

جامعة عجلون الوطنية
Ajloun National University

DR. ISLAM S. FATHI

Irbid, Jordan
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PROFILE

Assistant Professor at the Faculty of Information Technology, Ajloun National University, with a Ph.D. in Computer Science from Suez Canal University. His research covers signal processing, artificial intelligence, machine learning, metaheuristic optimization, bioinformatics and the Internet of Things. Author of more than 40 peer-reviewed publications in journals such as Scientific Reports, IEEE Access, Fractal and Fractional and PLOS One.

Personal Data

Date of birth: 03/08/1991
Nationality: Egyptian
Marital status: Married

EDUCATION

- **Ph.D. –** Computer Science, Faculty of Science, Suez Canal University, Egypt (2023).
- **Master –** Computer Science, Faculty of Science, Zagazig University, Egypt (2019).
- **Bachelor –** Computer Science and Mathematics, Faculty of Science, Zagazig University, Egypt (2013).

WORK EXPERIENCE

1. **Assistant Professor**: Faculty of Information Technology, Ajloun National University, Jordan, October 2024 – Present.
2. **Assistant Professor**: Faculty of Artificial Intelligence, Egyptian Russian University, Egypt.
3. **Assistant Professor**: Al-Alson Higher Institute for Computer Science, Egypt, March 2023 – September 2024.
4. **Lecturer**: Al-Alson Higher Institute for Computer Science, Egypt, March 2019 – May 2023.
5. **Demonstrator**: Al-Alson Higher Institute for Computer Science, Egypt, February 2017 – March 2019.
6. **Demonstrator**: Science Valley Academy, Egypt, January 2014 – February 2017.



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SKILLS

- Signal & Image Processing
- Machine Learning & Deep Learning
- Metaheuristic Optimization & Feature Selection
- Fractional Orthogonal Moments
- IoT & Fog Computing
- Project Management
- Complex Problem Solving
- Teamwork & Communication

Languages

Arabic (native), English.

TEACHING EXPERIENCE

1. Web Design
2. Computer Skills
3. Database
4. Database Management Systems
5. Computer Vision
6. Digital Logic Design
7. Pattern Recognition
8. Data Structures
9. Data Mining
10. Introduction to Computer Programming
11. Operating Systems
12. Advanced Techniques of High-Dimensional Data
13. Applied Data Science
14. Fundamentals of Data Science
15. Signal Processing
16. Image Processing

PROFESSIONAL ACTIVITIES

- **Research output:** more than 40 peer-reviewed publications in Scientific Reports, IEEE Access, Fractal and Fractional, PLOS One, Mathematics, Neural Computing and Applications, Multimedia Tools and Applications and EURASIP Journal on Advances in Signal Processing.
- **Research areas:** bio-signal compression and reconstruction, fractional orthogonal moments, metaheuristic optimization and feature selection, fog and IoT computing, and deep learning for medical and visual recognition.
- **Peer review:** reviewer for IEEE Access, Signal, Image and Video Processing, Computer Systems Science and Engineering, PeerJ Computer Science and Sinai International Scientific Journal.
- **Committees:** member of the Quality Committee and the E-Learning Committee (Al-Alson Higher Institute), and of the Monitoring and Examinations Committee and the Youth and Sports Welfare Authority (Science Valley Academy).
- **Conferences:** co-ordinator of the 4th International Conference on Environmental Sciences, Faculty of Science, Zagazig University (2019); participant in the 10th Young Researchers Conference, Suez Canal University (2023).

RESEARCH PROFILES

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Journal Publications

1. Tawfik, M., Al-sellami, B., Heshmat, M., **Fathi, I. S.**, & Shaban, W. M. (2026). Hybrid rank fusion of a group-token transformer with gradient boosting improves detection of evasive and novel-family malware. *Scientific Reports*. DOI: 10.1038/s41598-026-75034-w.

2. Tawfik, M., Almekhlafi, M. A. S. H., Shakah, G., Al-walidi, N. H., & **Fathi, I. S.** (2026). HIFN-Mamba: Hybrid information flow networks with selective state-space sequence modeling for intrusion detection in the Internet of Medical Things. *Scientific Reports*. DOI: 10.1038/s41598-026-73701-6.

3. Abdelhaliem, A. H., Tawfik, M., Al Tamimi, N., & **Fathi, I. S.** (2026). Asymmetric class-conditional routing in a federated quantum mixture-of-experts improves imbalanced intrusion detection in edge industrial IoT networks. *Scientific Reports*. DOI: 10.1038/s41598-026-71421-5.

