

Ibrahim Aljarah, PhD

Associate Professor of Big Data Mining and Computational Intelligence
Assistant Director of International Affairs Unit for Externally Funded Projects

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Google Scholar: <https://scholar.google.com/citations?user=moOTIYEAAAAJ&hl=en>

Research Gate: https://www.researchgate.net/profile/Ibrahim_Aljarah



Address 1:

International Affairs Unit
The University of Jordan
Queen Rania Street
Amman, Jordan, 11942

Address 2:

Business Information Technology Department
King ABDULLAH II School of Information Technology
The University of Jordan
Queen Rania Street
Amman, Jordan, 11942

Research Interests

Scalable Data Mining, Nature-inspired Algorithms, Swarm Intelligence, Applied Evolutionary Computation, Big Data Analysis, MapReduce/Hadoop, Distributed Computing, Cloud Computing, Mining Software Repositories, Software Development, Bug Detection and Localization, and Scheduling problems

Education

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|-------------|--|
| 2010 - 2014 | PhD, Computer Science
North Dakota State University, USA
Dissertation title: MapReduce-Enabled Scalable Nature-Inspired Approaches For Clustering
Adviser: Dr. Simone A. Ludwig
GPA: 3.9 |
| 2003 - 2007 | Master in Computer Science
Jordan University of Science and Technology, Jordan
Thesis Title: An Automatic Course Scheduling Approach Using Instructors' Preferences
Adviser: Dr. Ayad Salhieh
Cumulative average 80.2 |
| 1999 - 2003 | Bachelor in Computer Science
Yarmouk University, Jordan
Cumulative average 78.2 |
| 1998 - 1999 | High School Graduate
Al-Mazar School, Jordan
Cumulative average 81.3 |

Experience

- 2018 - Current **Assistant to Unit Director for Externally Funded Projects**
International Affairs Unit
The University of Jordan, Amman, Jordan
- 2018 - Current **Associate Professor**
Business Information Technology Department
The University of Jordan, Amman, Jordan
- 2017 - 2018 **Dean Assistant for Laboratory Affairs**
King ABDULLAH II School of Information
Technology
The University of Jordan
- 2014 - 2018 **Assistant Professor**
Business Information Technology Department
The University of Jordan, Amman, Jordan
- 2010 - 2014 **Teaching and Research Assistant**
Computer Science Department
North Dakota State University, Fargo, ND, USA
Duties include:
- Tutoring
 - Invigilating tests or exams
 - Assisting a professor with a large lecture class by teaching students in recitation, laboratory, or discussion sessions
 - Conduct literature and database searches
 - Continue to update knowledge and develop skills
 - Write up results of own research
 - Contribute to the production of research reports and publications
 - Present information on research progress and outcomes to bodies supervising research, e.g. steering groups, sponsors or members of research groups
 - Prepare papers for steering groups and other bodies
 - Make use of standard research techniques and methods
 - Analyze and interpret the results of own research and generate original ideas based on outcomes
- 2007 - 2009 **Part Time Instructor**
Computer Information Systems
King Abdullah II for information and technology Faculty,
University of Jordan, Amman, Jordan
- Duties include:**
- Instructor for Advance Computer Skills (MS-Word, MS-Excel, MS-Frontpage).
 - Instructor for VB.NET.
 - Instructor for C++ Programming Course (Fundamentals Level).
 - Instructor for Object Oriented C++ Course (Advance Level).

2006 - 2009

Online/Automated Exams Administrator
University of Jordan, Amman, Jordan

Duties include:

- Analyzing online exams system logs and identifying potential issues with computer systems.
- Introducing and integrating new automated exams technologies into existing data center environments.
- Performing routine audits of online exam system and the other systems.
- Performing grades analysis and maintaining system backups.
- Applying operating system updates, patches, and configuration changes.
- Installing and configuring new hardware and software.
- Adding, removing, or updating user account information.
- Answering technical queries and dealing with often frustrated users.
- Responsibility for security.
- Responsibility for documenting the configuration of the online exam system.
- Troubleshooting any reported problems discovered in the online exams system.
- Ensuring that the network infrastructure is up and running.

