Ali Shakiba

Contact Information

Assistant Professor
Department of Computer Science
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Research Profiles

Google Scholar Profile (Total Citations: 335, h-index: 11, i10-index: 14)

SCOPUS: 56971235200 (Total Citations: 209, h-index: 8)

WoS Researcher ID: J-6420-2016 (Total Citations: 187, h-index: 8, Verified Reviews: 39)

ORCID: 0000-0002-2253-1166

Education

Sept. 2012 - Feb. 2016

Ph.D. in Computer Science, Department of Computer Science, Yazd University, Yazd, Iran

- Title: S-approximation and its applications to information processing
- Committee Members: Prof. M. R. Hooshmandasl, Prof. B. Davvaz & Prof. S. A. Shahzadeh Fazely

Sept. 2010 - Sept. 2012

M.Sc. in Computer Science, Department of Computer Science, Yazd University, Yazd, Iran

- Title: An Overview of Generalized Quantum Turing Machine and Computational Complexity
- Committee Members: Prof. M. R. Hooshmandasl & Prof. S. A. Shahzadeh Fazely
- Graduated with 1^{st} rank

Sept. 2006 - Sept. 2010

B.Sc. in Computer Science, Department of Computer Science, Shahid Bahonar University of Kerman, Kerman, Iran

- Title: Classical Information Retrieval Models
- Supervisor: Prof. H. Sanatnama

Research Interests

- Parameterized Complexity and Graph Algorithms (10 publications + 1 paper under review)
- Machine Learning, Interpretable Machine Learning, Data Analysis and Information Processing (14 publications + 2 papers under review + 3 projects)
- Cryptography and Security (12 publications)

Selected Honors

- Distinguished Researcher Award of Vali-e-Asr University at the Department of Computer Science, 2022, 2019
- Distinguished Researcher Award of Vali-e-Asr University in the Faculty of Mathematical Sciences, 2020

- Best Instructor of the Year Award, voted as best professor by the student body of the Department of Computer Science at Vali-e-Asr University, 2019

Selected Publications

1. Shakiba, A. Correlation Clustering Algorithm for Dynamic Complete Signed Graphs: An Index-based Approach. arXiv-preprint (2023).
2. Shakiba, A. Online correlation clustering for dynamic complete signed graphs. arXiv-preprint (2022).
3. Alambardar Meybodi, M., Goharshady, A.K., Hooshmandasl, M.R. and Shakiba, A. Optimal Mining: Maximizing Bitcoin Miners' Revenues from Transaction Fees. In *The 5th IEEE International Conference on Blockchain (Blockchain'2022)* (2022).
4. Shakiba, A. A novel randomized chaotic bit-level image encryption algorithm based on a novel 2D-CICM hyper-chaotic mapping with CPA-security. *Multimedia Tools & Applications*, (2022).
5. Shakiba, A. Distributed Decision Making with S-approximation Spaces. *International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems 29*, 2 (2021) 281–311.
6. Hashemipour, M., Hooshmandasl, M., and Shakiba, A. On the complexity of the outer-connected bondage and the outer-connected reinforcement problems. *Australasian Journal of Combinatorics 73*, 3 (2019), 466–477.
7. Rajaati, M., Hooshmandasl, M., Dinneen, M., and Shakiba, A. On fixed-parameter tractability of the mixed domination problem for graphs with bounded tree-width. *Discrete Mathematics & Theoretical Computer Science 20* (2018).
8. Meybodi, M. A., Hooshmandasl, M. R., and Shakiba, A. W[1]-hardness of Outer Connected Dominating set in d-degenerate graphs. In *49th Annual Iranian Mathematics Conference at Iran University of Science and Technology* (2018).
9. Shakiba, A., Hooshmandasl, M. R., and Meybodi, M. A. Cryptanalysis of multiplicative coupled cryptosystems based on the Chebyshev polynomials. *International Journal of Bifurcation and Chaos 26*, 07 (2016), 1650112.
10. Shakiba, A., and Hooshmandasl, M. R. S-approximation spaces: a three-way decision approach. *Fundamenta Informaticae 139*, 3 (2015), 307–328.
11. Shakiba, A. S-approximation spaces. In *Algebraic Methods in General Rough Sets*. Birkhäuser, Cham, 2019, pp. 697–725.

