Hasan Kurban, Ph.D.

CONTACT INFORMATION

Computer Science Department
Indiana University
47408 Bloomington, IN, USA

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RESEARCH INTERESTS

Data Mining, Machine Learning, Big Data, Data Science, Artificial Intelligence

EDUCATION

Indiana University, Bloomington, IN, USA — September 2017

- Ph.D. in Computer Science and minor in Statistics
- Advisor: Prof. Mehmet M. Dalkilic
- Committee: Prof. Predrag Radivojac, Prof. Michael W. Trosset, Prof. Yuzhen Ye
- Thesis: *A Novel Approach to Optimization of Iterative Machine Learning Algorithms: Over Heap Structure*

Indiana University, Bloomington, IN, USA — May 2012

- M.Sc. in Computer Science

University of Connecticut, Storrs, CT, USA — July 2010

- Intensive Certificate Program

Marmara University, Istanbul, Turkey — June 2009

- Intensive Certificate Program

Inonu University, Malatya, Turkey — June 2008

- B.Sc. in Mathematics

PUBLICATIONS

Journal Articles [Refereed]

J20. **Hasan Kurban**, Mustafa Kurban and Mehmet M. Dalkilic. "An Efficient and Novel Approach for Predicting Kohn-Sham Total Energy: Bootstrapping a Duplex Model Framework with Minimal Viable Theoretical Data", *Nature Scientific Reports*, 2022 (under-review).

J19. 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*, 2022 (under-review).

J18. Selcuk Temiz, **Hasan Kurban**, Salim Erol and Mehmet M. Dalkilic. "Data on Machine Learning regenerated Lithium-ion battery impedance". *Data in Brief*, 2022 (under-review).

J17. Marcin S. Malec, **Hasan Kurban** and Mehmet M. Dalkilic. "ccImpute: an accurate and scalable consensus clustering based algorithm to impute dropout events in the single-cell RNA-seq data". *BMC Methods*, 2022 (accepted).

J16. 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*, 2022 (accepted).

J15. 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.

J14. **Hasan Kurban** and Mustafa Kurban. "Building Machine Learning Systems for Multi-Atoms Structures: CH3NH3PbI3 Perovskite Nanoparticles". *Computational Materials Science*, 195, 110490(1-9), 2021.

J13. **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.

J12. **Hasan Kurban** and Mustafa Kurban. "Rare-class Learning over Mg-Doped ZnO Nanoparticles". *Chemical Physics*, vol.546, 11159(1-9), 2021.

J11. 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.

J10. **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.

J9. **Hasan Kurban**. "Atom Classification with Machine Learning and Correlations among Physical Properties of ZnO Nanoparticle". *Chemical Physics*, vol.545, 111143(1-9), 2021.

J8. **Hasan Kurban**. "Measuring the Proximity of Medical Treatment Areas with Text Mining". *European Journal of Science and Technology*, no.21, pp. 518-526, 2021.

J7. **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.

J6. **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.

J5. **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.

J4. 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.

J3. **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.

J2. **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.

J1. 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.

Conference Proceedings [Refereed]

C9. Madhavan Kalkunte Ramachandra, **Hasan Kurban**, M. Oguzhan Kulekci and Mehmet M. Dalkilic. "k-NN-p: A paired index structure for k-Nearest Neighbor Search Algorithms over High Dimensional Data & Large Data Sets". *The IEEE International Conference on Data Mining (ICDM)*, 2022 (under-review).

C8. Parichit Sharma, Marcin Malec, **Hasan Kurban**, M. Oguzhan Kulekci and Mehmet M. Dalkilic. "Applying Data-Centric AI to Improve a Single-cell RNA-seq Pipeline". *The IEEE International Conference on Data Mining (ICDM)*, 2022 (under-review).

C7. **Hasan Kurban**, Parichit Sharma and Mehmet M. Dalkilic. "Data Expressiveness and Its Use in Data-centric AI". *Neurips Data-centric AI*, 2021.

C6. **Hasan Kurban**, Mustafa Kurban and Mehmet M. Dalkilic. "Size Dependent Electronic Structure and Structural Properties of Cupric Oxide (CuO) Nanoparticles". *International Natural Science, Engineering and Material Technologies Conference (NEM)*, Istanbul, Turkey, 2019.