2006 - 2007

Website Administrator

Language Center, University of Jordan, Jordan

Duties include:

- Server Upgrades and Maintenance
- Security Audits
- Content Maintenance
- Site Design
- Database Administration
- Backups

2003 - 2006

Computer Programming Instructor/Computer Software - Hardware Technical.

NASA for computer technology center, Irbid, Jordan

Duties include:

- Instructor for some programming languages courses Such as C++, Visual Basic, SQL, Oracle 9i, SQL server.
- Developing small programming projects.
- Computer Maintenance.

2004 - 2006

Computer Programming Instructor

Almazar Secondary School

Ministry of Education – Jordan

Publications

2010-Current

Journals

1. Shukri, Sarah, Hossam Faris, **Ibrahim Aljarah**, Seyedali Mirjalili, and Ajith Abraham. "**Evolutionary static and dynamic clustering algorithms based on multi-verse optimizer.**" Engineering Applications of Artificial Intelligence 72 (2018): 54-66.
2. **Ibrahim Aljarah**, Ala' M Al-Zoubi, Hossam Faris, Mohammad A. Hassonah, Seyedali Mirjalili, and Heba Saadeh.

"Simultaneous Feature Selection and Support Vector Machine Optimization Using the Grasshopper Optimization Algorithm." Cognitive Computation (2018): 1-18.

3. Mafarja, Majdi, **Ibrahim Aljarah**, Ali Asghar Heidari, Abdelaziz I. Hammouri, Hossam Faris, Al-Zoubi Ala'M, and Seyedali Mirjalili. **"Evolutionary Population Dynamics and Grasshopper Optimization Approaches for Feature Selection Problems."** Knowledge-Based Systems, December 2017.
4. Hossam Faris, **Ibrahim Aljarah**, Mohammed Azmi Al-Betar , and Seyedali Mirjalili, . **"Grey wolf optimizer: a review of recent variants and applications"**, Neural Computing and Applications, Springer, Dec 2017.
5. Hijawi, Wadi, Hossam Faris, Ja'far Alqatawna, **Ibrahim Aljarah**, Ala'M. Al-Zoubi, and Maria Habib. **"EMFET: E-mail Features Extraction Tool."** arXiv preprint arXiv:1711.08521 (2017).
6. Seyedeh Zahra Mirjalili, Seyedali Mirjalili, Shahrazad Saremi, Hossam Faris, and Ibrahim Aljarah. **"Grasshopper optimization for multi-objective optimization problems"**, Applied Intelligence, Springer, July 2017.
7. Hossam Faris, **Ibrahim Aljarah**, and Seyedali Mirjalili. **"Improved monarch butterfly optimization for unconstrained global search and neural network training"**, Applied Intelligence, Springer, June 2017.
8. Hossam Faris, Mohammad A. Hassonah, Ala' M. Al-Zoubi, Seyedali Mirjalili, and **Ibrahim Aljarah**. **"A multi-verse optimizer approach for feature selection and optimizing SVM parameters based on a robust system architecture"**, Neural Computing and Applications, Springer, December 2017
9. **Ibrahim Aljarah**, Hossam Faris, Seyedali Mirjalili, Nailah Al-Madi, **"Optimizing connection weights in neural networks using the whale optimization algorithm"**, Soft Computing, Springer, November 2016.
10. Hossam Faris, **Ibrahim Aljarah**, Nailah Al-Madi, and Seyedali Mirjalili. **"Optimizing the Learning Process of Feedforward Neural Networks Using Lightning Search Algorithm."** International Journal on Artificial Intelligence Tools 25, no. 06, 2016.
11. **Ibrahim Aljarah**, Hossam Faris, Seyedali Mirjalili, Nailah Al-Madi, **"Training radial basis function networks using biogeography-based optimizer"**, Neural Computing and Applications, Springer, August 2016.
12. Elaf Abu Amrieh, Thair Hamtini, and **Ibrahim Aljarah**. **"Mining Educational Data to Predict Student's academic Performance using Ensemble Methods."** International Journal of Database Theory and Application 9.8 (2016): 119-136.
13. Bashar Awad Al-Shboul, Heba Hakh, Hossam Faris, **Ibrahim Aljarah**, Hamad Alsawalqah, **"Voting-based Classification for E-mail Spam Detection"**, Journal of ICT Research and Applications, June 2016.
14. Hossam Faris, **Ibrahim Aljarah** and Seyedali Mirjalili, **"Training feedforward neural networks using multi-verse optimizer for binary classification problems"**, Applied Intelligence, Springer, March 2016.

