ASPAI
TENERIFE•2023

5th International Conference on Advances in Signal Processing and Artificial Intelligence (ASPAI' 2023)

Conference Programme

Tenerife (Canary Islands), Spain
7-9 June 2023



Organized by:

IFSA

Message from Chairman

On behalf of Organizing Committee, I would like to welcome you to the *5th International Conference on Advances in Signal Processing and Artificial Intelligence (ASPAI '2023)*, 7-9 June 2023, Adeje, Tenerife (Canary Islands), Spain.

Technological innovations and advances in signal processing and artificial intelligence (AI) have been always an important part of the majority of the industries and driving factors of the artificial intelligence (AI) market. The global artificial intelligence market size was valued at US $ 136.55 billion in 2022 and is projected to expand at a compound annual growth rate (CAGR) of 37.3 % from 2023 to 2030.

The ASPAI Conference Series has been launched to provide a forum for open discussion and development of emerging artificial intelligence and appropriate signal processing technologies focused on real-word implementations. The goal of the conference is to provide an interactive environment for establishing collaboration, exchanging ideas, and facilitating discussion between researchers, manufacturers and users. The *1st International Conference on Advances in Signal Processing and Artificial Intelligence (ASPAI '2019)* has taken place in Barcelona, Spain, the second ASPAI '2020 and the third ASPAI '2021 conferences where in the virtual format due to the COVID-19 pandemic. In 2022 we have returned to the in-person format with the traditional plenary and poster session, keynote presentations and social activities during the ASPAI' 2022 in Corfu, Greece.

The ASPAI' 2023 is organized by IFSA – a professional, non-profit association serving for academy and industry since 1999, with the media partners: IOS Press (journal *Integrated Computer-Aided Engineering* (ISSN: 1069-2509, e-ISSN: 1875-8835)), and World Scientific (*International Journal of Neural Systems* (ISSN: 0129-0657, e-ISSN: 1793-6462).

The conference is focusing any significant breakthrough and innovation in the mentioned field with a broadest concept.

We trust that you will find ASPAI' 2023 conference professionally rewarding and stimulating as well as enjoyable. Welcome to ASPAI' 2023 !

Prof., Dr. Sergey Y. Yurish
ASPAI' 2023 Conference Chairman

Conferences Venue

The Conferences will take place on 7-9 June 2023 in the Hard Rock Hotel (Costa Adeje, Tenerife), conference rooms *Wembley I* (regular sessions) and *Wembley II* (poster session).

Registration

The Registration Desk is opened in the Hard Rock Hotel event hotel:

- Tuesday, 6 June, from 20:00-22:00 (in the Welcome Cocktail area)
- Wednesday, 7 June, from 9:45-16:00 (near the room *Wembley I*)
- Thursday, 8 June, from 9:45-16:00 (near the room *Wembley I*)
- Friday, 9 June, from 9:45-13:00 (near the room *Wembley I*)

Language

The official language of the Conferences is English. There will be no simultaneous interpretation.

Insurance and Liability

The conferences organizers do not accept responsibility for any individual, medical, travel or personal insurance policies as necessary.

Conference Identification Tag

The Organizing Committee request that you wear your identification tag (badge) at all times during the conference. Your conference identification tag will serve as your admission to all conference paper presentation sessions.

Welcome Cocktail

6 June 2023, Tuesday (20:00-22:00), Hard Rock Hotel, the 16th floor (Sky Lounge Bar) situated on the Hard Rock Hotel's Nirvana Tower building's roof - the most impressive rooftop bar in Tenerife. The 16th sky lounge bar overlooks the most spectacular sunsets on the island, with captivating views of the El Teide volcano, La Gomera island and, of course, the Atlantic Ocean. Do not miss this opportunity to say the first "hello" to attendees and committee members.

Please do not forget to collect your badge (ID tag) at the registration desk before the Welcome Cocktail. The registration desk will be opened in the Welcome cocktail area from 20:00 to 21:30.

Coffee/Tea Refreshment

Coffee/tea will be served at the times indicated in the programme near the *Wembley I* conference room.