C5. Kurt Zimmer, **Hasan Kurban**, Mark Jenne, Logan Keating, Perry Maull, Mehmet M. Dalkilic. "Using Data Analytics to Optimize Public Transportation on a College Campus". *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, Turin, Italy, 2018.

C4. **Hasan Kurban**, Mehmet M. Dalkilic. "A novel approach to optimization of iterative machine learning algorithms: over heap structure". *IEEE International Conference on Big Data (Big Data)*, Boston, MA, USA, 2017.

C3. **Hasan Kurban**, Mark Jenne and Mehmet M. Dalkilic. "EM*: An EM algorithm for Big Data". *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, Montreal, Canada (received "Honorable Mention Paper Award", best paper awards), 2016.

C2. Hussein Mohsen, **Hasan Kurban**, Kurt Zimmer, Mark Jenne, Mehmet M. Dalkilic. "Red-RF: Reduced Random Forest for big data using priority voting & dynamic data reduction, International Congress on Big Data". *IEEE BigData Congress*, New York, USA, 2015.

C1. Hussein Mohsen, **Hasan Kurban**, Mark Jenne, Mehmet M. Dalkilic. "A new set of Random Forests with varying dynamic data reduction and voting techniques". *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, Shanghai, China, 2014.

Workshop Proceedings [Refereed]

W2. **Hasan Kurban**, Can Kockan, Mark Jenne and Mehmet M. Dalkilic. "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, 2017.

W1. Mark Jenne, Alex Zimmerman, **Hasan Kurban**, Claudia Johnson and Mehmet M. Dalkilic. "Employing Software Engineering Principles to Enhance Management of Climatological Datasets for Coral Reef Analysis". *The 6th International Workshop on Climate Informatics (CI)*, Colorado, USA, 2016.

Poster Proceedings [Refereed]

P1. **Hasan Kurban**, Can Kockan, Mark Jenne and Mehmet M. Dalkilic. "Case study: clustering big stellar data with EM*". *IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT)*, Austin, Texas, USA (received "Best Poster Award"), 2017.

Abstract Proceedings [Refereed]

A1. **Hasan Kurban**. "Comparison of Machine Learning Algorithms for CuO Nanoparticles". *4th International Conference on Physical Chemistry and Functional Materials (PCFM21)*, Elazığ, Turkey, 2021.

Book Reviews

B2. "Mastering Social Media Mining with R", Sharan Kumar Ravindran, 2015, ISBN 1784396311

B1. "Learning Data Mining with R", Bater Makhabel, 2015, ISBN 1783982101

Invited Talks

Invited Talks [Conferences]

- "Comparison of Machine Learning Algorithms for CuO Nanoparticles". *4th International Conference on Physical Chemistry and Functional Materials (PCFM21)*, Elazığ, Turkey (04/08/2021).
- "Predicting Atom Types of Anatase TiO2 Nanoparticles with Machine Learning". *International Conference on Engineering and Innovative Materials (ICEIM)*, Singapore (09/05/2020).
- "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 (08/12/2020).
- "Using Data Analytics to Optimize Public Transportation on a College Campus". *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, Turin, Italy (10/4/2018).
- "A novel approach to optimization of iterative machine learning algorithms: over heap structure". *IEEE International Conference on Big Data (Big Data)*, Boston, MA, USA (12/14/2017).
- "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 (12/12/2017).
- "Case study: clustering big stellar data with EM*". *EEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT)*, Austin, Texas, USA (12/07/2017).

- "EM*: An EM algorithm for Big Data". *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, Montreal, Canada (10/18/2016).
- "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 (10/30/2014).

Invited Talks [Teaching/Hiring]

- "Clustering". *Department of Statistics and Data Science, Northwestern University*, Spring 2022.
- "Data-Centric Machine Learning". *San Jose State University, University of Houston, University of Montana, American University of the Middle East, United Arab Emirates University*, Spring 2022.
- "Data Science". *Computer Engineering Department, Izmir Institute of Technology*, Spring 2020.
- "Clustering". *Computer Engineering Department, Yildirim Beyazit University*, Spring 2019.
- "Data Science". *Informatics Department, Istanbul Technical University*, Fall 2018
- "Data Science and Big Data". *Eli Lilly and Company*, Fall 2017.
- "EM for clustering". *Computer Science Department, Indiana University*, Fall 2016.
- "Principal Component Analysis". *Computer Science Department, Indiana University*, Fall 2016.
- "Data Structures". *Computer Science Department, Indiana University* , Spring 2014.
- "Ensemble Models". *Computer Science Department, Indiana University*, Spring 2013.