Publications: Parameterized & Graph Algorithms

1. Alambardar Meybodi, M., Goharshady, A.K., Hooshmandasl, M.R. and Shakiba, A. Optimal Mining: Maximizing Bitcoin Miners' Revenues from Transaction Fees. In *The 5th IEEE International Conference on Blockchain (Blockchain'2022)* (2022).
2. Alambardar, M., Hooshmandasl, M.R., Sharifani, P., Shakiba, A. On the k-rainbow domination in graphs with bounded tree-width. *Electronic Journal of Graph Theory and Applications (EJGTA) 9*, 2 (2021) 277–300.
3. Hashemipour, M., Hooshmandasl, M., and Shakiba, A. On the outer-connected domination for graph products. *Journal of Information and Optimization Sciences* (2019).
4. Meybodi, M. A., Hooshmandasl, M., Sharifani, P., and Shakiba, A. Domination cover number of graphs. *Discrete Mathematics Algorithms and Applications 11*, 1 (2019), 1950020.

5. Hashemipour, M., Hooshmandasl, M., and Shakiba, A. On the complexity of the outer-connected bondage and the outer-connected reinforcement problems. *Australasian Journal of Combinatorics 73*, 3 (2019), 466–477.
6. Hashemipour, M., Hooshmandasl, M., and Shakiba, A. On the outer-connected reinforcement and the complexity. In *International Conference on Recent Achievements in Mathematical Science at Yazd University* (2019).
7. Meybodi, M. A., Hooshmandasl, M. R., and Shakiba, A. W[1]-hardness of Outer Connected Dominating set in d-degenerate graphs. In *49th Annual Iranian Mathematics Conference at Iran University of Science and Technology* (2018).
8. Hashemipour, M., Hooshmandasl, M., and Shakiba, A. On the complexity of the outer-connected bondage and the outer-connected reinforcement problems. In *10th Conference on Graph Theory and Algebraic Combinatorics at Yazd University* (2018).
9. Rajaati, M., Hooshmandasl, M., Dinneen, M., and Shakiba, A. On fixed-parameter tractability of the mixed domination problem for graphs with bounded tree-width. *Discrete Mathematics & Theoretical Computer Science 20* (2018).
10. Rajaati, M., Shakiba, A., Hooshmandasl, M., Sharifani, P., and Dinneen, M. J. An efficient algorithm for mixed domination on generalized series-parallel graphs. *Algebraic structures and their applications 5*, 1 (2018), 23–39.

Publications: Chaotic-based Security Algorithms

1. Shakiba, A. A novel randomized chaotic bit-level image encryption algorithm based on a novel 2D-CICM hyper-chaotic mapping with CPA-security. *Multimedia Tools & Applications*, (2022)
2. Shakiba, A. A novel 2D cascade modulation couple hyperchaotic mapping for randomized image encryption. *Multimedia Tools & Applications 80*, (2021) 17983–18006.
3. Chaboki, B., Shakiba A. An image encryption algorithm with a novel chaotic coupled mapped lattice and chaotic image scrambling technique. *Indonesian Journal of Electrical Engineering and Computer Science 21*, 2 (2021) 1103–1112.
4. Shakiba, A. A novel randomized bit-level two-dimensional hyperchaotic image encryption algorithm. *Multimedia Tools & Applications 79*, (2020) 32575–32605.
5. Shakiba, A. Generating dynamical S-boxes using 1D Chebyshev chaotic maps. *Journal of Computing & Security 7*, 1 (2020), 1–7. *Distinguished paper of the Journal on 2020*
6. Shakiba, A. A novel randomized one-dimensional chaotic Chebyshev mapping for chosen plaintext attack secure image encryption with a novel chaotic breadth first traversal. *Multimedia Tools & Applications 78*, (2019) 34773–34799.
7. Shakiba, A. A randomized CPA-secure asymmetric-key chaotic color image encryption scheme based on the Chebyshev mappings and one-time pad. *JKSU-Computer and Information Sciences* (2019).
8. Shakiba, A. Security analysis for chaotic maps-based mutual authentication and key agreement using smart cards for wireless networks. *Journal of Information and Optimization Sciences 40*, 3 (2019), 725–750.
9. Shakiba, A., Hooshmandasl, M. R., and Meybodi, M. A. Cryptanalysis of multiplicative coupled cryptosystems based on the Chebyshev polynomials. *International Journal of Bifurcation and Chaos 26*, 07 (2016), 1650112.

