Objective Optimization

**Abstract:** The multi-guide particle swarm optimization (MGPSO) algorithm has originally been developed to solve multi-objective optimization problems. The MGPSO is a subswarm approach, where each subobjective is optimized by a separate swarm. In order to facilitate finding of non-dominated solutions and convergence to a Pareto-front, the particle velocity update is adapted by adding an archive guide term. The archive term serves as a mechanism to transfer knowledge about the non-dominated solutions throughout all subswarms. This talk will introduce the MGPSO algorithm and will present results to show that it performs excellently with reference to state-of-the-art approaches. The talk will then proceed to discuss the control parameters of the MGPSO, providing theoretically derived stability conditions on the control parameters to ensure that an equilibrium state is reached, to present alternative strategies to adapt the archive balance coefficient, and to analyze the importance of the control parameters. Due to the simplicity of the approach, and the use of subswarms, then MGPSO is easily scaled to many-objectives. The talk will present results to illustrate the scalability of the MGPSO in comparison with other many-objective optimization algorithms.

**Biography:** Prof Andries Engelbrecht received the Masters and PhD degrees in Computer Science from the University of Stellenbosch, South Africa, in 1994 and 1999 respectively. He is currently appointed as the Voigt Chair in Data Science in the Department of Industrial Engineering, with a joint appointment as Professor in the Computer Science Division, Stellenbosch University. Prior to 2019, he was appointed in the Department of Computer Science, University of Pretoria (1998-2018), where he served as the head of the department (2008–2017), South African Research Chair in Artificial Intelligence (2007–2018), and Director of the Institute for Big Data and Data Science (2017–2018). His research interests include swarm intelligence, evolutionary computation, artificial neural networks, machine learning, data analytics, and the application of these artificial intelligence paradigms to data mining, data clustering, finance, and difficult optimization problems. He is author of two books, “Computational Intelligence: An Introduction” and “Fundamentals of Computational Swarm Intelligence”. He serves as an associate editor for Swarm Intelligence, IEEE Transactions on Evolutionary Computation, IEEE Transactions on Neural Networks and Learning Systems, Engineering Applications of Artificial Intelligence, and Complex and Intelligent Systems.



**Speaker 6:** Frédéric Guinand, Le Havre Normandy University, France

**Title:** Swarms of Unmanned Aerial Vehicles

**Abstract:** Following big military drones and prototypes dedicated to scientific studies, lightweight drones are now very common and will probably be part of our daily life in a near future. Their agility and low cost make them very attractive for testing new usages. Their use is spreading every day more, in a growing number of domains: audiovisual, industrial inspection and maintenance, security, precision agriculture, surveillance, photogrammetry and cartography, archeology, transportation and logistics, health, leisure, disaster management, rescue, etc. Mainly, these activities rely on the use of only one UAV (fixed wing or multicopter) or on a group of remotely and individually piloted drones. However, for few years, a new challenge has been engaged by major actors of the domain: a challenge aiming at flying simultaneously many drones in groups, a challenge leading to a kind of "race for records". Thus, in 2015, Intel deployed 100 drones, establishing a world record for the largest number of UAVs flying simultaneously, a small number in comparison to the 1374 machines deployed by Ehang Egret three years later in the city of Xi'an, record broken again the same year by Intel at the occasion of the celebration of the 50th anniversary of the company. The, up-to-now, last milestone was reached in March 2021 by Genesis, the luxury vehicle division of Hyundai, with 3281 UAVs drawing in the sky the brand logo. While impressive, these demonstrations organize the flights as choreographies. After many hours of simulation, drones are programmed and every movement of every drone is computed offline and controlled online during the demonstration. Beyond the show, for a large number of agricultural, industrial or service activities, the choreographic approach is not a possible option insofar as it does not allow the swarm to adapt to the conditions, sometimes changing, of the mission.