Teaching Experience

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

- Applied Algorithms (Graduate), Fall 2021.
- Introduction to Data Analysis and Mining (Undergraduate), Spring 2022.
- Discrete Structures for Computer Science (Undergraduate), Summer 2022.

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

- Data Structures, Artificial Neural Networks, Introduction to Computer Engineering, Fall 2018.
- Data Security, Algorithms and Programming II, Web and Internet Technologies, Spring 2019.
- Algorithms and Programming I, Artificial Neural Networks, Introduction to Computer Engineering, Fall 2019.

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

- Applied Machine Learning (Graduate), Online Applied Data Mining (Graduate), Fall 2017.
- Elements of Artificial Intelligence (Graduate), Introduction to Data Analysis and Mining (Undergraduate), Spring 2018.

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

Worked as an Associate Instructor in the Computer Science Department at Indiana University Bloomington between Aug. 2012 - May 2016. Graded homeworks, exams, weekly quizzes; taught labs; held office hours, weekly help sessions; lectured.

- Data Mining (Graduate), Fall 2012, Fall 2013, Spring 2015, Spring 2016.
- Machine Learning (Graduate), Spring 2013.
- Data Structures (Undergraduate/Graduate), Spring 2014.
- Seminar in Computer Science: Data Mining (Undergraduate), Fall 2014, Fall 2015.
- Topics in Algorithms and Computing Theory (Graduate), Fall 2014.

- Real World Data Science (Graduate), Summer 2016: Online class sponsored by Eli Lilly and Company.

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

Head Associate Instructor (AI). Managed a group of AIs; lectured; designed homeworks; graded homeworks, exams.

- Data Mining (Graduate), Fall 2016.
- Introduction to Artificial Intelligence (Graduate), Spring 2017.

Professional Experience

Indiana University Bloomington, IN, USA

- Visiting Associate Professor, Computer Science Department (July 2021 - Current).
- Contact: Yuzhen Ye, yye@indiana.edu

Siirt University, Siirt, Turkey

- Dr. Lecturer, Computer Engineering Department (Aug. 2018 - July 2021).
- Contact: Musa Atas, hakmesyo@gmail.com

Indiana University Bloomington, IN, USA

- Visiting Assistant Professor, Computer Science Department (Aug. 2017 - Aug. 2018).
- Contact: Amr Sabry, sabry@indiana.edu

Turbo Appeal, Chicago IL, USA

- Data Scientist (Jan 2015 - Dec. 2015): Predictive analytics on valuation of homes; web scraping; stored, processed, analyzed, modeled big data sets.
- Contact: Scott Beason, scottmbeason@gmail.com

Indiana University Bloomington, IN, USA

- Undergraduate Research Mentor (Jan. 2015 - May 2017): Designed data mining research projects for undergraduate students; coached students.
- Contact: Dr. Lamara D. Warren, ldwarren@indiana.edu

Honors and Awards

- ***Best Paper Award:*** Honorable Mention Paper Award, IEEE International Conference on Data Science and Advanced Analytics (DSAA'16), Montreal, Canada, 2016.
- ***Best Poster Award:*** IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (UCC/BDCAT), Austin, TX, USA, 2017.
- ***Turkish National Ministry of Education Scholarship :*** (all tuitions, fees, and a stipend) Scholarship awarded to high-achieving Turkish university graduates enabling them to pursue graduate study and research in top-ranked universities abroad, 2009 - 2017.
- ***Computer Science Graduate Fellowship:*** Indiana University, Bloomington, Aug. 2010 - May 2012.
- ***Nomination for Associate Instructor of the year:*** Being nominated for the Computer Science Program Associate Instructor of the year award, 2014 - 2015, Indiana University Bloomington.
- ***Nomination for Researcher of the year:*** Being nominated for the Computer Science Program Researcher of the year award, 2016 - 2017, Indiana University Bloomington.

Computer and Language Skills

- ***Programming Languages:*** Python, C, C++, C♯, Java.
- ***Technical Softwares:*** R, Matlab, OpenCV, Octave, OpenBUGS, WinBUGS, Weka, Rattle, Tableau, Knime.
- ***Databases:*** MySQL, NoSQL, PostgreSQL, SQL Server.
- ***Languages:*** English (fluent), Turkish (native).

References

Available upon request.