4. Abdelhaliem, A. H., Alomari, T., Tawfik, M., & **Fathi, I. S.** (2026). Causal-aware training with counterfactual supervision and structural causal models improves the robustness of LLM-based vulnerability detection. *Scientific Reports*. DOI: 10.1038/s41598-026-69332-6.

5. Abdelhaliem, A. H., **Fathi, I. S.**, Aljunaeidi, B. Z., Tawfik, M., Alsmadi, I., & Heshmat, M. (2026). A novel TCP-PD framework: Discrete orthogonal polynomial-based compressed sensing for EOG signal compression in IoT-based healthcare. *EURASIP Journal on Advances in Signal Processing*. 2026, 80. DOI: 10.1186/s13634-026-01363-7.

6. **Fathi, I. S.**, El-Saeed, A. R., Tawfik, M., & Aly, M. (2026). Explainable multi-objective evacuation optimization: A fractional-order EvoMapX approach with Grünwald-Letnikov memory and fractal landscape analysis. *Fractal and Fractional*. 10(5), 314. DOI: 10.3390/fractalfract10050314.

7. **Fathi, I. S.**, El-Saeed, A. R., Tawfik, M., & Hassan, G. (2026). Fractional Tchebichef-ResNet-SE: A hybrid deep learning framework integrating fractional Tchebichef moments with attention mechanisms for enhanced IoT intrusion detection. *Fractal and Fractional*. 10(3), 172. DOI: 10.3390/fractalfract10030172.

8. Abu-Ein, A. A., El-Saeed, A. R., Al-Hazaimeh, O. M., Ardah, H., Hassan, G., Tawfik, M., & **Fathi, I. S.** (2026). Symmetry-driven multi-objective dream optimization for intelligent healthcare resource management and emergency response. *Symmetry*. 18(3), 530. DOI: 10.3390/sym18030530.

9. Tawfik, M., Heshmat, M., **Fathi, I. S.**, Shaban, A. S., Shakah, G., & Shaban, W. M. (2026). Federated learning-based cervical cancer classification using a novel hybrid KAN-ViT-autoencoder architecture. *Neural Computing and Applications*. DOI: 10.1007/s00521-026-12311-9.

10. Al-Sharo, Y. M., Tawfik, M., Almadani, A. M., Abdelhaliem, A. H., **Fathi, I. S.**, & Hassan, G. (2026). FedMamba-IoMT: Federated state space models with differential privacy and Byzantine resilience for privacy-preserving intrusion detection in Internet of Medical Things. *PLOS One*. DOI: 10.1371/journal.pone.0355601.

11. Tawfik, M., Tarazi, H., Dalalah, A., Aljunaeidi, B. Z., Shaban, W. M., & **Fathi, I. S.** (2026). Few-shot Android malware classification with quantum-enhanced prototypical learning and drift detection. *Scientific Reports*. DOI: 10.1038/s41598-026-45738-0.

12. Abu-Ein, A. A., Al-Hazaimeh, O. M., Tawfik, M., & **Fathi, I. S.** (2026). Dynamic fog node placement optimization using adaptive dynamic pufferfish optimization for real-time IoT networks. *Scientific Reports*. DOI: 10.1038/s41598-026-41740-8.

13. Shaban, A. S., Tawfik, M., **Fathi, I. S.**, & Myla, A. (2026). MultiScaleKANNet: A hybrid CNN-KAN-transformer architecture for radiographic bone-loss risk stratification from knee X-rays. *Scientific Reports*. DOI: 10.1038/s41598-026-50126-9.



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Journal Publications (cont.)

14. **Fathi, I. S.** (2026). Green D-OXA: Energy-efficient fog node placement with renewable energy integration for sustainable IoT networks. *International Journal of Computer Network and Information Security*. DOI: 10.5815/ijcnis.2026.03.01.

15. Alsmadi, I., **Fathi, I. S.**, Dalalah, A., Shakah, G., & Al-Sharo, Y. M. (2026). FK-FGO: A fractional Krawtchouk–fungal growth hybrid for optimal fog node deployment in IoT networks. *Statistics, Optimization & Information Computing*. DOI: 10.19139/soic-2310-5070-3890.

16. Metawea, A. A., Hamadneh, B. N., Ahmed, A. M., & **Fathi, I. S.** (2026). Adaptive multi-objective OX optimizer of irrigation and fertilization scheduling under weather uncertainty in sustainable agriculture. *Statistics, Optimization & Information Computing*. DOI: 10.19139/soic-2310-5070-3313.