Gala Dinner

8 June 2023, Thursday (20:00-23:30). The Gala Dinner will take place in the Hard Rock Hotel.

Local Time

The local time in Tenerife is: GMT+1

Conference web site:

http://www.aspai-conference.com/

Post-Conference Publications

Selected papers presented at the conference will be published by IOS Press in *Integrated Computer-Aided Engineering* journal (ISSN: 1069-2509, e-ISSN: 1875-8835, Impact Factor 2022: 6.137), by World Scientific in the *International Journal of Neural Systems* (ISSN: 0129-0657, e-ISSN: 1793-6462, Impact Factor 2022: 6.325), by Elsevier in *Data in Brief* (ISSN: 2352-3409) open access journal, special issue on 'Big Data in AI', and by IFSA Publishing in *Sensors & Transducers* open access journal (ISSN: 2306-8515, e-ISSN 1726-5479) special issue on 'AI & Signal Processing'.

Authors will be also invited to extend their paper or/and articles into the book chapters for the '*Advances in Signal Processing: Reviews*' Vol. 3 or '*Advances in Artificial Intelligence: Reviews',* Vol. 3 Book Series. These open access books will be published in 2023/2024 by IFSA Publishing, S.L. (Barcelona, Spain).

Conference proceedings and books published by IFSA Publishing, S.L. were indexed in the Conference Proceedings Citation Index (CPCI) and Book Citation Index respectively by Clarivate Analytics (former Thomson Reuters).

Organizing Committee

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Programme at Glance

Date / Time (GMT+1)	7.06.2023 Wednesday	8.06.2023 Thursday	9.06.2023 Friday
9:45-10:00	Registration	Registration	Registration
10:00-10:15	* Opening Session (Sergey Y. Yurish, Chairman)	* Daily Notifications	* Daily Notifications
10:15-12:30	Regular Session: *Signal Processing*	Regular Session: *Machine & Deep Learning: Theory and Applications*	Zoom Session (I): *Signal Processing & AI Applications*
12:30-13:30	*Coffee and Sandwiches*	*Coffee and Sandwiches*	*Lunch on your own*
13:30-16:00	Regular Session: *Image, Speech, Video & Biomedical Signal Processing*	Regular Session: *Applied Artificial Intelligence*	Zoom Session (II): *AI Algorithms & Applications*
16:00-17:30	-	-	*Poster Session & Farewell Cocktail*
17:30-18:00	-	-	* Closing Session (Sergey Y. Yurish, Chairman)
18:00-20:00	-	-	-
20:00-23:30	-	Gala Dinner	-

* - must attend sessions

The time in the table and in the technical programme below is the local time in Corfu is: GMT+1.

Technical Conference Programme

Day 1

7 June 2023, Wednesday

Regular Session:
Signal Processing

Chairman: Prof., Dr. Paolo Meloni
Università degli studi di Cagliari, Italy

1. **New moment functions for signal and image analysis**
   Barmak Honarvar Shakibaei Asli, *(UK)*

2. **Velocity time of arrival in the tip-timing analysis of steam turbine rotor blades**
   Romuald Rzadkowski and Jerzy Manerowski, *(Poland)*

3. **Extraction of characteristic ranges for unbalance and misalignment conditions in rotating machines from cepstrum coefficients**
   Arly Dario Rincón Quintero, Camilo Leonardo Sandoval Rodriguez, Omar Lengerke Perez, Oscar Arnulfo Acosta Cárdenas and Jessica Maradey, *(Colombia)*

4. **Feature extraction of VLF radio signal for solar flares detection**
   Nicole Christoff, Ivaylo Nachev, Ilia Iliev and Peter Petkov, *(Bulgaria)*

5. **Application of the adaptive wavelet filtering to the identification of non-stationary systems parameters**
   Andrzej Klepka
   (Poland)

6. **Sensors fusion using RSSI and IMU data for IoT devices indoor localization**
   Waf a Njima, Xun Zhang, Hongxiu Zhao and Masood Jan, *(France)*

