

Salih Tutun, PhD

Faculty of Olin Business School and Faculty Scholar at Institute for Public Health
Washington University in St. Louis

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Education

- Sep 2013 – May 2018 **Binghamton University, State University of New York (ABET Accredited)**
Ph.D., Systems Science and Industrial Engineering
Binghamton, New York, United States
Dissertation Title: Robust Framework for Investigation and Detection of Adversarial Activities
- Proposed a comprehensive new framework, namely Networked Pattern Recognition (NEPAR) framework
 - Analyzed the terrorist activity patterns and relations, and also use with ten different classification problems
- Sep 2010 – Sep 2012 **Erciyes University (ABET Accredited)**
M.Sc., Industrial Engineering
Kayseri, Turkey
Thesis Title: Estimating the Net Electricity Energy Consumption using Artificial Intelligence Techniques
- Proposed a new framework to forecast sufficient electricity that is generated to meet future needs
- Sep 2006 – Sep 2010 **Sakarya University (ABET Accredited)**
B.Sc., Industrial Engineering
Adapazari, Turkey
Graduation Project: Improvement in the Automobile Service Industry by Using Value Stream Mapping

Research Interests

Deep Learning, Large-Scale Data Analysis, Business Analytics, Risk Analysis, Computational Social Science, Natural Language Processing, Adaptive Optimization, Complex Systems

Publications (Published or in Process)

Interviews (Magazines, Professional Community Press, etc.)

- Mar 2017 **Eureka!alert**, Researchers can predict terrorist behaviors with more than 90 percent accuracy
Daily Caller, Researchers Say They Can Predict Terrorist Behavior With More Than 90% Accuracy
Google News, New framework uses patterns to predict terrorist behavior
- Nov 2016 **Contrepoints**, Le profilage est-il l'avenir de la lutte anti-terroriste?
- Sep 2016 **Economic Times**, Researchers find a faster way to predict flight delays
Science Daily, Researchers have a better way to predict flight delays
ISE Magazine - Frontier Cover: Patterning Terrorist Behavior, ([Magazine](#))
- Jun 2016 **Yahoo**, New framework tells when terrorists are likely to attack
MSN, Scientist claim to have developed framework to predict terrorist attacks
Science Daily, New framework uses patterns to predict terrorist behavior
NDTV, New Framework Tells When Terrorists Are Likely To Attack
Times of India, New framework tells when terrorists are likely to attack
WordPress.com, New framework tells when terrorists are likely to attack

Personal Seminars

- Dec 2019 **Seminar:** Speaker, Artificial Intelligence in Business, AI-Centric Transformation in Business Seminar Training for vertical industries where hottest topics in AI in business, Brussel, Belgium.
- Nov 2019 **Seminar:** Speaker, Artificial Intelligence and Public Health, 3.International-21.National Public Health Congress, 26-30 November 2019, Antalya- Turkey
- Apr 2019 **Seminar:** Key Note Speaker, Psychiatry and Artificial Intelligence, 11. International. psychopharmacology Conference, in Antalya, Turkey
- Jan 2017 **Seminar:** Doctoral Student Seminar Series, the remote presentation about the dissertation topic (the NEPAR Framework) to colleagues at VIT University in Vellore, India
- Apr2016 **Seminar:** The Collective Dynamics of Complex Systems (CoCo) Seminar “Understanding Patterns and Relations of the Terrorist Attacks to Prevent Future Threats”

Patents and Projects

- [1] **Salih Tutun**, Sedat Irgil, Ilker Yesilkaya: WeCureX Intelligence Psychiatric Assistant, Turkish Patent Institute, as DNB Analytics 2018 (*Under Review*) (*Patent*).
- [2] **Salih Tutun**, Haifeng Wang, Zhao Liu, Sina Khanmohammadi: Agent-Based Approach for Understanding Complex Terrorism Behaviors, 2016.
- [3] Sedat Irgil, **Salih Tutun**, Ilker Yesilkaya: Image Analysis for Bender-Gestalt Test by using Deep Learning for Detecting Demantia, DNB Analytics, 2019 (*Project*).
- [4] Sedat Irgil, **Salih Tutun**, Ilker Yesilkaya: Developing Clock-Drawing Tool by using Deep Learning for Detecting Alzheimer Disease, DNB Analytics, 2019 (*Project*).
- [5] **Salih Tutun**, Sedat Irgil, Ilker Yesilkaya: Behavioral Based Business Improvement Framework for Occupational Health & Safety, DNB Analytics 2019 (*Project*).
- [6] Sedat Irgil, **Salih Tutun**, Ilker Yesilkaya: WeCureX: Intelligent Psychiatric Assistant, DNB Analytics, 2018 (*Project*).
- [7] Sina Khanmohammadi, **Salih Tutun**: Prediction Flight Delay Time with a New Multilevel Input Layer Artificial Neural Network, 2018 (*Project*).
- [8] Mohammad T. Khasawneh, **Salih Tutun**: The NEPAR: Networked Pattern Recognition Framework and Preventing Terrorist Activities, 2015 (*Project*).

