

Mojtaba Khodadadi

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Born in Sep 1991

Research Interests

Application of Machine Learning in Data Analysis, Computational Neuroscience, Network Science, Human Behavior, Human Decision Making, Spread of Information in Networks, The Physics of Data, Collective Phenomena in Complex Systems, Stochastic Processes, Statistical Physics of {Complex Networks, Social Systems, Financial Markets}, Computational Social Science, Econophysics, Computational Finance.

Education

- 2015 – 2016 **ICTP Postgraduate Diploma Programme in Physics**, *International Centre for Theoretical Physics (ICTP)*, Trieste, Italy.
◦ Thesis: "Application of the Critical Variable Selection in Keyword Extraction". [abstract](#)
◦ Supervisor: [Prof. Matteo Marsili](#).
- 2013 – 2015 **M.Sc. Condensed Matter Physics with Highest Distinction (Summa Cum Laude)**, *Isfahan University of Technology (IUT)*, Isfahan, IR.
◦ GPA: 19.15/20 (%96, 4.00/4.00), thesis grade: 19.5/20 (%98, 4.00/4.00).
◦ Master's thesis: "Investigation of Epileptic Seizures by Analyzing EEG Data using Machine Learning". [abstract](#)
◦ Supervisor: [Dr. Farhad Shahbazi](#).
- 2009 – 2013 **B.Sc. Physics with Distinction**, *Isfahan University of Technology (IUT)*, Isfahan, IR.
◦ GPA: 17.54/20 (%88, 3.78/4.00), and Major GPA: 17.82/20 (%90, 3.85/4.00).
- 2005 – 2009 **Diploma Mathematics & Physics**, *Saadi High School & Adle Pre-University School*, Isfahan, IR.
◦ Diploma GPA: 19.69/20 (%98, 4.00/4.00), and Pre-University GPA: 19.51/20 (%98, 4.00/4.00).

Selected Honors and Awards

Computer-related:

- 2013 **Merit-Based Admission Offer**, to Master's Program in both **Software Eng. and AI** without entrance exam, *School of Computer Engineering, Iran University of Science and Technology*, Tehran, IR (declined).
- 2010 **Honored as Outstanding Researcher**, *SBM Project*, President of IUT, Isfahan, IR.
- 2010 **Institute of Steel Employee Support & Retirement Fund Award**, *SBM Project*, Chairman & CEO, IR.
- 2009 **Ranked 2nd in 11th Iran's National Youth Kharazmi Award with the Statuette**, for "Smart Bandwidth Manager (SBM)" Project, Minister of Science, Research and Technology & Minister of Education, IR.

Physics-related:

- 2016 **PhD Admission Offer with 4-year Fellowship**, in both **Statistical Physics** and **Physics & Chemistry of Biological Systems** program, *International School for Advanced Studies (SISSA)*, Trieste, Italy (declined).
- 2010 & 2015 **Isfahan University of Technology Dean Award with the Statuette**, President of IUT, Isfahan, IR.
- 2014 & 2015 **Ranked 1st, out of 70 Students**, in all Programs of M.Sc. Physics according to GPA, IUT, Isfahan, IR.
- 2014 & 2015 **Ranked 1st, out of 33 M.Sc. Students**, in Condensed Matter Physics Program according to GPA, IUT.
- 2013 **Ranked 15th in 18th Iran's National Collegiate Scientific Olympiad**, among all B.Sc Physics Students of Nation, IR.
- 2013 **Merit-Based Admission Offer**, to full-time Master's Program in **Physics** without Entrance exam, IUT, IR.
- 2013 **Ranked 4th, out of 67 in Undergraduate Physics program**, according to GPA, IUT, Isfahan, IR.

Fellowships & Grants

- 2015 – 2016 **ICTP Scholarship and Travel Grant**, International Centre for Theoretical Physics, Trieste, Italy.
- 2013 – 2015 **Iran's National Elites Foundation 2-year Graduate Fellowship**, Government of Iran.
- 2010 & 2015 **University Outstanding Student Scholarship**, Isfahan University of Technology, Isfahan, IR.
- 2014 **Isfahan University of Technology Research Grant**, for Master's Thesis, Isfahan, IR.
- 2009 – 2013 **Iran's National Elites Foundation 4-year Undergraduate Fellowship**, Government of Iran.
- 2011 **Isfahan Science & Technology Town (ISTT) Research Grant**, for eCMS Project, Isfahan, IR.
- 2010 **Iran's National Elites Foundation Research Grant**, for "Smart Bandwidth Manager (SBM)" Project, Vice President for Science and Technology, Government of Iran.

