Mojtaba Khodadadi

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Research Interests

Application of Machine Learning in Data Analysis, Computational Social Science, User & Human Behavior, Human Decision Making, Online Social Media Analysis, Spread of {mis}Information in Social Media, Social Physics, Computational Neuroscience, Collective Phenomena, Stochastic Processes, Statistical Physics of {Complex Networks, Social Systems, Financial Markets}, 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 & Outstanding Honor (egregia 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)*.

Relevant Courses

Aug 2018   Big Data Tools and Technology, Real Time Event Processing, Low Latency Query, Analyzing Social Media and Customer Sentiment (Kafka, ZooKeeper, Spark, Cassandra), The CODATA-RDA Research Data Science Advanced Workshops on Internet of Things (IoT)/Big-Data Analytics at ICTP, Trieste, Italy.

Aug 2018   Research Data Management, Curation and Security for Open Science, Large-scale Data Handling, Analysis, Visualization and Modeling Technique, The CODATA-RDA Research Data Science Summer School at ICTP.

Jun 2018   Sensing Web Social Signals for Cryptocurrencies, Data Science & Computational Social Science, ETH Crypto Datathon 2018, powered by ETH COSS & SoBigData, Zurich, Switzerland.

Feb – Mar 2018   Reinforcement Learning, Bayesian Learning, and Statistics of Extremes in Correlated Systems (**all passed with exams**), Spring College on the Physics of Complex Systems at ICTP, Trieste, Italy.

Apr – May 2016   Machine Learning, and Markov Processes, Spring College on the Physics of Complex Systems at ICTP.

Online Courses   Machine Learning (A. Ng, Coursera).

Postgraduate Program, ICTP   Statistical Mechanics (E, %100), Numerical Methods (E, %100), Numerical Methods II (E, %100) at ICTP. 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).

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 Activity**, *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**, *for "Smart Bandwidth Manager (SBM)" Project*, Minister of Science, Research and Technology & Minister of Education, IR.

Physics-related:

2016   **Two PhD Admission Offers with 4-year Fellowship**, in **Statistical Physics** and **Physics & Chemistry of Biological Systems** programs, International School for Advanced Studies (SISSA), Trieste, Italy (declined).

2010 & 2015	**Isfahan University of Technology Dean Award**, 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

2018	**SISSA Postgraduate Fellowship**, International School for Advanced Studies (SISSA), Trieste, Italy.
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.

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.

Research Experience

Jun'18 – present	**Visiting Researcher**, *working with Dr. Chris Mathys, and Prof. Matteo Marsili*, Cognitive Neuroscience section, International School for Advanced Studies (SISSA) and Quantitative Life Sciences section, International Centre for Theoretical Physics (ICTP), Trieste, Italy. ○ Backtesting different strategies on historical Forex data. ○ Investigating the possibility of seizure prediction using hierarchical clustering of correlation matrices of different brain regions over time and identifying epilepsic seizures' focus.
Jun'17 – present	**Self-employment**, *Analyzing Tehran Stock Exchange (TSE)*, IR. ○ Backtesting different strategies on historical Tehran Stock Exchange data.
Mar'17 – Feb'18 *part-time*	**Volunteer Researcher**, *working with Dr. Meisam Akbarzadeh*, Department of Transportation Engineering, Isfahan University of Technology, Isfahan, IR. ○ Investigating taxi services data in the city of Isfahan and study dynamics of its network. ○ Identifying journey-map states using hierarchical clustering of the map of journeys at different times.
Nov'16 – Feb'17	**Visiting Scientist**, *working with Prof. Matteo Marsili*, Quantitative Life Sciences section, International Centre for Theoretical Physics (ICTP), Trieste, Italy. ○ Designing and building a keyword extraction tool based upon Critical Variable Selection (CVS).
Sep'16 – Nov'16	**Volunteer Researcher**, *working with Dr. Meisam Akbarzadeh*, Department of Transportation Engineering, Isfahan University of Technology, Isfahan, IR. ○ Investigating taxi services data in the city of Isfahan and study dynamics of its network.
May'16 – Sep'16	**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. ○ 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. Farhad Shahbazi*, Physics department, Isfahan University of Technology, Isfahan, IR. abstract. ○ Identifying epilepsy 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**, *IT Center, Isfahan University of Technology (IUT) & Isfahan Science & Technology Town (ISTT)*, IR. ○ Implementing an integrated *Electronic Content Management System (eCMS)* and upgrading *eLibrary* to *eCMS*. ○ Implementing and developing *Smart Bandwidth Manager (SBM)*.

Invited Lectures and Talks

March 2018	**Investigation of Epileptic Seizures by Analyzing EEG Data using Machine Learning**, *ETH COSS*, Zurich, Switzerland.

Winter 2015	**Scientific Computing with Python: An Introduction to Data Analysis & High Performance Computing (16 hours)** , at the age of 23, for graduate students of Physics, *Department of Physics, Isfahan University of Technology (IUT)*, Isfahan, IR. more info. invitation-certificate, github.
Winter 2014	**Python Short Course for Physics Students: An introduction to Scientific Computing (14 hours)** , at the age of 22, for graduate students of Physics, *Department of Physics, Isfahan University of Technology (IUT)*, Isfahan, IR. invitation-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 invitation-certificate.

Computer Skills

13 years experience in computer programming & **4 years experience** in data analysis.

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	**5 years experience**,
	○ Scientific Computing.
	○ NumPy, Pandas, Matplotlib, Scikit-learn, SciPy, Jupyter, VPython, Dask, NetworkX, Graph-tool, Blosc, Bcolz.
Big Data	Spark, Hadoop, Kafka, ZooKeeper, Apache Cassandra, MongoDB .
Software	Gephi, Mathematica, Maple.
Other	GIT, R, Fortran, C++, PHP, Javascript, AJAX, MySQL, SQLite, 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.

Teacher Assistantship and Selected Presentation

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.
Fall 2015	**Monthly Presentation (in English)**, *Instructor: Dr. N. Seriani & Dr. O. Gonzalez*, Condensed Matter & Statistical Physics, ICTP, Trieste, Italy.

Computer-related 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.

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.

References

Prof. Matteo Marsili, *ICTP*, marsili@ictp.it, +390402240461, Trieste, Italy.

Dr. Farhad Shahbazi, *IUT*, shahbazi@cc.iut.ac.ir, +983133913755, Isfahan, Iran.

Dr. Sebastiano Pilati, *ICTP & UNIPD*, spilati@ictp.it, sebastiano.pilati@unipd.it, Italy.

Dr. Alessandro Silva, *SISSA & ICTP*, asilva@sissa.it, +390403787420, Trieste, Italy.

Dr. Keivan Aghababaei Samani, *IUT*, samani@cc.iut.ac.ir, +983133913763, Isfahan, Iran.

Dr. Mojtaba Alaei, *IUT*, m.alaei@cc.iut.ac.ir, +983133913704, Isfahan, Iran.