Journal Publications

- [1] **Salih Tutun**, Chun-An Chou, Erdal Canıyılmaz: A new forecasting framework for volatile behavior in net electricity consumption: A case study in Turkey, *Energy* 10/2015; 93.
- [2] **Salih Tutun**, Mohammad T. Khasawneh, Jun Zhuang: New framework that uses patterns and relations to understand terrorist behaviors. *Expert Systems with Applications* 78 (2017): 358-375.
- [3] Mohammed Aladeemy, **Salih Tutun**, Mohammad T. Khasawneh: A new hybrid approach for feature selection and support vector machine model selection based on self-adaptive cohort intelligence. *Expert Systems with Applications* 88 (2017): 118-131.
- [4] Sina Khanmohammadi, **Salih Tutun**, Yunus Kucuk: A New Multilevel Input Layer Artificial Neural Network for Predicting Flight Delays at JFK Airport. *Procedia Computer Science* 12/2016.
- [5] Jifan Zhang, **Salih Tutun**, Samira Fazel Anvaryazdi, Mohammadhossein Amini, Durai Sundaramoorthi, Hema Sundaramoorthi, Mitigating the Effect of Covid-19: Management of a Critical Resource Using Double-Deep Q-Learning Models with Tutoring, *Production and Operations Management* (Under Review)
- [6] **Salih Tutun**, Hossein Sangrody, Ali Tosyali, and Mohammad T. Khasawneh, Intelligent Energy Framework for Forecasting Volatile Electricity Consumption Behavior: The Case of Turkey, *Annals of Operation Research* (Under Review)
- [7] **Salih Tutun**, Abdulaziz Ahmed, Sedat Irgil, Ilker Yesilkaya, Esmâ Nur Ucar, Tanalp Sengun, Intelligent Psychiatric Assistant for Detecting Psychological Symptom Patterns, *Decisions Support Systems* (Under Review)
- [8] Ozkan Bali, **Salih Tutun**, Ali Pala, Cihan Çörekçi: A MCDM Approach with Fuzzy DEMATEL and Fuzzy TOPSIS for 3PL Provider Selection, *Sigma* 32, 222-239, 2014
- [9] Emrah Korkmaz, Ercan Izgi, and **Salih Tutun**: Forecasting of short-term wind speed at different heights using a comparative forecasting approach, *Turkish Journal of Electrical Engineering & Computer Sciences* 26. 5 (2018).
- [10] **Salih Tutun**, Murat Akça, Omer Bıyıklı, and Mohammad T. Khasawneh: An Outlier-Based Intention Detection for Discovering Terrorist Strategies. *Procedia Computer Science* 114 (2017): 132-138.

- [11] **Salih Tutun**, Mohammad T. Khasawneh, Jun Zhuang: Networked Pattern Detection Framework for Identifying Suspicious Threats, *Engineering Applications of Artificial Intelligence (Under Review)*.

Conference Proceedings (Peer-Reviewed)