17. Alfawaz, A. M. F., Zyadeh, M. T. A., & **Fathi, I. S.** (2026). Advancing agricultural yield forecasting through geomagnetic navigation algorithm-optimized machine learning for accurate multi-crop agricultural yield prediction. *Statistics, Optimization & Information Computing*. DOI: 10.19139/soic-2310-5070-3930.

18. Aljaafreh, O., Abd Al-Slaibi, O. M., Metawea, A. A., & **Fathi, I. S.** (2026). Joint irrigation and fertilization scheduling in multi-crop agricultural systems using the gliding snake optimizer. *Statistics, Optimization & Information Computing*. DOI: 10.19139/soic-2310-5070-3960.

19. Obeidat, R. A., Aljunaeidi, B. Z., **Fathi, I. S.**, & Tawfik, M. (2026). EKT-XAI: Efficient Kolmogorov-Arnold network transformer for lightweight smishing detection with explainable AI. *Statistics, Optimization & Information Computing*. 15(6), 5111–5134. DOI: 10.19139/soic-2310-5070-2923.

20. Abdelhaliem, A. H., Aljunaeidi, B. Z., **Fathi, I. S.**, Tawfik, M., & Alsmadi, I. (2026). Integrating fractional generalized Laguerre moment with deep residual learning for real-time attack classification. *International Journal of Wireless and Microwave Technologies*. DOI: 10.5815/ijwmt.2026.03.16.

21. Al-Hazaimeh, O. M., Abu-Ein, A. A., **Fathi, I. S.**, & Tawfik, M. (2026). Securing IoT systems using artificial intelligence-driven approaches. *Statistics, Optimization & Information Computing*. DOI: 10.19139/soic-2310-5070-3342.

22. **Fathi, I. S.**, El-Saeed, A. R., Ardah, H., Tawfik, M., & Hassan, G. (2025). Integrating fractional calculus memory effects and Laguerre polynomial in secretary bird optimization for gene expression feature selection. *Mathematics*. 13(21), 3511. DOI: 10.3390/math13213511.

23. Tawfik, M., Abu-Ein, A. A., Abdelhaliem, A. H., Al-Sharo, Y. M., & **Fathi, I. S.** (2025). Explainable few-shot learning with modern BERT for detecting emerging phishing attacks using XF-PhishBERT. *Scientific Reports*. DOI: 10.1038/s41598-025-27500-0.

24. Tawfik, M., Abu-Ein, A. A., Noaman, H. M., Abdelhaliem, A. H., & **Fathi, I. S.** (2025). FedMedSecure: Federated few-shot learning with cross-attention mechanisms and explainable AI for collaborative healthcare cybersecurity. *Scientific Reports*. DOI: 10.1038/s41598-025-25107-z.

25. Hassan, G., Hosny, K. M., & **Fathi, I. S.** (2025). Optimized bio-signal reconstruction and watermarking via enhanced fractional orthogonal moments. *Scientific Reports*. DOI: 10.1038/s41598-025-16086-2.

26. Aly, M., & **Fathi, I. S.** (2025). Recognizing American Sign Language gestures efficiently and accurately using a hybrid transformer model. *Scientific Reports*. DOI: 10.1038/s41598-025-06344-8.



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Journal Publications (cont.)

27. Tawfik, M., Haider, N. S., **Fathi, I. S.**, Nimbhore, S. S., Alsmadi, I. M., & Sawah, M. S. (2025). E-RespiNet: An LLM-ELECTRA driven triple-stream CNN with feature fusion for asthma classification. *PLOS One*. DOI: 10.1371/journal.pone.0334528.

28. **Fathi, I. S.**, El-Saeed, A. R., Hassan, G., & Aly, M. (2025). Fractional Chebyshev transformation for improved binarization in the energy valley optimizer for feature selection. *Fractal and Fractional*. 9(8), 521. DOI: 10.3390/fractalfract9080521.

29. **Fathi, I. S.**, Ardah, H., Hassan, G., & Aly, M. (2025). Protecting IoT networks through AI-based solutions and fractional Tchebichef moments. *Fractal and Fractional*. 9(7), 427. DOI: 10.3390/fractalfract9070427.

30. **Fathi, I. S.**, Aljunaeidi, B. Z., & Tawfik, M. (2025). A high-dimensional feature selection based on modified energy valley optimizer and ReliefF algorithm. *Statistics, Optimization & Information Computing*. DOI: 10.19139/soic-2310-5070-2862.

