Hasan Kurban, Ph.D.

Curriculum Vitae

Electrical and Computer Engineering, Texas A&M University at Qatar
Office 246S, Education City, PO Box 23874, Doha, Qatar
✉ hasan.kurban@qatar.tamu.edu ✉ hasan.kurban@tamu.edu ✉ hakurban@iu.edu
www.hasankurban.com TAMUQ Profile TAMU Profile IU Profile

Research Interests & Education

Research Interests: Data Mining, Machine Learning, Big Data, Data Science, AI, Software Engineering

Ph.D. in Computer Science, **Minor in** Statistics

Indiana University, Bloomington, IN, USA **Completed: September 2017**
Advisor: Prof. Mehmet M. Dalkilic
Committee Members: Prof. Predrag Radivojac, Prof. Michael W. Trosset, Prof. Yuzhen Ye
Dissertation Title: *A Novel Approach to Optimization of Iterative Machine Learning Algorithms: Over Heap Structure*

Publications

Peer-Reviewed Journal Articles

22. **Hasan Kurban**, Parichit Sharma, Salim Erol, Selcuk Temiz, and Mehmet M. Dalkilic. "CRISP: Comprehensive Regression for Impedance Spectroscopy Prediction over ELF Regions using AI," 2023. (under-review)

21. Parichit Sharma, Marcin Malec, **Hasan Kurban**, Oguzhan Kulekci, Mehmet Dalkilic. "Geometric-k-means: A Novel, Exact, Unbounded Distance Calculation Reducing k-means," *IEEE Transactions on Knowledge and Data Engineering*, 2023. (under-review)

20. Selcuk Temiz, Salim Erol, **Hasan Kurban**, and Mehmet M. Dalkilic. "State of Charge and Temperature-Dependent Impedance Spectra Regeneration of Lithium-Ion Battery by Duplex Learning Modeling," *Journal of Energy Storage*, 64, 107085, 2023.

19. **Hasan Kurban**, Mustafa Kurban, and Mehmet M. Dalkilic. "Rapidly Predicting Kohn-Sham Total Energy Using Data-centric AI," *Nature Scientific Reports*, vol.12, pp.1-14, 2022.

18. Selcuk Temiz, **Hasan Kurban**, Salim Erol, and Mehmet M. Dalkilic. "Data on Machine Learning Regenerated Lithium-ion Battery Impedance," *Data in Brief*, 108698, 2022.

17. Marcin S. Malec, **Hasan Kurban**, and Mehmet M. Dalkilic. "ccImpute: an Accurate and Scalable Consensus Clustering Based Algorithm to Impute Dropout Events in Single-Cell RNA-seq Data," *BMC Methods*, vol.23, pp. 1-17, 2022.

16. Selcuk Temiz, **Hasan Kurban**, Salim Erol, and Mehmet M. Dalkilic. "Regeneration of Lithium-ion Battery Impedance Using a Novel Machine Learning Framework and Minimal Empirical Data," *Journal of Energy Storage*, 52, 105022(1-34), 2022.

15. Parichit Sharma, **Hasan Kurban**, and Mehmet M. Dalkilic. "DCEM: An R package for Clustering Big Data via Data-centric Modification of Expectation Maximization," *SoftwareX*, 17, 100944, 2022.

14. **Hasan Kurban** and Mustafa Kurban. "Building Machine Learning Systems for Multi-Atoms Structures: CH3NH3PbI3 Perovskite Nanoparticles," *Computational Materials Science*, 195, 110490(1-9), 2021.

13. **Hasan Kurban**, Mustafa Kurban, Parichit Sharma, and Mehmet M. Dalkilic. "Predicting Atom Types of Anatase TiO2 Nanoparticles with Machine Learning," *Key Engineering Materials*, vol.880, pp.89-94, 2021.

12. **Hasan Kurban** and Mustafa Kurban. "Rare-class Learning over Mg-Doped ZnO Nanoparticles," *Chemical Physics*, vol.546, 11159(1-9), 2021.

11. Iskender Muz, **Hasan Kurban**, and Mustafa Kurban. "A DFT Study on Stability and Electronic Structure of AlN Nanotubes," *Materials Today Communications*, 26, 102118(1-7), 2021.

