Author Information and Affiliations

Authors

1. Mohamed Amine Bellatreche (Corresponding Author)

Affiliation:
Department of Computer Science
University of Science and Technology of Oran Mohamed Boudiaf (USTO-MB)
BP 1505, El M'Naouer, Oran 31000, Algeria

Contact Information:
Email: amine.bellatreche@univ-usto.dz
Alternative Email: m.bellatreche@etu.univ-usto.dz
ORCID: [To be added]
Phone: [To be added]

Biographical Sketch:
Mohamed Amine Bellatreche is a Computer Science researcher at the University of Science and Technology of Oran Mohamed Boudiaf (USTO-MB), Algeria. His research focuses on meta-heuristic optimization algorithms, machine learning, and their applications to medical diagnostics and computer vision. He specializes in nature-inspired optimization, feature selection, and cross-domain validation of intelligent systems. His work emphasizes rigorous statistical validation and deployment-ready solutions for real-world problems.

Research Interests:

- Metaheuristic optimization algorithms (nature-inspired, swarm intelligence)

- Feature selection and dimensionality reduction

- Hyperparameter optimization and AutoML

- Medical machine learning and diagnostic systems

- Computer vision and deep learning optimization

- Cross-domain validation and transfer learning

- Statistical validation and reproducible research

Contributions to This Work:

- Conceptualization and research design

- Complete Python implementation of DIO algorithm from MATLAB specification

- Development of nested optimization framework

- Implementation of 30-run statistical validation protocol

- Formal analysis: Wilcoxon signed-rank tests, confidence intervals

- Breast cancer classification experiments (single-split, CV-based, XGBoost)

- CIFAR-10 computer vision extension experiments

- Discovery and characterization of algorithm-dependent optimization overfitting

- Writing—original draft preparation

- Creation of all visualizations (24 figures, 8 tables)

- Code documentation and repository management

Education:

- Master's Student in Data Science, USTO-MB, Algeria (Expected: [Year])

- Bachelor's Degree in Computer Science, USTO-MB, Algeria ([Year])

Publications:

jor publication"

2. Ghizlane Cherif (Co-Author)

Affiliation:
Data Science Speciality
University of Science and Technology of Oran Mohamed Boudiaf (USTO-MB)
BP 1505, El M'Naouer, Oran 31000, Algeria
Contact Information:
Email: ghizlane.cherif@univ-usto.dz
Alternative Email: [To be added]
ORCID: [To be added]

Biographical Sketch:
Ghizlane Cherif is a Data Science researcher at the University of Science and Technology of Oran Mohamed Boudiaf (USTO-MB), Algeria. Her expertise spans machine learning methodology, optimization algorithm validation, and practical deployment of intelligent systems. She specializes in fitness function design, cross-validation strategies, and resource management for computationally intensive optimization tasks. Her work emphasizes bridging the gap between theoretical algorithm development and real-world clinical applications.

Research Interests:

- Machine learning methodology and best practices

- Cross-validation and model validation strategies

- Fitness function design for multi-objective optimization

- Medical AI and clinical decision support systems

- Transfer learning and deep feature optimization

- Computational resource optimization

- Reproducible research and statistical rigor

Contributions to This Work:

- Methodology: Fitness function design (Equation 1: accuracy + feature penalty)

- Methodology: CV-based optimization strategy design (Equation 8: k-fold fitness)

- Validation: Cross-domain experimental validation framework

- Resources: Dataset curation and preprocessing

- Resources: ResNet50 feature extraction using Google Colab GPU

- Investigation: CIFAR-10 model selection experiments (XGBoost vs. RF vs. others)

- Analysis: Comparative analysis of medical vs. vision domain results

- Writing—Review & Editing: Critical revision for intellectual content

- Supervision: Research methodology oversight and quality assurance

Education:

Degree in Data Science, USTO-MB, Algeria ([Year])

ees if applicable

Publications:

jor publication"

Institutional Affiliation Details

University of Science and Technology of Oran Mohamed Boudiaf (USTO-MB)

Official Name: Université des Sciences et de la Technologie d'Oran Mohamed Boudiaf
Location:
BP 1505, El M'Naouer
Oran 31000
Algeria
Department: Computer Science
Website: https://www.univ-usto.dz
About the Institution:
USTO-MB is a leading Algerian university specializing in science, technology, and engineering. The Department of Computer Science conducts research in artificial intelligence, machine learning, data science, and computational optimization. The university emphasizes practical applications of theoretical research to address real-world challenges in healthcare, industry, and society.

Funding and Acknowledgments

Ethics and Competing Interests

Ethics Statement:
This research used publicly available, de-identified datasets that do not require ethics approval:

- **Breast Cancer Wisconsin (Diagnostic):** Public dataset from UCI Machine Learning Repository, originally collected with patient consent at University of Wisconsin Hospitals (Street et al., 1993).

- **CIFAR-10:** Public image dataset with no human subjects (Krizhevsky & Hinton, 2009).

    No new human subjects data were collected for this study.

Competing Interests:
The authors declare no competing interests, financial or otherwise, related to this research.

Data and Code Availability

Datasets:

- **Breast Cancer Wisconsin (Diagnostic):** Available at UCI Machine Learning Repository
  `https://archive.ics.uci.edu/ml/datasets/Breast+Cancer+Wisconsin+(Diagnostic)`

- **CIFAR-10:** Available at University of Toronto
  `https://www.cs.toronto.edu/~kriz/cifar.html`

Code Repository:

Python implementation of DIO algorithm, nested optimization framework, and all experimental code will be made publicly available on GitHub upon manuscript acceptance:

`https://github.com/amine-dubs/dio-optimization`

Repository will include:

- Complete DIO Python implementation

- Nested optimization framework code

- Breast cancer classification experiments (30-run protocol)

- CIFAR-10 computer vision experiments

- Statistical analysis scripts (Wilcoxon tests, visualizations)

- Requirements.txt for reproducibility

- Comprehensive README with usage instructions

- Jupyter notebooks demonstrating key experiments

License: MIT License (to be specified upon repository creation)

Corresponding Author Responsibilities

Mohamed Amine Bellatreche, as the corresponding author, will:

- Handle all communication with the journal editor and reviewers

- Coordinate responses to peer review comments with co-author

- Ensure accuracy of all submitted materials

- Manage revisions and resubmissions

- Coordinate publication logistics (proofs, copyright, open access fees if applicable)

- Serve as primary point of contact for post-publication inquiries

- Maintain the public code repository

Contact for Correspondence:
Mohamed Amine Bellatreche
Email: amine.bellatreche@univ-usto.dz
Department of Computer Science
University of Science and Technology of Oran Mohamed Boudiaf (USTO-MB)
Oran, Algeria