15. Loai Alnemer, Lama Rjab, and Ibrahim Aljarah. "Conformal Prediction Technique to Predict Breast Cancer Survivability", International Journal of Advance Sciences and Technology, SERSC, 2016.
16. **Ibrahim Aljarah** and Simone A. Ludwig, "**A Scalable MapReduce-enabled Glowworm Swarm Optimization Approach for High Dimensional Multimodal Functions**", International Journal of Swarm Intelligence and Research, IGI Global, January 2016.
17. Nazeeh Ghatasheh, Hossam Faris, **Ibrahim Aljarah**, Rizik MH Al-Sayyed, "**Optimizing Software Effort Estimation Models Using Firefly Algorithm**", Journal of Software Engineering and Applications, Vol 8(3), pp. 133- 142, March 2015.
18. **Ibrahim Aljarah**, Ayad Salhieh and Hossam Faris, "**An Automatic Course Scheduling Approach Using Instructors Preferences**", International Journal of Emerging Technologies in Learning (IJET), Vol 7(1), pp. 24-32, March 2012.
19. Saeed Salem, Rami Alroobi, Shadi Banitaan, Loqmane Seridi, **Ibrahim Aljarah** and James Brewer. "**Improving Functional Modules Discovery by Enriching Interaction Networks with Gene Profiles**", Current Bioinformatics, Volume 7, 4 Issues, 2012

Conferences

1. Reham Barham, and **Ibrahim Aljarah**. "**Link Prediction Based on Whale Optimization Algorithm.**" In 2017 International Conference on New Trends in Computing Sciences (ICTCS), pp. 55-60. IEEE, 2017.
2. Heba Hakh, **Ibrahim Aljarah**, Bashar Al-Shboul. "Online Social Media-based Sentiment Analysis for US Airline companies". Proceedings of the New Trends in Information Technology (NTIT-2017), Amman, Jordan, April 2017.
3. Hamad Alsawalqah, Bashar Al-Shboul, Yazan Alshamaileh, Hossam Faris, **Ibrahim Aljarah**, Ahmad Abadleh. "**A Proposed Index for Evaluating Component Commonality for Software Product Family**". Proceedings of the New Trends in Information Technology (NTIT-2017), Amman, Jordan, April 2017.
4. AL-Sukkar Ghadeer, **Ibrahim Aljarah**, Hamad Alsawalqah, "**Enhancing the Arabic Sentiment Analysis Using Different Preprocessing Operators**", Proceedings of the New Trends in Information Technology (NTIT-2017), Amman, Jordan, April 2017.
5. Hossam Faris, **Ibrahim Aljarah**, Sayedali Mirjalili, Pedro Castillo, and J.J Merelo. **EvoPy: An Open-source Nature-inspired Optimization Framework in Python**. In Proceedings of the 8th International Joint Conference on Computational Intelligence - Volume 3: ECTA, ISBN 978-989-758-201-1, pages 171-177, Portugal, 2016
6. Laila M. Qaisi, and **Ibrahim Aljarah**, "**A Twitter Sentiment Analysis for Cloud Providers: A Case Study of Azure vs. AWS**", 7th International Conference on Computer Science and Information Technology, Amman, Jordan, July 2016.
7. Hossam Faris, **Ibrahim Aljarah** and Ja'far Alqatawna, "**Optimizing Feedforward Neural Networks Using Krill Herd Algorithm for E-mail Spam Detection**", IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT), Amman, Jordan, November 2015.