Teaching Experience

Invited Lectures

- Winter 2015 **Scientific Computing with Python: An Introduction to Data Analysis & High Performance Computing (16 hours)**, for **graduate students of Physics**, Department of Physics, *Isfahan University of Technology (IUT)*, Isfahan, IR. [more info](#). [certificate](#), [github](#).
- Winter 2014 **Python Short Course for Physics Students: An introduction to Scientific Computing (14 hours)**, , Department of Physics, *Isfahan University of Technology (IUT)*, Isfahan, IR. [certificate](#), [github](#).
- Summer 2010 **Java Programming Course: from Novice to Professional (50 hours)**, **at the age of 18**, for **senior and graduate students of Computer Science & Engineering**, Electronic and Open Learning Center, *Isfahan University of Technology (IUT)*, Isfahan, IR. [more info](#) [certificate](#).

Teacher Assistant

- Spring 2015 **Advanced Statistical Mechanics I (graduate course)**, Physics Dept., IUT, IR.
- Spring 2015 **Advanced Statistical Mechanics II (graduate course)**, Physics Dept., IUT, IR.
- Fall 2014 **Modern Physics**, Physics Dept., IUT, IR.

Presentations

- Fall 2015 **Monthly Presentation (in English)**, *Instructor: Dr. N. Seriani*, Statistical Physics, ICTP, Trieste, Italy.

Publications

- Sep 26 - Oct 2, 2015 M. Khodadadi, F. Shahbazi, "**Classification of Epilepsy Focus in Interictal and Ictal States**", *accepted for 20-minute presentation at Conference On Complex Systems 2015*, Tempe, Arizona, USA. [link](#).
- In preparation M. Khodadadi, F. Shahbazi, "**PyMarkov: A Python Module for Markovian Stochastic Processes**".
- In preparation M. Khodadadi, F. Shahbazi, "**PyCorrState: A Python Package for Correlation States Extraction**".
- Current project M. Khodadadi, M. Akbarzadeh, M. Marsili, "**Study of the Network of Taxi Data in the City of Isfahan**".
- Current project M. Khodadadi, M. Marsili, "**Critical Variable Selection as a Keyword Selection Method**".

Research Experience

- Nov 2016 – Feb 2017 **Visiting Scientist**, working with *Prof. Matteo Marsili*, Quantitative Life Sciences section, International Centre for Theoretical Physics (ICTP), Trieste, Italy.
Fields of research: Keyword Extraction, Data Analysis, Complex Systems, Statistical & Machine Learning, Text Mining.
◦ Designing and building a keyword extraction tool based upon Critical Variable Selection (CVS).
- Sep – Oct 2016 **Visiting Researcher**, working with *Dr. Marzieh Zare*, School of Computer Science, Institute for Research in Fundamental Sciences (IPM), Tehran, IR.
Fields of research: Data Analysis, Machine Learning, Computational Neuroscience, Complex Systems.
◦ Identifying correlation states of the brains of 12 patients suffering language-based learning disorder (LLD).
- Sep – Nov 2016 **Visiting Researcher**, working with *Dr. Meisam Akbarzadeh*, Department of Transportation Engineering, Isfahan University of Technology, Isfahan, IR.
Fields of research: Data Analysis, Network Science, Public Transportation, Power Law Behavior.
◦ Investigating taxi services data in the city of Isfahan and study dynamics of its network.
- May – Sep 2016 **Graduate Researcher (ICTP Diploma's Thesis)**, under supervision of *Prof. Matteo Marsili*, Quantitative Life Sciences section, International Centre for Theoretical Physics (ICTP), Trieste, Italy. [abstract](#).
Fields of research: Keyword Extraction, Data Analysis, Complex Systems, Statistical & Machine Learning, Text Mining.
◦ Implementing the Critical Variable Selection (CVS) algorithm in Python and Fortran via Stochastic Gradient Descent.
◦ Designing and building a keyword extraction tool based upon CVS.
- 2014 – 2015 **Graduate Researcher (Master's Thesis)**, under supervision of *Dr. F. Shahbazi*, Physics department, Isfahan University of Technology, Isfahan, IR. [abstract](#).
Fields of research: EEG Data Analysis, Machine Learning, Stochastic Processes, Complex Systems.
◦ Doing computation on **14 GB data**.
◦ Identifying epileptic seizures focus by correlation matrix and stochastic processes methods.
◦ Investigating the possibility of seizure prediction using hierarchical clustering of correlation matrices of different parts of brain over time.
- 2011 – 2013 **Researcher**, Association of Efflorescence Creativity, *Isfahan Science & Technology Town (ISTT)*, Isfahan, IR.
◦ Implementing an integrated *Electronic Content Management System (eCMS)* and upgrading eLibrary to eCMS.
- 2007 – 2011 **Researcher**, IT Center, *Isfahan University of Technology (IUT)*, Isfahan, IR.
◦ Designing and implementing *Smart Bandwidth Manager (SBM)* core, and developing and testing SBM v2.2.1.
- 2010 **Researcher**, Research Projects Office, *Isfahan Science & Technology Town (ISTT)*, Isfahan, IR.
◦ Developing, testing and debugging SBM v2.1.1 .