7. **Abnormal behavior recognition based on multiple instance learning**
   Zhanhe Yu and Yuanyao Lu *(China)*

Regular Session:
Image, Speech, Video & Biomedical Signal Processing

Chairman: Prof., Dr. Romuald Rzadkowski
Air Force Institute of Technology, Poland

1. **A novel approach combining deep learning and stochastic modeling to retrieve 3D properties of multiphase flows from 2D projections**
   Kassem Dia, Fabrice Lamadie and Johan Debayle
   (France)

2. **Stereophonic acoustic echo cancellation with the RLS algorithm using the conjugate gradient method**
   Ionuț-Dorinel Fîciu, Cristian-Lucian Stanciu, Constantin Paleologu, Jacob Benesty, Camelia Elisei-Iliescu, Cristian Anghel and Silviu Ciochină
   (Romania, Canada)

3. **A novel intra prediction mode using transformer-based GAN for VVenC (pre-recorded video presentation)**
   Takafumi Katayama, Tian Song, Takashi Shimamoto and Xiantao Jiang
   (Japan, China)

4. **The tone of superficial electromyography provides characteristics that allow the discrimination of hand gestures**
   Camilo Leonardo Sandoval Rodriguez, Andres Felipe Jimenez Qeuzada, Diana Maria Reyes Bravo, Nicole Andrea Castillo Zambrano and Omar Lengerke Perez
   (Colombia)

5. **Force signal and superficial electromyographic signals associated to hand movements: A General Mixed effects model**
   Camilo Leonardo Sandoval Rodriguez, Diana Maria Reyes Bravo, Arly Dario Rincón Quintero, Omar Lengerke Perez and Andres Felipe Jimenez Quezada
   (Colombia)

6. **EMDNet: New DL framework to classify motor imagery-based brain activities in both healthy and paraplegic subjects**
   Niraj Bagh, Fatemeh Shahlaei, Machireddy Ramasubba Reddy and M.S. Zambare
   (India)

7. **On-FPGA neural decoding with Spiking Neural Networks**
   G. Leone, L. Martis and P. Meloni
   (Italy)

Day 2
8 June 2023, Thursday

Regular Session:
Machine and Deep Learning: Theory and Applications

Chairman: Prof., Dr. Végh János
Kalimános BT, Hungary

1. **Bayesian deep transfer learning for refinement of stability predictions in milling**
   Vahid Ostad Ali Akbari, Michal Kuffa and Konrad Wegener (Switzerland)

2. **ConTraGAN - A conditional transformer-based generative adversarial network for zero-day network attack analysis and detection**
   Sharmarke Gabayre, Xiyu Shi, Safak Dogan, Yogachandran Rahulamathavan, Andrew Weightman and Glen Cooper (UK)

3. **Autolabel: Improving Petri Dish automatic labels with AI algorithms**
   Victorien Quevit, Jean-Marc Laferte, Alain-Jerome Fougeres, Hayet Djelal, Jean-Louis Dillenseger and Emmanuel Jalenques *(France)*

4. **The effect of Stopwords Removal and Feature Engineering on analysing the sentiment of air-traveller**
   Mohammed Homaid, Irene Moulitsas and Karl Jenkins (UK)

5. **Enhancing early detection of schizophrenia through multi-modal EEG analysis: A fusion of wavelet transform, reconstructed phase space, and deep learning neural networks**
   Amjed Al Fahoum and Ala'A Zyout (Jordan)

6. **Classifying musical instruments using temporal and spectral features with deep neural nets (Pre-recorded video presentation)**
   Cai Xiu Chiah, Lee Choo Tay and Weng Kin Lai (Malaysia)

7. **Classification of time series as images using deep convolutional neural networks: application to glitches in gravitational wave data**
   Shuzu Jin, Soumya Mohanty, Qunying Xie, Hanzhi Wang and Xue-Hao Zhang (China, USA)

Regular Session:
Applied Artificial Intelligence

Chairman: Prof., Dr. Enrique Dominguez
University of Malaga, Spain

1. **How science and technology limit performance of AI networks**
   Végh János *(Hungary)*