8. Sarah Shukri, Rawan Yaghi, , **Ibrahim Aljarah**, and Hamad Alsawalqah “**Twitter Sentiment Analysis: A Case Study in the Automotive Industry**”, IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT), Amman, Jordan, November 2015.
9. Elaf Abu Amrieh, Thair Hamtini, and **Ibrahim Aljarah**, “**Preprocessing and Analyzing Educational Data Set Using X-API for Improving Student's Performance**”, IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT), Amman, Jordan, November 2015.
10. Nailah Al-Madi, **Ibrahim Aljarah**, Simone Ludwig, “**Parallel Glowworm Swarm Optimization Clustering based on MapReduce**”, In Proceedings of the IEEE Symposium Series on Computational Intelligence, Swarm Intelligence (SIS), Orlando, USA, June 2014.
11. **Ibrahim Aljarah** and Simone A. Ludwig, “**A New Clustering Approach based on Glowworm Swarm Optimization**”, In Proceedings of 2013 IEEE Congress on Evolutionary Computation Conference (IEEE CEC'13), Cancun, Mexico, June 2013.
12. **Ibrahim Aljarah** and Simone A. Ludwig, “**MapReduce Intrusion Detection System based on a Particle Swarm Optimization Clustering Algorithm**”, In Proceedings of 2013 IEEE Congress on Evolutionary Computation Conference (IEEE CEC'13), Cancun, Mexico, June 2013.
13. **Ibrahim Aljarah** and Simone A. Ludwig, “**Towards a Scalable Intrusion Detection System based on Parallel PSO Clustering Using MapReduce**”, In Proceedings of Genetic and Evolutionary Computation Conference (ACM GECCO'13), Amsterdam, Netherlands, July 2013.
14. **Ibrahim Aljarah** and Simone A. Ludwig, “**A MapReduce based Glowworm Swarm Optimization Approach for Multimodal Functions**”, In Proceedings of the IEEE Symposium Series on Computational Intelligence – IEEE SSCI'13, Singapore, April 2013. ***Nominated for Best Paper Award***
15. **Ibrahim Aljarah** and Simone A. Ludwig, “**Parallel Particle Swarm Optimization Clustering Algorithm based on MapReduce Methodology**”, In Proceedings of the Fourth World Congress on Nature and Biologically Inspired Computing (IEEE NaBIC'12), Mexico City, Mexico, November 2012.
16. Saeed Salem, Shadi Banitaan, **Ibrahim Aljarah** and Rami Alroobi, “**Mining Maximal-Homogeneous Subnetworks using Protein Interaction Networks and Gene Profiles**”, in proceeding of the 4th international conference on Bioinformatics and Computational Biology (BICoB), Las Vegas, Nevada, USA, March 2012.
17. **Ibrahim Aljarah**, Shadi Banitaan, Sameer Abufardeh, Wei Jin and Saeed Salem. “**Selecting Discriminating Terms for Bug Assignment: A Formal Analysis**”, in proceeding of the 7th International Conference on Predictive Models in Software Engineering (ACM Promise'11), Banff, Alberta, Canada, September 2011.
18. Saeed Salem, Shadi Banitaan, **Ibrahim Aljarah**, James Brewer and Rami Alroobi. “**Discovering Communities in Social Networks using Topology and Attributes**”, in Proceedings of the International Conference on Machine Learning and

Applications (IEEE ICMLA'11), Honolulu , Hawaii, USA, December 2011.

19. Saeed Salem, Rami Alroobi, Shadi Banitaan, Loqmane Seridi, James Brewer, **Ibrahim Aljarah**. “**CLARM: An Integrative Approach for Functional Modules Discovery**”, In 3rd International Workshop on Bimolecular Network Analysis (IWBNA11), Chicago, IL, USA, August 2011.
20. Shadi Banitaan, Saeed Salem, Wei Jin, **Ibrahim Aljarah**. “**A formal study of classification techniques on Entity Discovery and their application to Opinion Mining**”, In 2nd International Workshop on Search and Mining User-generated Contents (with ACM CIKM'2010), Toronto, Canada, October 2010.

