

ISSN: 2150-8402

Volume 17, Number 3, August 2025



Journal of Intelligent Learning Systems and Applications



ISSN: 2150-8402



<https://www.scirp.org/journal/jilsa>

Journal Editorial Board

ISSN Print: 2150-8402 ISSN Online: 2150-8410

<https://www.scirp.org/journal/jilsa>

Editor-in-Chief

Prof. Wei-Chiang Hong

Harbin Engineering University, China

Editorial Advisory Board

Prof. Rob Law

Hong Kong Polytechnic University, China

Dr. Steve S. H. Ling

University of Technology Sydney, Australia

Prof. Yi Pan

Georgia State University, USA

Prof. Xin Xu

National University of Defense Technology, China

Editorial Board

Prof. Ala Al-Fuqaha

Western Michigan University, USA

Prof. George Angelos Anastassiou

The University of Memphis, USA

Prof. Tao Ban

National Institute of Information and Communications Technology, Japan

Prof. Mokhtar Beldjehem

University of Ottawa, Canada

Dr. Rifai Chai

University of Technology, Australia

Dr. Kit Yan Chan

Curtin University, Australia

Dr. Longbiao Chen

Xiamen University, China

Dr. Ying Guo

Commonwealth Scientific and Industrial Research Organization, Australia

Prof. Kao-Shing Hwang

National Sun Yat-sen University, Chinese Taipei

Prof. Fakhreddine Karray

University of Waterloo, Canada

Dr. Michail G. Lagoudakis

Technical University of Crete, Greece

Dr. Hak-Keung Lam

King's College London, UK

Prof. Shutao Li

Hunan University, China

Prof. Yiguang Liu

Sichuan University, China

Prof. Kin Huat Low

Nanyang Technological University, Singapore

Dr. Vincenzo Pacelli

University of Foggia, Italy

Prof. George Panayiotakis

University of Patras, Greece

Dr. Phyo Phyo San

Nanyang Technological University, Singapore

Prof. Steven Weidong Su

University of Technology Sydney, Australia

Prof. Theodore B. Trafalis

The University of Oklahoma, USA

Dr. Jue Wang

Chinese Academy of Sciences, China

Prof. Xuesong Wang

China University of Mining and Technology, China

Prof. Changjin Xu

Guizhou University of Finance and Economics, China

Prof. Simon X. Yang

University of Guelph, Canada

Prof. Shi Ying

Wuhan University, China

Prof. G. Peter Zhang

Georgia State University, USA

Prof. Yudong Zhang

University of Leicester, UK

Dr. Yi Zhao

Harbin Institute of Technology Shenzhen Graduate School, China

Prof. Wei Zhong

University of South Carolina Upstate, USA

Prof. Dingxuan Zhou

City University of Hong Kong, China

Prof. Antanas Zilinskas

Institute of Mathematics and Informatics, Lithuania

Table of Contents

Volume 17 Number 3

August 2025

Optimizing Prescription Practices Using AI-Powered Drug Substitution Models to Reduce Unnecessary Healthcare Expenditures in Outpatient Settings

A. Al Nahian, S. Samia, M. T. M. Hussan, F. Mahmud, M. N. M. Sunny, S. W. Ahmed, N. Jahan..... 113

Optimization of Data Structure in Classification and Clustering Problems

V. N. Shats..... 126

Optimizing Medical Supply Chain Resilience for Future Pandemics: A Data-Driven Framework Integrating Public Health Risk, Logistics Efficiency, and Predictive Analytics

M. H. Akter, S. Palit, K. M. S. Hossain, M. E. Hoque, T. Shabnam 133

Building Privacy and Preserving AI Models for Secure Student Data Management in Educational Technology Platforms

E. O. Imohimi 149

The Role of Augmented Reality in Improving Attention and Retention in Stem Education

E. O. Imohimi 172

Recognizing Properties of Decision Rule Systems Using Deterministic and Nondeterministic Decision Trees

K. Durdymyradov, M. Moshkov..... 193

Journal of Intelligent Learning Systems and Applications (JILSA)

Journal Information

SUBSCRIPTIONS

The *Journal of Intelligent Learning Systems and Applications* (Online at Scientific Research Publishing, <https://www.scirp.org/>) is published quarterly by Scientific Research Publishing, Inc., USA.

Subscription rates:

Print: \$89 per copy.