31. Abdelhaliem, A. H., **Fathi, I. S.**, & Tawfik, M. (2025). Fast and efficient feature selection in AI application based on enhanced binary secretary bird optimization algorithm. *Statistics, Optimization & Information Computing*. DOI: 10.19139/soic-2310-5070-2597.

32. Tawfik, M., Abdelhaliem, A. H., & **Fathi, I. S.** (2025). Quantum-resistant privacy-preserving IoT authentication via zero-knowledge proofs and blockchain integration. *Statistics, Optimization & Information Computing*. DOI: 10.19139/soic-2310-5070-2399.

33. Tawfik, M., Abdelhaliem, A. H., & **Fathi, I. S.** (2025). Transforming IoT security through large language models: A comprehensive systematic review and future directions. *Statistics, Optimization & Information Computing*. DOI: 10.19139/soic-2310-5070-2424.

34. **Fathi, I. S.**, & Tawfik, M. (2025). Enhancing IoT systems with bio-inspired intelligence in fog computing environments. *Statistics, Optimization & Information Computing*. DOI: 10.19139/soic-2310-5070-2305.

35. Shikoun, N. H., Al-Eraqi, A. S., & **Fathi, I. S.** (2024). BinCOA: An efficient binary crayfish optimization algorithm for feature selection. *IEEE Access*. 12, 28621–28635. DOI: 10.1109/ACCESS.2024.3366495.

36. Aly, M., Ghallab, A., & **Fathi, I. S.** (2024). Tumor ViT-GRU-XAI: Advanced brain tumor diagnosis framework: Vision transformer and GRU integration for improved MRI analysis: A case study of Egypt. *IEEE Access*. DOI: 10.1109/ACCESS.2024.3513235.

37. Shikoun, N. H., & **Fathi, I. S.** (2024). Improved energy valley optimizer with Levy flight for optimization problems. *IgMin Research*. 2(4), 245–254. DOI: 10.61927/igmin172.

38. Aldakheel, E. A., Khafaga, D. S., **Fathi, I. S.**, Hosny, K. M., & Hassan, G. (2023). Efficient analysis of large-size bio-signals based on orthogonal generalized Laguerre moments of fractional orders and Schwarz–Rutishauser algorithm. *Fractal and Fractional*. 7(11), 826. DOI: 10.3390/fractalfract7110826.



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Journal Publications (cont.)

39. Hassan, G., Hosny, K. M., Fouda, M. M., & **Fathi, I. S.** (2023). Efficient compression of fetal phonocardiography bio-medical signals for Internet of Healthcare Things. *IEEE Access*. 11, 122991–123003. DOI: 10.1109/ACCESS.2023.3329889.

40. Aly, M., Ghallab, A., & **Fathi, I. S.** (2023). Enhancing facial expression recognition system in online learning context using efficient deep learning model. *IEEE Access*. 11, 121419–121433. DOI: 10.1109/ACCESS.2023.3325407.

41. **Fathi, I. S.**, Ahmed, M. A., & Makhlouf, M. A. (2023). An efficient compression technique for foetal phonocardiogram signals in remote healthcare monitoring systems. *Multimedia Tools and Applications*. DOI: 10.1007/s11042-022-14259-z.

42. **Fathi, I. S.**, Makhlouf, M. A. A., Osman, E., & Ahmed, M. A. (2022). An energy-efficient compression algorithm of ECG signals in remote healthcare monitoring systems. *IEEE Access*. 10, 39129–39144. DOI: 10.1109/ACCESS.2022.3166476.

43. **Fathi, I. S.**, Ahmed, M. A., & Makhlouf, M. A. (2022). An efficient computation of discrete orthogonal moments for bio-signals reconstruction. *EURASIP Journal on Advances in Signal Processing*. 2022, 104. DOI: 10.1186/s13634-022-00938-4.

44. **Fathi, I. S.**, Ahmed, M. A., Makhlouf, M. A., & Osman, E. A. (2021). Compression techniques of biomedical signals in remote healthcare monitoring systems: A comparative study. *International Journal of Hybrid Information Technologies*. 1(1), 33–50.

45. **Fathi, I. S.**, Abo-Bakr, R. M., & Farouk, R. (2018). Some penalty-based constraint handling techniques with Ant Lion Optimizer for solving constrained optimization problems. *International Journal of Computer Applications*. 181(30), 24–36.

Conference Papers

46. **Fathi, I. S.**, Abo-Bakr, R. M., & Farouk, R. (2019). Solving constraint optimization problems based on improved Ant Lion Optimizer. *4th International Conference on Environmental Sciences, Faculty of Science, Zagazig University, Egypt*.