10. **Hasan Kurban**, Sholeh Alaei, and Mustafa Kurban. "Effect of Mg content on Electronic Structure, Optical and Structural Properties of Amorphous ZnO Nanoparticles: A DFTB Study," *Journal of Non-Crystalline Solids*, 560, 120726(1-6), 2021.

9. **Hasan Kurban**. "Atom Classification with Machine Learning and Correlations among Physical Properties of ZnO Nanoparticle," *Chemical Physics*, vol.545, 111143(1-9), 2021.

8. **Hasan Kurban**. "Measuring the Proximity of Medical Treatment Areas with Text Mining," *European Journal of Science and Technology*, no.21, pp. 518-526, 2021.

7. **Hasan Kurban**. "Practical Data Science: Examining the Correlations between Structural and Electronic Properties of Different Phases of TiO2 Nanoparticles," *Journal of Selcuk-Technic*, 4(19), 1-9, 2020.

6. **Hasan Kurban**, Mehmet Dalkilic, Selcuk Temiz, and Mustafa Kurban. "Tailoring the Structural Properties and Electronic Structure of Anatase, Brookite and Rutile Phase TiO2 Nanoparticles: DFTB Calculations," *Computational Materials Science*, 183, 109843(1-9), 2020.

5. **Hasan Kurban** and Mustafa Kurban. "Study of Structural and Optoelectronic Properties of Hexagonal ZnO Nanoparticles," *Bilecik Seyh Edebali University Journal of Science*, 6(2), 124-131, 2019.

4. Mustafa Kurban, **Hasan Kurban**, and Mehmet M. Dalkilic. "Controlling Structural and Electronic Properties of ZnO NPs," *Bilge International Journal of Science and Technology Research*, 3(0), 35-39, 2019.

3. **Hasan Kurban**, Mustafa Kurban, and Mehmet M. Dalkilic. "Density-functional Tight-binding Approach for the Structural Analysis and Electronic Structure of Copper Hydride Metallic Nanoparticles," *Materials Today Communications*, 21, 100648(1-7), 2019.

2. **Hasan Kurban**, Mark Jenne, and Mehmet M. Dalkilic. "Using Data to Build a Better EM: EM* for Big Data," *International Journal of Data Science and Analytics*, vol.4, no.2, pp. 83-97, 2017.

1. Mark Jenne, Owen Boberg, **Hasan Kurban**, and Mehmet M. Dalkilic. "Studying the Milky Way Galaxy using ParaHeap-k, a parallel heap-based k-means," *IEEE Computer*, vol.47, no.9, pp.26-33, 2014.

Peer-Reviewed Conference Proceedings

13. **Efficient Feature Engineering Over Unstructured Data for Use with Traditional AI Models**
Mert Onur Cakiroglu, **Hasan Kurban**, Parichit Sharma, Elham Khorasani Buxton, M. Oguzhan Kulekci, Maryam Raeeszadeh-Sarmazdeh, Haixu Tang and Mehmet Dalkilic (under-review)

12. **Making Fantasy Leagues More Real: Adding Team Chemistry**
Ganesh Arkanath, Nishad Gupta, Parichit Sharma, Madhavan K R, **Hasan Kurban**, Elham Khorasani Buxton and Mehmet M. Dalkilic
IEEE BigData, Sorrento, Italy, 2023 (under-review)

11. **tiknn: Telescope Indexing for k-Nearest Neighbor Search Algorithms over High Dimensional Data & Large Data Sets**
Madhavan Kalkunte Ramachandra, **Hasan Kurban**, M. Oguzhan Kulekci and Mehmet M. Dalkilic
ICDE, Utrecht, Netherlands, 2023 (under-review)

10. **Are Sports Awards About Sports? Using AI to Find the Answer**
Anshumaan Shankar, Gowtham Veerabadran Rajasekaran, Jacob Hendricks, Jared Andrew Schlak, Parichit Sharma, Madhavan K R, **Hasan Kurban** and Mehmet M. Dalkilic
ECML/PKDD: 10th Workshop on Machine Learning and Data Mining for Sports Analytics, Turin, Italy, 2023