- [1] Hossein Sangrody, Ning Zhou, **Salih Tutun**, Benyamin Khorramdel, Mahdi Motalleb, and Morteza Sarailoo: Long term forecasting using machine learning methods. IEEE Power and Energy Conference at Illinois (PECI), 2018, 1-5.
- [2] **Salih Tutun**, Abdulaziz Ahmet, Sedat Irgil, Ilker Yesilkaya: Detecting Psychological Symptom Patterns Using Regularized Multinomial Logistic Regression. Industrial & Systems Engineering Research Conference (ISERC), Orlando, Florida; 05/2019
- [3] **Salih Tutun**, Mohammad Bataineh, Mohammed Aladeemy, Mohammad T. Khasawneh: The Optimized Elastic Net Regression Model for Electricity Consumption Forecasting. Proceedings of the 5th Annual World Conference of the Society for Industrial and Systems Engineering, San Francisco, CA, USA; 10/2016
- [4] **Salih Tutun**, Sina Khanmohammadi, Chun-An Chou, Yunus Kucuk: Network Topology-based ANFIS Detection Framework for Identifying Terrorism Threats. Industrial & Systems Engineering Research Conference (ISERC), Anaheim, California; 05/2016
- [5] **Salih Tutun**, Sina Khanmohammadi, Lu He, Chun-An Chou: A Meta-heuristic LASSO Model for Diabetic Readmission Prediction. Industrial & Systems Engineering Research Conference (ISERC), Anaheim, California; 05/2016
- [6] **Salih Tutun**, Sina Khanmohammadi, Chun-An Chou: A Network-based Approach for Understanding Suicide Attack Behavior. Industrial & Systems Engineering Research Conference (ISERC), Anaheim, California; 05/2016
- [7] **Salih Tutun**, Haifeng Wang, Zhao Liu, Mehmet F. Yildirim, Sina Khanmohammadi: An Agent-Based Approach for Understanding Complex Terrorism Behaviors. Industrial & Systems Engineering Research Conference (ISERC), Anaheim, California; 05/2016

Conference Presentations and Posters

- [1] **Salih Tutun**, Sedat Irgil, Ilker Yesilkaya: WeCureX: Intelligent Psychiatric Assistant, the Institute for Operations Research and the Management Sciences (INFORMS), Annual Meeting, Phoenix, 2018 (Poster).
- [2] Ehsan Khan, **Salih Tutun**: Predicting organ donation outcome using network-based machine learning algorithms, Global Joint Conference on Industrial Engineering and Its Application Areas, Urgup, Nevsehir; 06/2018.
- [3] **Salih Tutun**, Mohammad T. Khasawneh: New supervised classification approach as Networked Pattern Recognition Framework, Global Joint Conference on Industrial Engineering and Its Application Areas, Urgup, Nevsehir; 06/2018.
- [4] **Salih Tutun**, Chun-an Chou: A New Framework for Terrorist Group Prediction using Artificial Intelligence Techniques. Military Operation Research Society (MORS), Alexandria, Virginia; 06/2015
- [5] **Salih Tutun**, Safak Yakti, Mohammad T. Khasawneh: Networked Pattern Recognition Framework for Classification, the Institute for Operations Research and the Management Sciences (INFORMS), Annual Meeting, at Houston, Texas; 10/2017.
- [6] Erkam Guresen, Gulhan Kutlukaya, **Salih Tutun**: Predicting the Use of Violence using Machine Learning Methods, the Institute for Operations Research and the Management Sciences (INFORMS), Annual Meeting, Philadelphia, PA; 11/2015
- [7] **Salih Tutun**, Mohammad T. Khasawneh: A New Framework for Terrorist Group Prediction using Artificial Intelligence Techniques, the Institute for Operations Research and the Management Sciences (INFORMS), Annual Meeting, Nashville, Tennessee, 11/2016
- [8] **Salih Tutun**, Chun-an Chou: Prediction of Net Electricity Consumption by Using Forecasted Scenario Approach, Industrial & Systems Engineering Research Conference (ISERC), Nashville, Tennessee, 05/2015
- [9] **Salih Tutun**, Chun-an Chou: Understanding Patterns or Relations of the Terrorist Attacks in Big Data to Prevent Future Threats, the Institute for Operations Research and the Management Sciences (INFORMS), Annual Meeting, Philadelphia, PA; 11/2015.
- [10] **Salih Tutun**, Abdulaziz Ahmad, Sedat Irgil, Ilker Yesilkaya, Tulay Korkusuz: Behavioral Business Intelligence Approach for Occupational Health & Safety, the Institute for Operations Research and the Management Sciences (INFORMS), Annual Meeting, Seattle, 2019.