The expected benefit of deploying a swarm of drones is to achieve certain objectives that remain beyond the reach of a single drone, in particular when the task to be handled is constrained in time and space. These systems are in fact capable of dealing with problems arising from rapidly evolving phenomena and/or requiring a significant geographic coverage which changes under time constraints, in an original and robust manner. If the deployment of several individually piloted drones partially removes these limitations, it requires the availability of a team of pilots and drastic coordination rules to avoid problems in flight while ensuring the success of the mission. The only way of exploiting the full potential of swarms of drones is to endow them with autonomy in making decisions on the basis of local information (sensors, communications between drones). In this talk we will deal with autonomous swarms of drones, systems relying neither on a central coordination station nor on pre-programmed plans for the mission, systems in which each drone takes its own decisions based on communications with peers and/or data stemmed from embedded sensors, camera or other devices carried by the drone itself.

**Biography:** Dr. Frédéric Guinand received MSc degree in Computer Science in 1991, and PhD degree in Computer Science in 1995 both from Grenoble Institute of Technology (France). Engineer in a startup in 1996 for developing Internet activities, he obtained an INRIA postdoc fellowship for working at the Swiss Federal Institute of Technology of Lausanne (EPFL, Switzerland). In 1997 he joined Le Havre University as Assistant Professor and he was appointed to a Full Professor in 2005. His research interests are in the areas of dynamic graph theory, distributed and mobile computing, nature-inspired computing and collective robotics. Currently co-chair of the Complex System research axis of CNRS Normastic federation, he is also Visiting Professor at the Department of Mathematics and Natural Science at Cardinal Stefan Wyszyński University in Warsaw.



**Speaker 7:** Cengiz Toklu, Beykent University, Istanbul, Turkey

**Title:** Hybrid Algorithms. Applications to Structural Mechanics

**Abstract:** Metaheuristics algorithms (MAs), together with neural networks, in conscious use since several decades, formed a real revolution in solving optimization problems in all fields of science and engineering. Versatility of MAs made them indispensable when attacking any kind of optimization problem with all kinds of variables, with convex and non-convex areas of definition, involving functions with undefined gradients and constraints of any sort, with one or more objectives, with unique or non-unique solutions, etc. Their extremely high level of popularity made that many a different type of MAs have been forwarded until now, some quite different than others, some being difficult to differentiate from the others, based on metaphors from quite different fields like life sciences, physics, metallurgy, sociology, etc. The number of MAs created in this way can be estimated as 200 or more. It is seen that all algorithms forwarded are successful, perhaps not for all problems, but certainly for some. Applications have shown that, in solving a problem, instead of using an algorithm from the start to the end, a hybrid application, i.e., using more than one algorithm alternatively or in parallel, may be a better procedure as far as speed and accuracy is concerned. It can be seen in the literature that this hybridization can be done not only between MAs, but other types of algorithms as well can be considered in this procedure. An important area of application of MAs, hybridized or not, is structural mechanics, i.e., structural design and structural analysis. In this presentation, after giving some generalities of hybrid algorithms, their applications on structural mechanics will be discussed based on studies some of which are carried out in our group.

**Biography:** Professor Toklu obtained his BS and MS degrees in Civil Engineering from Middle East Technical University, Ankara Turkey and his doctorate from Universite de Pierre et Marie Curie (Paris VI), Paris, France. In his professional life he directed and/or supervised numerous giant construction projects in Turkey, including a pontoon bridge, a long span suspension bridge, a light railed transportation system, and several motorways. In academic life he taught in several universities starting with Middle East Technical University, serving in many cases as Department Head or Dean. Being a member of several technical and scientific international and national organizations, he is currently affiliated to Beykent University in Istanbul, Turkey. His research interests include application of optimization techniques to engineering, application of Artificial Intelligence concepts to engineering, space civil engineering, nonlinear analysis of structures, engineering education and construction scheduling. He is the author of several books, book chapters and scientific articles. He has organized many congresses and served as keynote speaker in many international meetings. Dr. Toklu is the developer of the method "Total Potential Optimization using Meta-heuristic Algorithms (TPO/MA)" that gave way to the method Finite Element Method with Energy Minimization (FEMEM) which is shown to be more successful than classical methods in analyzing non-linear structural systems, under-constrained structures, unstable structures, degenerate structures and structures with non-unique deformed shapes. His current research is on producing lunar soil simulant and lunar construction materials including lunar bricks, lunar concrete, and the like.