Book chapters

1. Hossam Faris, **Ibrahim Aljarah**, Seyedali Mirjalili. “Evolving Radial Basis Function Networks using Moth-Flame Optimizer”. Handbook of Neural Computation 1st Edition, Elsevier, July 2017.
2. Hossam Faris, **Ibrahim Aljarah** and Bashar Al-Shboul, “**A Hybrid Approach based on Particle Swarm Optimization and Random Forests for E-mail Spam Filtering**”, 8th International Conference on Computational Collective Intelligence (ICCCI 2016), Lecture Notes in Computer Science, Springer September 2016.
3. Hamad Alsawalqah, Hossam Faris, **Ibrahim Aljarah**, Loai Alnemer, Nouh Alhindawi. “Hybrid SMOTE-Ensemble Approach for Software Defect Prediction”. CSOC 2017: Software Engineering Trends and Techniques in Intelligent Systems, pp 355-366, Springer, 2017.

Projects

2013 Jan – 2014 May

Vehicle Class Detection System: this project is developed for Upper Great Plains Transportation Institute (UGPTI), which is a research and education center at North Dakota State University. This project aims to design a traffic monitoring system by extracting vehicle images from video acquisition using OpenCV library (pattern recognition functions). Then with a rule-based system, each vehicle is classified according to its axle's properties.
Technologies used in this project: C++ language and OpenCV library.

2013 Sept – 2013 Dec

PAVVET iPhone app– Pavement Analysis Via Vehicle Electronic Telemetry: this project is developed for the Upper Great Plains Transportation Institute (UGPTI) which is a research and education center at North Dakota State University. This project aims to design a smart phone app under iPhone platform to collect information to monitor the road conditions using the iPhone embedded sensors (Motion sensor/accelerometer, Gyroscope and GPS).
Technologies used in this project: iOS operating system and Objective-C.

2013 Jan – 2013 Sep

Farm Cloud Storage System: this project is developed for John Deere/RDO Equipment companies and is supported by NDSU Computer Science Industry/University Consortium Program which is dedicated to strengthening ties between NDSU and regional industry.

The aim of this project is to automate the collection of data from farmers and the storage of this data in a cloud-based file system. The stored data is used for analysis in order to contribute towards specialized software tools for farm support.

Technologies used in this project: Cloud Operating System (OpenStack), FTP, ASP.NET, C#, IIS7, and MYSQL 5.0

2006 - 2009

Deploy a new System for Automated Exams at the University of Jordan using Microsoft Visual Basic and MySQL 2007 Database - University Of Jordan.

1999 - 2003

Worked in many projects at Yarmouk University, Jordan such as:

- Tourism Company Software.
- Medicines Company Software.
- Lawyers' office Software.

These projects were developed using Oracle 8i/9i, and Oracle Developer 6i/Suite.

Presentations

- **Optimizing Feedforward Neural Networks Using Krill Herd Algorithm for E-mail Spam Detection**, IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT), Amman, Jordan, November 2015.
 - **A New Clustering Approach based on Glowworm Swarm Optimization**, In Proceedings of 2013 IEEE Congress on Evolutionary Computation Conference (IEEE CEC'13), Cancun, Mexico, June 2013.
 - **MapReduce Intrusion Detection System based on a Particle Swarm Optimization Clustering Algorithm**, In Proceedings of 2013 IEEE Congress on Evolutionary Computation Conference (IEEE CEC'13), Cancun, Mexico, June 2013.
 - **Parallel Particle Swarm Optimization Clustering Algorithm based on MapReduce Methodology**, Fourth World Congress on Nature and Biologically Inspired Computing (IEEE NaBIC'12), Mexico City, Mexico, November 2012.
 - **Selecting Discriminating Terms for Bug Assignment: A Formal Analysis**, 7th International Conference on Predictive Models in Software Engineering (ACM Promise'11), Banff, Alberta, Canada, September 2011.
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Awards and Honors

- 2010
- A scholarship from University of Jordan to get the Ph. D. degree in Computer Science from North Dakota State University, USA.
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Involvement / Conferences

- 2017
- Phi's Research and Innovation Summit – PRIS17, Amman, Jordan, August, 2017.
 - New Trends in Information Technology (NTIT-2017) conference, Amman, Jordan, April, 2017.
- 2015
- New Trends in Information Technology (NTIT-2017) conference, Amman, Jordan
 - The third 2015 IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT), 3-5 November, Amman, Jordan.
- 2013
- The 2013 IEEE International Conference on Big Data (BigData'13), October 6-9, Silicon Valley – Santa Clara, California, USA.