To subscribe, please contact Journals Subscriptions Department, E-mail: sub@scirp.org

SERVICES

Advertisements

Advertisement Sales Department, E-mail: service@scirp.org

Reprints (minimum quantity 100 copies)

Reprints Co-ordinator, Scientific Research Publishing, Inc., USA.

E-mail: sub@scirp.org

COPYRIGHT

Copyright and reuse rights for the front matter of the journal:

Copyright © 2025 by Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY).

<http://creativecommons.org/licenses/by/4.0/>

Copyright for individual papers of the journal:

Copyright © 2025 by author(s) and Scientific Research Publishing Inc.

Reuse rights for individual papers:

Note: At SCIRP authors can choose between CC BY and CC BY-NC. Please consult each paper for its reuse rights.

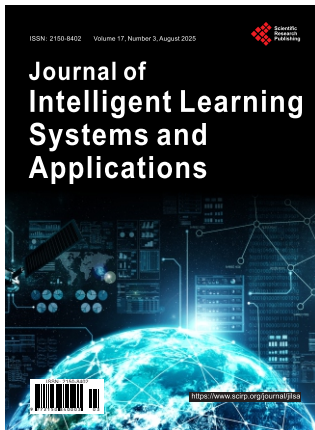
Disclaimer of liability

Statements and opinions expressed in the articles and communications are those of the individual contributors and not the statements and opinion of Scientific Research Publishing, Inc. We assume no responsibility or liability for any damage or injury to persons or property arising out of the use of any materials, instructions, methods or ideas contained herein. We expressly disclaim any implied warranties of merchantability or fitness for a particular purpose. If expert assistance is required, the services of a competent professional person should be sought.

PRODUCTION INFORMATION

For manuscripts that have been accepted for publication, please contact:

E-mail: jilsa@scirp.org



Journal of Intelligent Learning Systems and Applications

ISSN Print: 2150-8402 ISSN Online: 2150-8410

<https://www.scirp.org/journal/jilsa>

The *Journal of Intelligent Learning Systems and Applications (JILSA)* is a peer reviewed international journal with a key objective to provide the academic and industrial community a medium for presenting original cutting-edge research related to intelligent learning systems and their applications. JILSA invites authors to submit their original and unpublished work that communicates current research on intelligent learning systems both in the theoretical and methodological aspects, as well as various applications in real-world applications.

Papers are invited on the topics including, but not limited to:

- Approximate Dynamic Programming
- Autonomic Computing
- Autonomous Learning Systems
- Bio-Inspired Learning Method
- Clustering
- Cyber-Physical Systems
- Evolutionary Computation
- Filter Bank
- Fuzzy and Rough Set
- General Theory on Intelligent Learning Systems
- Intelligent Applications
- Learning Control Systems
- Multi-Agent Learning
- Multiple Models Strategy
- Neural Networks
- Pattern Recognition Based on Learning Techniques
- Predictive Control
- Recommendation System
- Reinforcement Learning
- Robotics
- Smart Grid Techniques and Applications
- Social Network Analysis
- Statistical Learning Theory
- Supervised Learning
- Time-Frequency Representation
- Unsupervised Learning
- User Behavior Modelling
- Wavelet Theory

Editor-in-Chief

Prof. Wei-Chiang Hong

Harbin Engineering University, China

Notes for Intending Authors

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere. Paper submission will be handled electronically through the website. All papers are refereed through a peer review process. For more details about the submissions, please access the website.

Website and E-Mail

<https://www.scirp.org/journal/jilsa>

E-mail: jilsa@scirp.org

What is SCIRP?

Scientific Research Publishing (SCIRP) is one of the largest Open Access journal publishers. It is currently publishing more than 200 open access, online, peer-reviewed journals covering a wide range of academic disciplines. SCIRP serves the worldwide academic communities and contributes to the progress and application of science with its publication.

What is Open Access?

All original research papers published by SCIRP are made freely and permanently accessible online immediately upon publication. To be able to provide open access journals, SCIRP defrays operation costs from authors and subscription charges only for its printed version. Open access publishing allows an immediate, worldwide, barrier-free, open access to the full text of research papers, which is in the best interests of the scientific community.

- High visibility for maximum global exposure with open access publishing model
- Rigorous peer review of research papers
- Prompt faster publication with less cost
- Guaranteed targeted, multidisciplinary audience



Website: <https://www.scirp.org>
Subscription: sub@scirp.org
Advertisement: service@scirp.org