9. **AReS: An AutoML Regression Service for Data Analytics and Novel Data-centric Visualizations**
Josh Elms, Sam Johnson, Madhavan K R, Keerthana Sugasi, Parichit Sharma, **Hasan Kurban** and Mehmet M. Dalkilic
KDD-UC, Long Beach, CA, USA, 2023

8. **Are They What They Claim: A Comprehensive Study of Ordinary Linear Regression Among the Top Machine Learning Libraries in Python**
Sam Johnson, Josh Elms, Madhavan K R, Keerthana Sugasi, Parichit Sharma, **Hasan Kurban** and Mehmet M. Dalkilic
KDD-UC, Long Beach, CA, USA, 2023

7. **Data Expressiveness and Its Use in Data-centric AI**
Hasan Kurban, Parichit Sharma and Mehmet M. Dalkilic
Neurips Data-centric AI, 2021

6. **Size Dependent Electronic Structure and Structural Properties of Cupric Oxide (CuO) Nanoparticles**
Hasan Kurban, Mustafa Kurban and Mehmet M. Dalkilic
NEM, 2019

5. **Using Data Analytics to Optimize Public Transportation on a College Campus**
Kurt Zimmer, **Hasan Kurban**, Mark Jenne, Logan Keating, Perry Maull, Mehmet M. Dalkilic
DSAA, Turin, Italy, 2018

4. **A novel approach to optimization of iterative machine learning algorithms: over heap structure**
Hasan Kurban, Mehmet M. Dalkilic
IEEE BigData, Boston, MA, USA, 2017

3. **EM*: An EM algorithm for Big Data**
Hasan Kurban, Mark Jenne and Mehmet M. Dalkilic
DSAA, Montreal, Canada, 2016 (Received Honorable Mention Paper Award)

2. **Red-RF: Reduced Random Forest for big data using priority voting & dynamic data reduction**
Hussein Mohsen, **Hasan Kurban**, Kurt Zimmer, Mark Jenne, Mehmet M. Dalkilic
IEEE BigData Congress, New York, USA, 2015

1. **A new set of Random Forests with varying dynamic data reduction and voting techniques**
Hussein Mohsen, **Hasan Kurban**, Mark Jenne, Mehmet M. Dalkilic
DSAA, Shanghai, China, 2014

Peer-Reviewed Workshop Proceedings

2. **Improving Expectation Maximization Algorithm over Stellar Data**
Hasan Kurban, Can Kockan, Mark Jenne and Mehmet M. Dalkilic
IEEE BigData: Workshop on Management, Search and Mining of Massive Repositories of Solar and Stellar Astronomy Data, Boston, MA, USA, 2017

1. **Employing Software Engineering Principles to Enhance Management of Climatological Datasets for Coral Reef Analysis**
Mark Jenne, Alex Zimmerman, **Hasan Kurban**, Claudia Johnson and Mehmet M. Dalkilic
The 6th International Workshop on Climate Informatics (CI), Colorado, USA, 2016

Peer-Reviewed Poster Proceedings

1. **Case study: clustering big stellar data with EM***
   Hasan Kurban, Can Kockan, Mark Jenne and Mehmet M. Dalkilic
   IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT), Austin, Texas, USA, 2017 (Best Poster Award)

Book Reviews

2. *Mastering Social Media Mining with R* by Sharan Kumar Ravindran, 2015
   ISBN: 1784396311

