

ICAAI 2022

**2022 The 6th International Conference on
Advances in Artificial Intelligence**

October 21-23, 2022 ◆ Birmingham, UK





**The Association for Computing Machinery
1601 Broadway, 10th Floor
New York, New York 10019, USA**

ACM COPYRIGHT NOTICE. Copyright © 2022 by the Association for Computing Machinery, Inc. Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, to republish, to post on servers, or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Publications Dept., ACM, Inc., fax +1 (212) 869-0481, or permissions@acm.org.

For other copying of articles that carry a code at the bottom of the first or last page, copying is permitted provided that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, +1-978-750-8400, +1-978-750-4470 (fax).

ACM ISBN: 978-1-4503-9694-3

Table of Contents

Preface	v
Conference Committees.....	vi

Chapter 1 – Machine Learning and Algorithm

Prospects for the Use of Algebraic Rings to Describe the Operation of Convolutional Neural Networks.....	1
<i>Ibragim E. Suleimenov; Akhat S. Bakirov; Yelizaveta S. Vitulyova</i>	
Measuring Airport Service Quality Using Machine Learning Algorithms	8
<i>Mohammed Salih Homaid; Irene Moulitsas</i>	
Depthwise Convolutions Using Physicochemical Features of DNA for Transcription Factor Binding Site Classification: Physicochemical Features for DNA-protein Classification with Depthwise Convolutions	15
<i>Gergely, GP, Pap; Krisztián, KÁ, Ádám; Zoltán, ZG, Györgypál; László, LT, Tóth; Zoltán, ZH, Hegedűs</i>	
A Visual Learning based Robotic Grasping System.....	22
<i>Weijun Guan; Yulan Guo</i>	
Miscellaneous EEG Preprocessing and Machine Learning for Pilots' Mental States Classification: Implications.....	29
<i>Ibrahim M. Alreshidi; Irene Moulitsas; Karl W. Jenkins</i>	
Batch Layer Normalization A New Normalization Layer for CNNs and RNNs.....	40
<i>Amir Ziaee; Erion Çano</i>	
Machine Learning for the Posture Evaluation of Women Snatch Barbell Trajectory	50
<i>Jen-Shi Chen; Ching-Ting Hsu; Wei-Hua Ho; Chiao-Yin Hsu</i>	
Incremental Learning of Classification Models in Deep Learning.....	56
<i>Atharv Nagrikar; Rahul Singh Dangi; Samrit Kumar Maity; Ashish Kuvelkar; Sanjay Wandhekar</i>	
Carbon-Fiber-reinforced Polymer as Confinement Reinforcement to Maximize Compressive Strength of Engineered Bamboo: An Artificial Neural Network Model.....	61
<i>Wilbert John E. Silva; Dante L. Silva</i>	
GLAF: Global-and-local Attention Flow Model for Question Answering.....	69
<i>Shaoshi Sun</i>	

Chapter 2 – Computer Vision and Image Detection

AutoMID : A Novel Framework for Automated Computer Aided Diagnosis of Medical Images	74
<i>Ayeshmantha Wijegunathileke; Achala Aponso</i>	

A Comprehensive Study on Machine Learning in Breast Cancer Detection and Classification.....	81
<i>Aya Al-Chikh Omar; Ali Bou Nassif</i>	
Deep Ternary Hashing Code for Palmprint Retrieval and Recognition.....	88
<i>Qizhou Lin; Lu Leng; Muhammad Khurram Khan</i>	
Anti-collision System for Accident Prevention in Underground Mines Using Computer Vision.....	94
<i>Mohamed Imam; Karim Baïna; Youness Tabii; Intissar Benzakour; Youssef Adlaoui; El Mostafa Ressami; El Hassan Abdelwahed</i>	

Chapter 3 – Intelligent Recognition Technology and Application

Comparative Analysis of the Light-CNN and FaceNet Methods for Identifying and Maintaining Human Faces.....	102
<i>Yea-Shuan Huang; Mahmood H.B. Alhlffee</i>	
MixUp based Cross-consistency Training for Named Entity Recognition.....	110
<i>Geonsik Youn; Bohan Yoon; Seungbin Ji; Dahee Ko; Jongtae Rhee</i>	
Spatial-temporal Transformers for EEG Emotion Recognition.....	116
<i>Jiyao Liu; Hao Wu; Li Zhang; Yanxi Zhao</i>	
Proxy-based Metric Learning for Emotion Recognition.....	121
<i>Junhyeong Park; Geonsik Youn; Bohan Yoon; Byeonghun Kim; Jongtae Rhee</i>	
A Semantic Real-time Activity Recognition System for Sequential Procedures in Vocational Learning.....	126
<i>Jeanpaul Magro; Daren Scerri</i>	