**Speaker 8:** Günther Raidl, Technische Universität Wien, Austria

**Title:** Combinatorial Optimization Meets (Reinforcement) Learning

**Abstract:** The machine learning boom of the last years also led to interesting new developments in the area of combinatorial optimization. Classical optimization techniques for approaching hard combinatorial problems include many based on tree search, frequently in combination with linear programming or constraint propagation, but also various kinds of metaheuristics. While end-to-end machine learning approaches are still far from replacing these classical techniques, it has been recognized that the latter may benefit from incorporating learning components for certain purposes. One may say the aim is to "learn how to better optimize". This talk will give an overview on some promising recent developments in this direction. For example, for branch-and-bound, approaches have been proposed that learn better performing branching and node selection strategies. In beam search, guidance heuristics may be learned that yield better results than leading manually crafted heuristics. In the area of metaheuristics, we will look at large neighborhood search approaches where the construction of the neighborhoods is learned. Some of these methods rely on imitation or supervised learning approaches where labeled training data or some powerful other method to learn from need to be available. More versatile may be methods based on reinforcement learning principles, on which we will also have a look at.

**Biography:** Günther Raidl is Professor at the Institute of Logic and Computation, TU Wien, Austria, and member of the Algorithms and Complexity Group. He received his PhD in 1994 and completed his habilitation in Practical Computer Science in 2003 at TU Wien. In 2005 he received a professorship position for combinatorial optimization at TU Wien. His research interests include algorithms and data structures in general and combinatorial optimization in particular, with a specific focus on metaheuristics, mathematical programming, intelligent search methods, and hybrid optimization approaches. His research work typically combines theory and practice for application areas such as scheduling, network design, transport optimization, logistics, and cutting and packing. Günther Raidl is associate editor for the *INFORMS Journal on Computing* and the *International Journal of Metaheuristics* and at the editorial board of several journals including *Algorithms*, *Metaheuristics* and the *Evolutionary Computation*. He is co-founder and steering committee member of the annual European Conference on Evolutionary Computation in Combinatorial Optimization (EvoCOP). Since 2016 he is also faculty member of the Vienna Graduate School on Computational Optimization. Günther Raidl has co-authored a text book on hybrid metaheuristics and over 180 reviewed articles in scientific journals, books, and conference proceedings. Moreover, he has co-edited 13 books and co-authored one book on hybrid metaheuristics. More information can be found at <http://www.ac.tuwien.ac.at/raidl>.





**Speaker 9:** Yukio Ohsawa, The University of Tokyo, Japan

**Title:** Elicitation of Feature Concepts as Data Federative Innovation Literacy

**Abstract:** Since 2000, the speaker has initiated and embodied Chance Discovery, a subdomain of data science, meaning to detect and explain a chance, that is a piece of high-utility information as part of data about events meaningful for human's decision making. At that time, he thought a network of networks can be the essential model for representing the latent dynamics where an edge between networks is linked to a chance. Then, he extended the methods of chance discovery for explaining the utility of datasets, via the analogy between an event as the base and the metadata of a dataset as the target. As well as the base problem of chance discovery, that is to explain the utility of information about an event considering its relation to other events, the utility of a dataset as the target goal could be explained its relation to other datasets. However, he found information obtained from a dataset created by a combination of different but connectable (sharing attributes and/or purpose of using) datasets is essentially hard to interpret because the same analysis models as of the original datasets cannot be applied directly due to the difference in the requirements of data user(s). Thus, it comes to be an important problem to elicit a new "feature concept" for target data. A feature concept is a model of the concept to be retrieved from data that cannot be represented by a simple feature such as a single variable but can be by a conceptual illustration. Decision trees, Clusters, and even deep neural networks can be positioned as examples of feature concepts. A useful feature concept for satisfying a requirement of a data user has been elicited via creative communication using Data Jackets among data providers, data users, and other stakeholders in the market of data. In this keynote, the history of chance discovery and data-jacket-based design of creative communication is reviewed with some cases of application -- marketing, detection of earthquake precursors, suppression of COVID-19 spreading risk, etc, cases and highlight the feature factors elicited and used in these examples. An essential message here is that sharing and using/reusing feature concepts is literacy for data-federative innovations.