1. *Learning Data Mining with R* by Bater Makhabel, 2015
   ISBN: 1783982101

Invited Talks

Conferences, Teaching & Hiring

- *Are Sports Awards About Sports? Using AI to Find the Answer*
  ECML/PKDD: 10th Workshop on Machine Learning and Data Mining for Sports Analytics, Turin, Italy September 18, 2023.
- *Data-Centric Machine Learning*
  Various Universities (San Jose State, University of Houston, University of Montana, American University of the Middle East, United Arab Emirates University, University of Illinois, Zayed University, University of Missouri, University of South Carolina, etc.), 2022-2023.
- *Clustering in Data Science*
  Department of Statistics and Data Science, Northwestern University, Spring 2022.
- *Comparison of Machine Learning Algorithms for CuO Nanoparticles*
  4th International Conference on Physical Chemistry and Functional Materials (PCFM21), Elazığ, Turkey, April 8, 2021.
- *Practical Data Science: Examining the Correlations between Structural and Electronic Properties of Different Phases of TiO2 Nanoparticles*
  International Conference on Advanced Technologies (ICAT), Istanbul, Turkey, August 12, 2020.
- *Predicting Atom Types of Anatase TiO2 Nanoparticles with Machine Learning*
  International Conference on Engineering and Innovative Materials (ICEIM), Singapore, September 5, 2020.
- *Introduction to Data Science*
  Computer Engineering Department, Izmir Institute of Technology, Spring 2020.
- *Clustering Techniques in Engineering*
  Computer Engineering Department, Yildirim Beyazit University, Spring 2019.
- *Data Science Fundamentals*
  Informatics Department, Istanbul Technical University, Fall 2018.
- *Using Data Analytics to Optimize Public Transportation on a College Campus*
  IEEE International Conference on Data Science and Advanced Analytics (DSAA), Turin, Italy, October 4, 2018.
- *Data Science and Big Data*
  Eli Lilly and Company, Fall 2017.

- *A Novel Approach to Optimization of Iterative Machine Learning Algorithms: Over Heap Structure*
  IEEE International Conference on Big Data (Big Data), Boston, MA, USA, December 14, 2017.
- *Improving Expectation Maximization Algorithm over Stellar Data, Workshop on Management*
  Search and Mining of Massive Repositories of Solar and Stellar Astronomy Data, Boston, MA, USA, December 12, 2017.
- *Case Study: Clustering Big Stellar Data with EM**
  IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT), Austin, Texas, USA, December 7, 2017.
- *EM*: An EM Algorithm for Big Data*
  IEEE International Conference on Data Science and Advanced Analytics (DSAA), Montreal, Canada, October 18, 2016.
- *EM Algorithms for Clustering*
  Computer Science Department, Indiana University, Fall 2016.
- *Principal Component Analysis*
  Computer Science Department, Indiana University, Fall 2016.
- *A New Set of Random Forests with Varying Dynamic Data Reduction and Voting Techniques*
  IEEE International Conference on Data Science and Advanced Analytics, Shanghai, China, October 30, 2014.
- *Data Structures and Algorithms*
  Computer Science Department, Indiana University, Spring 2014.
- *Ensemble Models in Machine Learning*
  Computer Science Department, Indiana University, Spring 2013.

Teaching Experience

Research Assistant Professor, Electrical and Computer Engineering **Texas A&M University, Doha, Qatar**

- ECEN 210: Computer Programming and Algorithms (Undergraduate) — Fall 2023
- ECEN 248: Introduction to Digital Systems Design (Undergraduate) — Fall 2023

Visiting Associate Professor, Computer Science Department **Indiana University, IN, USA**

- CSCI-B 565: Data Mining (Graduate Level) — Spring 2023
- CSCI-B 365: Introduction to Computers and Programming (Undergraduate) — Spring 2023
- CSCI-C 241: Discrete Structures for Computer Science (Undergraduate) — Fall 2022
- CSCI-C 241: Discrete Structures for Computer Science (Undergraduate) — Summer 2022
- CSCI-B 365: Introduction to Data Analysis and Mining (Undergraduate) — Spring 2022
- CSCI-B 505: Applied Algorithms (Graduate Level) — Fall 2021

Dr. Lecturer, Computer Engineering Department **Siirt University, Turkey**

- BMH101: Algorithms and Programming I (Undergraduate) — Spring 2019, Fall 2019
- BMH 406: Data Security (Undergraduate) — Spring 2019
- BMH 104: Web and Internet Technologies (Undergraduate) — Spring 2019
- BMH 205: Data Structures (Undergraduate) — Fall 2018
- BMH 413: Artificial Neural Networks (Undergraduate) — Fall 2018, Fall 2019
- BMH 103 Introduction to Computer Engineering (Undergraduate) — Fall 2018, Fall 2019