2. **A robot-based measurement setup for tactile surface classification**
   Atae Jafari-Tabrizi, Thomas Ules, Michael Grießer, Davide Tranchida and Dieter P. Gruber *(Austria)*

3. **Active learning-based online coupling of sawmill simulators and their surrogate model: the effect of sampling bias on concept drift detection**
   Sylvain Chabanet, Philippe Thomas and Hind Bril El-Haouzi *(France)*

4. **Building Kalypso: The construction**
   Nikos Manos, Marios Vasileiou and Ergina Kavallieratou *(Greece)*

5. **Building Kalypso: The navigation system**
   Nikos Vasilopoulos, Ergina Kavallieratou and Efstathios Stamatatos *(Greece)*

6. **Deep learning for coronary artery disease severity classification**
   Ariadna Jiménez-Partinen, Karl Thurnhofer-Hemsi, Esteban J. Palomo and Ana I. Molina-Ramos *(Spain)*

7. **Detection of the start of the gait cycle by artificial intelligence (pre-recorded video presentation)**
   Diego Teran-Pineda and Enrique Dominguez *(Ecuador, Spain)*

8. **Data augmentation of tumour histopathological images using Generative Adversarial Networks**
   Jose Luis Ruiz-Casado, Miguel A. Molina-Cabello, Enrique Dominguez and Rafael M. Luque-Baena *(Spain)*

Day 3

9 June 2023, Friday

Virtual Session in Zoom (I):

Signal Processing and AI Applications

Chairman: Prof., Dr. Sergey Y. Yurish
International Frequency Sensors Association (IFSA), Spain

1. **Wavelet coefficients and autoregressive reflection coefficients for hand movement detection**
   Mohammad Nur Hossain Khan, Anik Baul, Utpal Mozumder, Gobinda Chandra Sarker, Jannatul Ferdaous Progga and Ahmed Abdelgawad *(Bangladesh, USA)*

2. **Classification of heart sounds using quantum machine learning models**
   Fernando Plou-Llorente, Elías F. Combarro, Antonio Jesús Muñoz-Montoro and José Ranilla *(Spain)*

3. **Swin transformer tiny for music genre classification using SpecAugment**
   Liu Wanjun, Li Yumeng and Qu Haicheng
   (China)

4. **An approach using deep learning for forest fire detection**
   Nguyen Thu Huong and Nguyen The Long
   (Viet Nam, Russia)

5. **A convolutional neural network for recognition of coffee leaf disease**
   Nameer Baht and Enrique Domínguez
   (Iraq, Spain)

6. **AI-based, fast moisture measurement for food drying application**
   Nick Stoupas and Michail Maniadakis
   (Greece)

Virtual Session in Zoom (II):

Chairman: Prof., Dr. Sergey Y. Yurish
International Frequency Sensors Association (IFSA), Spain

1. **Ongoing experiments with the DetObj prototype for vision substitution**
   Guido Bologna, Ludovic Pfeiffer, David Gonzalez, Quentin Leblanc and Jean-Marc Boutay
   (Switzerland)

2. **Pulse signals standing out based on SR Effect**
   Oksana Kharchenko and Zlatinka Kovacheva
   (Bulgaria)

3. **Synthetic data generator based on Principal Curves**
   Fernando Borges, Victor Reis and Danton Ferreira
   (Brazil)

4. **Radar Target DOA Estimation Using Deep Learning**
   Yiyang Li and Webert Montlouis
   (USA)

5. **Revising and reexamining Angluin's algorithm: Implications for unified regular language learning algorithms**
   Aziz Fellah *(USA)*

6. **Estimation of height of a shape a 2D image from its shadow using neural networks**
   Julian Rene Muñoz Burbano, Pablo Emilio Jojoa Gomez and Fausto Miguel Castro *(Colombia)*

7. **An Improved multiview stereo for semantic reconstruction**
   Sk. Mohammadul Haque
   (India)

Poster Session (Conference Room *Wembley II*):
9 June 2023 (16:00-17:30)