10. Shakiba, A., and Hooshmandasl, M. R. Generalized Quantum Turing Machines and Satisfiability Problem. In *2nd National Conference on Software Engineering at University of Lahijan* (2012).
11. Shakiba, A., Hooshmandasl, M. R., and Meybodi, M. A. Multiplicative Coupled Public Key Schemes. In *9th ISC's International Conference on Information Security and Cryptography at University of Tabriz* (2012).
12. Meybodi, M. A., Hooshmandasl, M. R., and Shakiba, A. A Public Key Cryptographic Scheme by Invertible Mappings. In *9th ISC's International Conference on Information Security and Cryptography at University of Tabriz* (2012).

Publications: Machine Learning Algorithm

1. Shakiba, A. Correlation Clustering Algorithm for Dynamic Complete Signed Graphs: An Index-based Approach. arXiv-preprint (2023).
2. Shakiba, A. Online correlation clustering for dynamic complete signed graphs. arXiv-preprint (2022).
3. Khalili, S. and Shakiba, A. A face detection method via ensemble of four versions of YOLOs. In *The 12th Iranian and the second International Conference on Machine Vision and Image Processing (MVIP'2022)* (2022).
4. Shakiba, A. Distributed Decision Making with S-approximation Spaces. *International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems 29*, 2 (2021) 281–311.
5. Shakiba A., Goharshady A.K., Hooshmandasl M.R., Alambardar Meybodi M. A note on belief structures and S-approximation Spaces. *Iranian Journal of Mathematical Sciences and Informatics 15*, 2 (2020), 117–128.
6. Shakiba, A. The Combination of S-approximation Spaces to Model Group Decision Making. In *International Conference on Recent Achievements in Mathematical Science at Yazd University* (2019).
7. Shakiba, A. Differentially Private Fuzzy C-Means Clustering Algorithms for Fuzzy Datasets. In *6th Iranian Joint Congress on Fuzzy and Intelligent Systems (17th Conference on Fuzzy Systems and 15th Conference on Intelligent Systems) at Shahid Bahonar University of Kerman* (2018).
8. Shakiba, A., Hooshmandasl, M., Davvaz, B., and Shahzadeh Fazeli, S. A. S-approximation spaces: A fuzzy approach. *Iranian Journal of Fuzzy Systems 14*, 2 (2017), 127–154.
9. Shakiba, A., and Hooshmandasl, M. R. Data volume reduction in covering approximation spaces with respect to twenty-two types of covering based rough sets. *International Journal of Approximate Reasoning 75* (2016), 13–38.
10. Shakiba, A., and Hooshmandasl, M. R. Neighborhood system S-approximation spaces and applications. *Knowledge and Information Systems 49*, 2 (2016), 749–794.
11. Shakiba, A., Hooshmandasl, M. R., Davvaz, B., and Fazeli, S. A. S. An intuitionistic fuzzy approach to S-approximation spaces. *Journal of Intelligent & Fuzzy Systems 30*, 6 (2016), 3385–3397.
12. Hooshmandasl, M. R., Meybodi, M. A., Goharshady, A., and Shakiba, A. A combinatorial approach to certain topological spaces based on minimum complement s-approximation spaces. In *8th International Seminar on Geometry and Topology at Amirkabir University of Technology* (2016).
13. Shakiba, A., and Hooshmandasl, M. R. S-approximation spaces: a three-way decision approach. *Fundamenta Informaticae 139*, 3 (2015), 307–328.