- The Fifth 2013 IEEE World Congress on Nature and Biologically Inspired Computing (NaBIC2013), August 12-14, Fargo, North Dakota, USA.
- The 2013 IEEE Congress on Evolutionary Computation Conference (IEEE CEC'13), June 20-23, Cancun, Mexico.
- 2012 • The Forth 2012 IEEE World Congress on Nature and Biologically Inspired Computing (NaBIC2012), November 5-9, Mexico City, Mexico.
- 2011 • The Seventh ACM International Conference on Predictive Models in Software Engineering (Promise'11), Banff, Canada, September 20-21(Co-located with ESEM'11)

Professional Activities

- **Organizing Committee:** New Trends in Information Technology (NTIT-2017) conference, Amman, Jordan, April, 2017.
- **Technical Committee:** International Conference on New Trends in Computing Sciences, Amman, Jordan, October 2017
- **Technical Committee:** The International Conference on Computer Science and Information Technology (CSIT 2016), Amman, Jordan.
- **Organizing Committee:** Fifth World Congress on Nature and Biologically Inspired Computing (IEEE NaBIC'13), USA.
- **Organizing Committee:** Fifth International Conference on Computational Aspects of Social Networks (CASoN 2013), USA.
- **Journals/Conferences Reviewer:**
 - Applied Soft Computing. Elsevier. IF: 2.810
 - Neurocomputing, Elsevier. IF: 2.083
 - Journal of Computer and System Sciences, Elsevier. IF: 1.138
 - Neural Computing and Applications, Springer. IF:1.569
 - Journal of the American Society for Information Science and Technology
 - Modern Physics Letters B (MPLB)
 - Kuwait Journal of Science (KJS)
 - IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT)

Professional Affiliations

- Institute of Electrical and Electronics Engineers (IEEE) Society
- Extreme Science and Engineering Discovery Environment (XSEDE)

Selected Supervised Theses and Projects

Elaf Abu Amrieh, "A Recommender System For Predicting And Improving Student's Performance Using Educational Data Mining", M.Sc. Thesis. University of Jordan. May 2016.

Sarah Shukri, "Web Log Clustering Based on Evolutionary Optimization Algoritm", M.Sc. Thesis. University of Jordan. Dec 2016.

Rawan Yaghi, "Link Prediction Using Evolutionary Learning Models", M.Sc. Thesis. University of Jordan. May 2017.

Moath Alrefai, "Building a Hybrid Sentiment Analysis System for Arabic Language", University of Jordan. Dec 2017

Selected Courses Taught:

Undergraduate: Decision Support Systems, Operation Research, Web Application Development, Special Topics in Big Data Science, Computer Fundamentals, and Social Media.

Graduate: Social Network Analysis

Relative Computer Skills

Operating Systems	Ubuntu Linux, Windows7, 8, and 10, Windows Vista.
Programming Languages	Oracle PL/SQL, Oracle Forms, Oracle Developer Suite, C++, VB.NET, HTML 5, CSS 3, Java, Java Script, C#, Python, Perl, R-Language and Others.
Software Packages	Matlab 2017, MS-Office 2016 (Word, Access, Excel, PowerPoint), yED.
Machines	IBM PC's and Compatibles.
Knowledge	Big Data Analytics, Hadoop/MpReduce , Hive, Pig, Spark, Mahout Framework, Software Engineering life cycle, Database Management Systems, Relational Databases, Assembly Programming, Hardware and Software Maintenance, and Windows 8 Security, and familiar with NTFS file system, Networks Management With Windows 2013 Server, and Windows7.

References

- Dr. Bassam Hamoo, The University of Jordan, Jordan, Amman, b.hammo@ju.edu.jo.
- Dr. Simone Ludwig, North Dakota State University, USA, simone.ludwig@ndsu.edu
- Dr. Ayad Salhieh , Jordan University of Sciences and Technology, Jordan, salhieh@just.edu.jo

Official papers available upon request