Chapter 4 – AI-based Smart Products and Intelligent Services

Design for the Elderly: The Acceptance of Smart Vests in the Senior Population.....	134
<i>Zhuozhen Xie</i>	
Optimizing Ethanol Production in Escherichia Coli Using a Hybrid of Particle Swarm Optimization and Artificial Bee Colony	140
<i>Mohamad Faiz Dzulkalnine; Mohd Saberi Mohamad; Yee Wen Choon; Muhammad Akmal Remli; Hany Alashwal</i>	
An Effective Implementation of Detection and Retrieval Property of Episodic Memory	147
<i>Aniket Sharma; Pramod Kumar Singh; Jay Prakash</i>	
Online Psychological Counseling Chatbot for Seniors	154
<i>Byeonghun Kim; Eunji Kim; Jongtae Rhee</i>	

Preface

ICAAI 2022 conference proceedings contain quite effective and diverse academic achievements. Over 30 academics from many countries of the world participated in the conference. Each contributed paper has been peer-reviewed by the technical committee members as well as other experts in the field from various countries. The proceedings present the reader the recent results and findings in the field of artificial intelligence.

Sessions of the conference were highly fruitful in discussion and participation. The keynote speeches were very diverse, involving issues such as Social Media and Machine Learning, Robot Skill Learning, Conceptual Modeling Views, Humanoid Robots and Artificial Super Intelligence, and Artificial Intelligence and Big Data Analytics.

ICAAI is the premier forum that brings both industry and academia for the dissemination of technological advances, research results and applications in the fields of Artificial Intelligence Methods and Technologies. The conference provides a valuable opportunity for researchers and industry experts to exchange their ideas. Even though the conference was held virtually, as shown from the conference proceeding, it was characterized by many excellent papers, the obvious effectiveness in presentations, the richness of the discussion, the friendly atmosphere, and the establishment of a beneficial connect of academic communication!

Thank you very much to everyone who contributed to the success of this conference, including committee members, keynote and invited speakers, chairs, presenters, hosts and conference staff.

Conference Chair

Professor Huseyin Seker, Birmingham City University, UK

Conference Committees

Conference Chair

Huseyin Seker, Birmingham City University, UK

Conference Co-chairs

Jianhua Zhang, Oslo Metropolitan University, Norway

Alaa Ali Hameed, Istinye university, Turkey

Program Chairs

Xin-She Yang, Middlesex University, UK

Michael M. Bronstein, Israel Institute of Technology, Israel

Special Session Chairs

Mak Sharma, Birmingham City University, UK

Ferdi Sarac, Suleyman Demirel University, Turkey

Publicity Chair

Serkan Ayvaz, Bahcesehir University, Turkey

Local Chairs

Ahmet Orun, De Montfort University, UK

Kubra Seker, University of Nottingham, UK

International Technical Committee

Abel Angel Sullon Macalupu, Universidad Peruana Unión, Peru

Adam Cholewa, Silesian University of Technology, Poland

Ayman Aljarbouh, University of Central Asia, Kyrgyzstan

Benhur Bakhtiari Bastaki, Staffordshire University, UK

Bouabid El Ouahidi, University Mohammed V, Morocco

Elena-Niculina Dragoi, "Gh. Asachi" Technical University, Romania

Feng Jia, Chang'an University, China

Florin Leon, "Gh. Asachi" Technical University, Romania

Gniewko Niedbała, Poznan University of Life Sciences, Poland
Hany Alashwal, United Arab Emirates University, United Arab Emirates
Heru Susanto, Indonesian Institute of Sciences, Indonesia
Ibrahim Alreshidi, Cranfield University, UK
Irene Moulitsas, Cranfield University, UK
Irina Ioniță, Petroleum-Gas University of Ploiesti, Romania
Jonah Lissner, Athens Institute for Education & Research
Kaan UYAR, Near East University, Turkey
Karim Baina, Mohammed V University in Rabat, Morocco
Lu Leng, Nanchang Hangkong University, China
Mehdi Vafakhah, Tarbiat Modarres University, Iran
Mohammad Tariq Yaseen, University of Mosul, Iraq
Mohd Khalid Awang, Universiti Sultan Zainal Abidin, Malaysia
Mohd Saberi Mohamad, United Arab Emirates University, United Arab Emirates
Muhammad Akmal Remli, Universiti Malaysia Kelantan, Malaysia
Muhammad Fayaz, University of Central Asia, Kyrgyzstan
Nacer Eddine Zarour, University of Constantine 2 - Abdelhamid Mehri, Algeria
Naveen Aggarwal, Panjab University, India
Noureddine Elouazizi, University of British Columbia, Canada
Rozniza Ali, Universiti Malaysia Terengganu, Malaysia
Ryszard Tadeusiewicz, AGH University of Science and Technology, Poland
Sarah Ibri, UHBC, Algeria
Toshihiro Matsui, Nagoya Institute of Technology, Japan
Vaidyanathan Ganesa Sankara, Amazon Web Services, US