14. Hooshmandasl, M. R., Shakiba, A., Goharshady, A., and Karimi, A. S-approximation: a new approach to algebraic approximation. *Journal of Discrete Mathematics 2014* (2014).

Publications: Scientific Computations

1. Heydari, M., Mahmoudi, M., Shakiba, A., and Avazzadeh, Z. Chebyshev cardinal wavelets and their application in solving nonlinear stochastic differential equations with fractional brownian motion. *Communications in Nonlinear Science and Numerical Simulation 64* (2018), 98–121.
2. Heydari, M., Hooshmandasl, M. R., Shakiba, A., and Cattani, C. Legendre wavelets Galerkin method for solving nonlinear stochastic integral equations. *Nonlinear Dynamics 85*, 2 (2016), 1185–1202.
3. Heydari, M., Hooshmandasl, M. R., Shakiba, A., and Cattani, C. An efficient computational method based on the hat functions for solving fractional optimal control problems. *Tbilisi Mathematical Journal 9*, 1 (2016), 143–157.

Books and Book Chapters

1. Shakiba, A., Tari, M., Ashorioun, M. Fundamentals of information security. Payam Noor University Press (PNU), (in Persian), 2022. *nationally selected as the textbook for the CS, CE & IT undergraduate curriculum at PNU*
2. Heydari, M., Shakiba, A., Avazzadeh, Z., and Cattani, C. Second kind Chebyshev wavelets for solving variable-order space-time fractional telegraph equation. In *Special Functions and Analysis of Differential Equations*. Taylor and Francis, 2020.
3. Shakiba, A. S-approximation spaces. In *Algebraic Methods in General Rough Sets*. Birkhäuser, Cham, 2019, pp. 697–725.
4. Farshi, M., Hasheminezhad, M., Meybodi, M.A., Shakiba, A., Babaei, M., Nazari, Kh. Fundamentals of computer programming in C++. Yazd University Press, (in Persian), 2015. (*2nd edition in 2021*)

Manuscripts Under Review

1. Shakiba, A. Correlation Clustering Algorithm for Dynamic Complete Signed Graphs: An Index-based Approach. arXiv-preprint (2023).
2. Shakiba, A. Online correlation clustering for dynamic complete signed graphs. arXiv-preprint (2022).
3. Rajaati, M., Meybodi, M.A., Hooshmandasl, M.R., Davvaz, B. and Shakiba, A. Explicit construction of Mixed Dominating Sets in Petersen Graphs.
4. Karimi, M., Zamani, N., Hooshmandasl, M.R., Shakiba, A. Single-valued Neutrosophic S-approximation Spaces.

Industrial Projects

(2022-2023) Data integration and data analysis on the Geographical Information System at the North Kerman Electricity Distribution Company

- Designed and deployed a batch-processing system to perform ETL from various heterogeneous databases
- Designed and deployed an automatic data quality procedure, outlier detection and frequent pattern detection through ML pipelines
- Analyzed multiple data sources and extracted data dictionaries, and reverse engineered database scheme designs
- Provided a 360° view over the data for the managers, business analysts and quality assurance office with various charts through multiple dashboards
- Provided a feature store by designing and implementing a set of web-services

- Technologies used: Apache Airflow (Batch Processing); Python with scikit-learn, pandas, SQLAlchemy, and FastAPI (Data cleaning, ML models, Outlier analysis, Entity-identification, and web services); Apache Superset (Visualizations & Dashboards); PostgreSQL with PostGIS (Data warehouse); Linkedin Data Hub (Data catalog); and Docker (Containerization)

(2021-2022) Designing and implementing an automation web application for collecting and evaluating the performance of employees at the National Iranian Copper Industries Corporation - Sarcheshme (join work with Dr. S.M. Sabbagh Jafari)

- Designed and developed a web application, jointly with Dr. S.M. Sabbagh Jafari, to collect documents of about 3 000 employees (in 8 categories such as research, education and skills), with verification/edit workflows
- Applied data mining and analyzed the performance of employees based on their documents and track of records
- Provided insight into the data for managers by visualizations
- Technologies used: Laravel 8 (Back-end), MariaDB (Database), NGINX (Web server), Docker (Containerization)

(2020-2021) Customer segmentation based on their transactions in the personal finance management system at Yekta Ertebat Ta-amoli Parto Nama (joint work with Mr. H. Iranmanesh, M.Sc.)