1. **Explainable similarity measures with categorical attributes**
   Magne Aarset
   (Norway)

2. **Estimation of selected geometric dimensions during manufacturing of aircraft accessory gearboxes on a CNC machine using ANFIS**
   Piotr Gierlak, Magdalena Muszyńska, Andrzej Burghardt, Dariusz Szybicki, Krzysztof Kurc and Grzegorz Bomba
   (Poland)

3. **Iterative laser measurement of an aircraft engine blade in robotic grinding process**
   Krzysztof Kurc, Andrzej Burghardt, Piotr Gierlak, Magdalena Muszyńska and Dariusz Szybicki
   (Poland)

4. **Implementation of SSN in the evaluation of the robotic welding process of aircraft engine casing components**
   Andrzej Burghardt, Piotr Gierlak, Magdalena Muszyńska, Krzysztof Kurc, Dariusz Szybicki, Marek Uliasz and Tomasz Muszyński
   (Poland)

5. **The use of a fuzzy controller in the machining of aircraft engine components**
   Magdalena Muszyńska, Andrzej Burghardt, Dariusz Szybicki, Piotr Gierlak and Krzysztof Kurc
   (Poland)

6. **A hybrid system containing a 3D scanner and a laser tracker dedicated to robot programming**
   Dariusz Szybicki, Magdalena Muszyńska, Andrzej Burghardt, Piotr Gierlak and Krzysztof Kurc
   (Poland)

7. **Inversion artifacts on Time-Lapse Electrical Resistivity Tomography data**
   Azadeh Hojat, Luigi Zanzi and Meng Heng Loke
   (Iran, Italy, Malaysia)

8. **Iterative inversion of 2D electrical resistivity tomography data to remove 3D effects**
   Luigi Zanzi and Azadeh Hojat
   (Italy, Iran)

9. **Information extraction from electricity invoices through named entity recognition with transformers**
   Agustín Salgado de la Nuez and Javier Sánchez Pérez
   (Spain)

10. **High accuracy brain tumor classification with efficientnet and magnetic resonance images**
    Juan Manuel Medina and Javier Sánchez
    (Spain)

11. **Revealing patterns of symptomatology in Parkinson's Disease: A latent space analysis with 3D convolutional autoencoders**
    Enrique Delgado de Las Heras, Francisco Jesús Martínez-Murcia, Ignacio A. Illán, Carmen Jimenez-Mesa, Diego Castillo-Barnes, Javier Ramirez and Juan M. Gorriz
    (Spain)

12. **YOLO-based multi-modal analysis of vineyards using RGB-D detections**
    Thibault Clamens, Joaquin Rodriguez, Mickaël Delamare, Lew Fock Chong Lew Yan Voon, Éric Fauvet and David Fofi
    (France)

13. **4D joint harmonic retrieval and model order estimation with Convolutional Neural Networks**
    S. Schieler, S. Semper, R. Faramarzahangari, C. Schneider and R. S. Thomä
    (Germany)

14. **Spiking Neural Networks on embedded vector processors**
    Felix Kreutz, Daniel Scholz, Jiaxin Huang, Klaus Knobloch and Christian Mayr
    (Germany)

15. **2D spectral analysis of OFDM radar data using deep learning**
    R. Faramarzahangari, S. Schieler, R.Thomae, C. Schneider
    (Germany)

16. **Enhancing graph representation learning with attention-driven Spiking neural networks**
    Huifeng Yin, Mingkun Xu, Jing Pei and Lei Deng
    (China)

17. **Reliable learning-based controllers and how structured simulation is a path towards them**
    Krešimir Kušić, René Schumann, Martin Gregurić, Edouard Ivanjko and Marko Šoštarić
    (Croatia, Switzerland)

18. **Boosting robustness and continual learning in spiking neural networks through dendrite dynamics optimization**
    Mingkun Xu, Jianping Xiong, Jing Pei and Lei Deng
    (China)

19. **A two-phase regularization approach to enhance generalization and convergence in neural networks**
    Mingkun Xu, Jing Pei and Lei Deng
    (China)

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