Relevant Courses

- Apr – May 2016 Machine Learning & Markov Processes, [Spring College on the Physics of Complex Systems](#) at ICTP.
- Online Courses Machine Learning (A. Ng, Coursera), Probabilistic Graphical Model (D. Koller, Coursera).
- Postgraduate Program, ICTP Statistical Mechanics (E, %100), Numerical Methods (E, %100), Numerical Methods II (E, %100).
E: Excellent. [grading system](#)
- M.Sc., IUT Computational Physics (20, %100), Advanced Statistical Mechanics (19.1, %96),
Advanced Statistical Mechanics II containing structure & dynamics of complex networks and stochastic processes (20, %100). [grading system](#)
- B.Sc., IUT Computational Physics (20 out of 20, %100), Statistical Mechanics (20, %100), Biophysics (20, %100).

Computer Skills

11 years experience in computer programming.

- Java **8 years experience**,
- Multithreaded Programming, Object Oriented Programming, Socket Programming, Web Scraping.
 - JSP, JSF, Hibernate, Swing, JUnit, Log4j, GWT, NIO, Java Sockets, RegEx, iText, Servlets, Struts, JDBC.
- Python **4 years experience**,
- Scientific Computing.
 - NumPy, Pandas, Matplotlib, Scikit-learn, SciPy, VPython, Dask, NetworkX, Graph-tool, Blosc, Bcolz.
- Database MySQL, SQLite.
- Software Gephi, Mathematica, Maple.
- IDE & Editor Netbeans, IPython, Spyder, IEP IDE, PyScripter, Ninja IDE, Spyder, Eclipse.
- Other GIT, Fortran, C++, PHP, Javascript, AJAX, SQL, LaTeX.

Work Experience

- 2008 – 2011 **Java Developer**, *IT Center, Isfahan University of Technology*, Isfahan, IR.
- Designing, Implementing and Developing the *Electronic Library (eLibrary)*.
 - Testing the *Smart Bandwidth Management (SBM)* on the IUT internet network.
 - Programming & developing more than **80 web and desktop projects** in Java.

Long Projects

- 2008 – 2010 **Smart Bandwidth Manager (SBM)**, *IT Center, Isfahan University of Technology (IUT)*, Isfahan, IR.
SBM is a dynamic network bandwidth management software that I and my friend have implemented at IT Center of IUT when we were high school students. **SBM saves 48,000\$ per year for Isfahan University of Technology.**
Awards: 2nd, 3rd & 4th award in [Honors & Awards](#) section and the last grant in [Fellowships & Grants](#) section are related to this project. I started working on this project **at the age of 16**. [more info](#)
- 2011 – 2013 **Electronic Content Management System (eCMS)**, *Isfahan Science & Technology Town (ISTT)*, IR.
eCMS is a research project which its main task is extracting metadata from ebook files and checking them with LoC website for validity. It also uses Tesseract OCR technology for scanned ebooks.
Awards: 6th grant in [Fellowships & Grants](#) section is related to this project. [more info](#)
- 2007 – 2010 **Electronic Library (eLibrary)**, *IT Center, Isfahan University of Technology (IUT)*, Isfahan, IR.
eLibrary enables users to search in metadata and subject of ebooks. **eLibrary was sold to two universities each paid 8000\$ (equals to 5 years' salary of one employee in Iran).** [more info](#)

Non-Academic Courses

- Summer 2012 **Introduction to Market Research and Marketing**, Isfahan Science & Technology Town (ISTT), IR.
- Fall 2011 **Ideas and Opportunities**, Isfahan Science & Technology Town (ISTT), Isfahan, IR.
- Summer 2011 **Entrepreneurship**, SITCO International, NIIT Isfahan Center, Iran's National Elites Foundation (BMN), IR.
- April 2010 **Security & Hack**, Ashiyaneh Security Corporation, Tehran, IR.

Participation in Conferences & Workshops

- Summer 2014 **4th Iran's Workshop on Computational Neuroscience**, Physics Dept., IASBS, Zanjan, Iran.
- Fall 2013 **Workshop on Physics of Polymers and Biopolymers**, School of Physics, IPM, Tehran, Iran.
- Fall 2013 **2nd IPM Conference on Soft Matter, Biological and Statistical Physics**, School of Physics, IPM.

Conference Organization

- January 2015 **12th Iran National Conference on Condensed Matter Physics**, *Member of Organization Committee*, IR.
- September 2014 **International Iran Conferences on Quantum Information 2014 (IICQI)**, *Member of Local Coordinating Committee*, Sharif University of Technology and Isfahan University of Technology, Isfahan, IR. [more info](#).