- Designing and developing a customer segmentation based on transactions, where the customers and items are anonymized
- Used a novel, density based clustering algorithm to extract initial clusterings
- Technologies used: C++ (Back-end to gain high performance) and Docker (Containerization)

(2015-2016) Diabetic retinopathy detection by processing fundus images at Yazd university (joint work with Prof. Dr. M.R. Hooshmandasl, Prof. Dr. M.H. Heydari and Prof. Dr. M.R. Manaviat)

- Designed and implemented a neural-network-based system
- Technologies used: Python with Theano (Tensor representations for GPU), and Lasagne (Deep learning framework)

Selected Teaching Experience

1. Advanced Algorithmic Design Techniques (Graduate course): Spring'2022 (with emphasis on Fine-grained Complexity), Spring'2021 (with emphasis on Parameterized Algorithms), Spring'2020 (with emphasis on Approximation Algorithms), Fall'2019 (with emphasis on Randomized Algorithms), Spring'2019 (with emphasis on Graph Algorithms).
2. Computational Data Mining (Graduate course): Fall'2022, Fall'2021, Fall'2020, Fall'2019, Fall'2018.
3. Data Mining: Fall'2022, Fall'2021, Spring'2021, Fall'2018, Spring'2018, Spring'2017.
4. Artificial Intelligence: Fall'2021.
5. Secure Computing: Spring'2022, Fall'2021, Fall'2020, Fall'2019, Fall'2018, Spring'2018, Fall'2017.
6. Scientific Computing: Spring'2022, Spring'2021.
7. Data Structures and Algorithms: Spring'2021 (with Java), Spring'2019 (with C++).

Academic Positions

Assistant Professor (Tenure-track) at the Department of Computer Science, Vali-e-Asr University of Rafsanjan, Rafsanjan, Iran - Since September, 2016

Deputy of the Information Technology Department at Vali-e-Asr University of Rafsanjan, Rafsanjan, Iran - May 2018 until Oct 2022

Director of the High Performance Computing Center at Vali-e-Asr University of Rafsanjan, Rafsanjan, Iran - June 2017 until May 2018

Member of the International Affairs Committee at the Faculty of Mathematical Sciences, Vali-e-Asr University of Rafsanjan, Rafsanjan, Iran - September 2017 - September 2021

Member of the Graduate Studies Committee at the Faculty of Mathematical Sciences, Vali-e-Asr University of Rafsanjan, Rafsanjan, Iran - September 2017 until November 2021

Research Assistant at the Laboratory of Quantum Information Processing, Yazd University, Yazd, Iran - June, 2012 until May 2017

Skills & Hobbies

Language Proficiency:	Persian, English
Programming Experience:	Python, C++, Java, Fortran, NumPy, SciPy, Matplotlib, Tensorflow, Keras, Pandas, sci-kit learn, MATLAB, OpenMP, Django, FastAPI, Laravel 8.
Data Experience:	Apache Hadoop, Apache Airflow, Apache Superset, MySQL, PostgreSQL, PostGIS.
Information Technology:	Configuring Fortinet Fortigate Firewalls, Cisco Switches, MikroTik RouterOS, Veeam Backup and Replication, VMware Virtualization Technology (ESXi, vSphere), FreeNAS (Network Attached Storage), Zabbix, Linux.
Hobbies:	Biking, Playing Chess, Coding, Learning various IT technologies.

References

A.K. Goharshady
Assistant Professor of Computer Science at Hong-Kong University of Science and Technology, Hong-Kong
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M.R. Hooshmandasl
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M. Heydarian
Assistant Professor of Computer Science at Vali-e-Asr University of Rafsanjan, Iran
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M.H. Heydari
Assistant Professor of Applied Mathematics at Shiraz University of Technology, Iran
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M. Alambardar Meybodi
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