**Biography:** Yukio Ohsawa is a professor of Systems Innovation in the School of Engineering, The University of Tokyo. He received BE, ME, and PhD in from the School of Engineering, The University of Tokyo (1995). Then worked for the School of Engineering Science in Osaka University (research associate, 1995-1999), Graduate School of Business Sciences in University of Tsukuba (associate professor, 1999-2005), and moved back to The Univ. of Tokyo. He started researches from non-linear optics, and, via artificial intelligence, created a new domain chance discovery meaning to discover events of significant impact on decision making, since year 2000. About chance discovery he gave keynote talks in conferences such as International Symposium on Knowledge and Systems Sciences, Intl Conf. on Rough Sets and Fuzzy Sets, Joint Conf. on Information Sciences, Knowledge-Based Intelligent Information and Engineering Systems, etc. Chance discovery came to be embodied as innovators? marketplace, a methodology for innovation borrowing principles of the dynamics of markets. Then he, when biking from his job in a business school, invented the basic idea of Data Jackets. Since then, he is introducing the method presented in this book to sciences, educations, and businesses. His original concepts and technologies have been published as books and monographs from global publishers such as Springer Verlag, Taylor & Francis, etc. Two most important books among them are, Chance Discovery (2003 Springer, foreword given by Eric von Hippel), Innovators Marketplace: Using Games to Activate and Train Innovators (2012 Springer, foreword given by Larry Leifer). He edited special issues as guest editors for journals, mainly relevant to chance discovery, such as Intelligent Decision Technologies (2016), Information Sciences (2009), New Generation Computing (2003), Journal of Contingencies and Crisis Management (2002), etc. As the program chair of the Annual Conference of The Japanese Society on Artificial Intelligence, he came to be the first to change this domestic conference into an international conference from June 2019.



**Speaker 10:** Marco Dorigo, Université Libre de Bruxelles, Belgium

**Title:** Improving controllability, robustness and security of robot swarms

**Abstract:** In the first part of the talk, I will discuss the concept of a mergeable nervous system for robot swarms and present experimental results that show how it can be used to design and implement swarms of robots that are easier to control and that can self-repair. In the second part, I will present some recent results of research aimed to improve security in robot swarms via the use of Merkle trees and of the blockchain.

**Biography:** Marco Dorigo received the Laurea, Master of Technology, degree in industrial technologies engineering in 1986, and the Ph.D. degree in electronic engineering in 1992 from the Politecnico di Milano, Milan, Italy, and the title of Agrégé de l'Enseignement Supérieur, from ULB, in 1995. From 1992 to 1993, he was a Research Fellow at the International Computer Science Institute, Berkeley, CA. In 1993, he was a NATO-CNR Fellow, and from 1994 to 1996, a Marie Curie Fellow. Since 1996, he has been a tenured Researcher of the FNRS, the Belgian National Funds for Scientific Research, and co-director of IRIDIA, the artificial intelligence laboratory of the ULB. He is the inventor of the ant colony optimization metaheuristic. His current research interests include swarm intelligence, swarm robotics, and metaheuristics for discrete optimization. He is the Editor-in-Chief of Swarm Intelligence, and an Associate Editor or member of the Editorial Boards of many journals on computational intelligence and adaptive systems. Dr. Dorigo is a Fellow of the AAAI, EurAI, and IEEE. He was awarded the Italian Prize for Artificial Intelligence in 1996, the Marie Curie Excellence Award in 2003, the Dr. A. De Leeuw-Damry-Bourlart award in applied sciences in 2005, the Cajastur International Prize for Soft Computing in 2007, an ERC Advanced Grant in 2010, the IEEE Frank Rosenblatt Award in 2015, and the IEEE Evolutionary Computation Pioneer Award, awarded in 2016.