Visiting Assistant Professor, Computer Science Department **Indiana University, IN, USA**

- CSCI-P 556: Applied Machine Learning (Graduate) — Fall 2017
- INFO-I590: Online Applied Data Mining (Graduate) — Fall 2017
- CSCI-B 351: Elements of Artificial Intelligence (Graduate) — Spring 2018
- CSCI-B 365: Introduction to Data Analysis and Mining (Undergraduate) — Spring 2018

Senior Associate Instructor, Computer Science Department **Indiana University, IN, USA**

- CSCI-B 565: Data Mining (Graduate Level) — Fall 2016
- CSCI-B 351: Elements of Artificial Intelligence (Graduate) — Spring 2017

Associate Instructor, Computer Science Department **Indiana University, IN, USA**

- CSCI-B 565: Data Mining (Graduate Level) — Fall 2012, Fall 2013, Spring 2015, Spring 2016
- CSCI-B 555: Machine Learning (Graduate) — Spring 2013
- CSCI-C 343: Data Structures (Undergraduate/Graduate) — Spring 2014
- CSCI-B 365: Seminar in Computer Science: Data Mining (Undergraduate) — Fall 2014, Fall 2015
- CSCI-B 609: Topics in Algorithms and Computing Theory (Graduate) Fall — 2014
- INFO-I590: Real World Data Science (Graduate, Online) - Summer 2016, Sponsored by Eli Lilly

Professional Experience

Texas A&M University, Doha, Qatar
Research Assistant Professor, Electrical and Computer Engineering Department
Contact: Dr. Erchin Serpedin, `eserpedin@qatar.tamu.edu`, **Period:** June 2023 - Present

Indiana University Bloomington, IN, USA
Visiting Associate Professor, Computer Science Department
Contact: Dr. Yuzhen Ye, `yye@indiana.edu`, **Period:** July 2021 - June 2023

Siirt University, Siirt, Turkey
Dr. Lecturer, Computer Engineering Department
Contact: Dr. Musa Atas, `hakmesyo@gmail.com`, **Period:** August 2018 - July 2021

Indiana University Bloomington, IN, USA
Visiting Assistant Professor, Computer Science Department
Contact: Dr. Amr Sabry, sabry@indiana.edu, **Period:** August 2017 - August 2018

Turbo Appeal, Chicago, IL, USA
Data Scientist
Contact: Scott Beason, scottmbeason@gmail.com, **Period:** January 2015 - December 2015

Indiana University Bloomington, IN, USA
Undergraduate Research Mentor
Contact: Dr. Lamara D. Warren, ldwarren@indiana.edu, **Period:** January 2015 - May 2017

Service

University Committees

- **Fall 2023, Texas A&M University at Qatar:** ABET & Curriculum; Seminars & Invited Speakers; Budget; Teaching Load Model.

Professional Engagements

Nature Scientific Reports	Editorial Board Member	2023 - Present
Pearson	Data Science Advisory Board Member	2023 - Present
Manning	Technical Editor	2023 - Present

Honors and Awards

- **Best Poster Award:**
IEEE/ACM International Conference on Big Data Computing, Applications and Technologies, Austin, TX, 2017.
- **Best Paper Award:**
IEEE International Conference on Data Science and Advanced Analytics, Montreal, Canada, 2016.
- **Turkish National Ministry of Education Scholarship:**
Comprehensive funding for graduate studies at prestigious international institutions, 2009–2017.
- **Nomination for Researcher of the Year:**
Indiana University, Bloomington; Academic Years 2016–2017.
- **Nomination for Associate Instructor of the Year:**
Indiana University, Bloomington; Academic Years 2014–2015.
- **Computer Science Graduate Fellowship:**
Indiana University, Bloomington; August 2010–May 2012.

Computer and Language Skills

- **Programming Languages:**
Python, C, C++, C#, Java
- **Technical Software:**
R, Matlab, OpenCV, Octave, OpenBUGS, WinBUGS, Weka, Tableau, Knime
- **Databases:**
MySQL, NoSQL, PostgreSQL, SQL Server

- **Languages:**
  Fluent in English, Native in Turkish

References

Available upon request.