Professional & Academic Experience

- Jan 2020 – Present **Faculty of Olin Business School and Faculty Scholar at Institute for Public Health**
Washington University in St Louis
Clayton, MO, USA
- Teaching for Deep Learning, Intro to Python and Data Science Course, Statistics, and SQL programing
 - Developing Deep NEPAR Learning for Detecting Dementia and Alzheimer Disease
- Feb 2019 – Dec 2019 **Postdoctoral Research Fellow**
Binghamton University, State University of New York
Systems Science and Industrial Engineering, Binghamton, New York, USA
- WeCureX: Intelligent Psychiatry Assistant for understanding mental disorders
 - Behavioral-based Business Intelligence for Occupational Health and Safety
- Feb 2018 – Feb 2019 **Co-founder Researcher at WeCureX Research Lab.**
DNB Analytics Inc., Balikesir, Turkey
Develop new AI tools for
- Assessed major symptoms of social and personal maladjustment
 - Identified suitable candidates for high-risk public safety positions
- Sep 2015 – Dec 2015 **Teaching Assistant**
Binghamton University, State University of New York
Systems Science and Industrial Engineering, Binghamton, New York, USA
- Advanced Topics in Healthcare (Graduate Course)
 - Used advanced data mining for healthcare applications
 - Grading HWs, final projects, and exams with providing optimal solutions
- Aug 2013 – Dec 2016 **Research Assistant and Data Scientist**
Binghamton University, State University of New York
Systems Science and Industrial Engineering, Binghamton, New York, USA
- Project: The NEPAR: Networked Pattern Recognition Framework and Preventing Terrorist Activities
 - Proposed and developed new techniques in machine learning and data mining that can perform better than existing algorithms
- Sep 2010 – May 2011 **Project Assistant**
Erciyes University
Industrial Engineering, Kayseri, Turkey
- Project: New Energy Framework for managing the level of future electricity needed
- Jun 2009 – Aug 2009 **Engineering-Intern**
DAF-TIRSAN Automotive Company
Industrial Engineer, Adapazari, Turkey
- Lean Product, Improvement in the Automobile Service Industry by Using Value Stream Mapping
 - Helped workers to manage lean product
- Jun 2008 – Aug 2008 **Engineering-Intern**
Federal Electric Company
Industrial Engineer, Adapazari, Turkey
- Learned Concepts of Lean Product
 - Made engineering intern in Federal Electric Company

Skills, Activities& Strengths

Computer skills	Programming Language	Python, (Tensorflow, Pytorch, Keras), R, Java, MATLAB, Visual Basic
	Statistical Analysis	R, SAS, SPSS, Minitab
	Artificial Intelligence Applications	

	Academic Software	Python, R, Java, Tableau, PostgreSQL, Microsoft Azure, Apache Spark, Flutter, Android Studio, Visual Studio, AWS, Flutter, Firebase, Dialogflow, GEPHI, Weka
	Operations Research	Latex, Colab, Jupyter, Git
	Simulation	Python, CPLEX, LINGO, LINDO
	Decision Making	Arena, Simio, Python(NetworkX)
	Web Design	Expert-Choice (AHP), Super Decisions (ANP) Flask and Django
Language skills	English (Professional working proficiency) German (Elementary proficiency) Turkish (Native or bilingual proficiency)	
Scientific Groups	IISE, INFORMS, MORS, IEEE	

Institutional and Professional Service

Project Reviewer

- National Science Foundation (NSF) for Decision, Risk, and Management Sciences

Journal Reviewer

- Expert Systems with Applications-Elsevier (2016)
- The Open Fuels & Energy Science Journal (2017)

Conference Reviewer

- Industrial & Systems Engineering Research Conference (ISERC)(2014)
- Complex Adaptive Systems Conference-Missouri S&T(2015)

Conference Section Chair

- Complex Adaptive Systems Conference-Missouri S&T (2015)
Intelligent adaptive Systems-Track
- Industrial & Systems Engineering Research Conference (ISERC)(2015)
Homeland Security-Track

Guest Lectures

- SSIE 641: Advanced Topics in Network Science (Fall 2015)
- SSIE 520: Modeling and Simulation (Fall 2014)
- SSIE 523: Collective Dynamics of Complex Systems (Spring 2016)

Awards & Grants

- 11/2020 Award: IISE 2020 Cup Competition - Finalist.
- 07/2016 Award: Binghamton University National News Hits on MSN.com and Science Daily for the NEPAR framework.
Total Circulation: Over 9 million in two months
- 07/2016 Award: Watson School Graduate Research Ambassador Award
- 12/2015 Grant: GSO Traveling Grant, Graduate School, Binghamton University
- 04/2015 Award: Alpha Pi Mu – Industrial Engineering Honor Society, Binghamton University, NY
- 09/2013 Grant: Ph.D. Graduate Education Scholarship
- 11/2011 Grant: ERASMUS-Germany - master's degree (Exchange Program),
Hochschule Niederrhein (University)
- 06/2010 Award: Ranked 7th for an undergraduate degree