Ehsan Hoseinzade

Education

2016-present **Masters of Computer Science**, University of Tehran.
GPA: 18.93/20 - Ranked 1st according to GPA
Thesis: Using Deep Learning in Financial Markets Prediction
Supervisor: Dr. Saman Haratizadeh

2012-2016 **Bachelor of Computer Science**, Shahid Beheshti University.
GPA – 17.44/20 - Ranked 3rd according to GPA
Thesis: A survey on bitcoin
Supervisor: Dr. Ziba Eslami

Research Interests

- Machine Learning
- Deep Learning
- Computational Finance
- Natural Language Processing
- Social Networks
- Game Theory

Publication and Projects

M.Sc. Thesis **Hoseinzade E, Haratizadeh S. "CNNPred: CNN-based stock market prediction using several data sources"**, *Expert systems with applications*, Under review, full length paper.

Abstract: Feature extraction from finnancial data is one of the most important problems in market prediction domain for which many approaches have been suggested. Among other modern tools, convolutional neural networks (CNN) have recently been applied for automatic feature selection and market prediction. However, in experiments reported so far, less attention has been paid to the correlation among different markets as a possible source of information for extracting features. In this paper, we suggest a CNN-based framework with specially designed CNNs, that can be applied on a collection of data from a variety of sources, including different markets, in order to extract features for predicting the future of those markets. The suggested framework has been applied for predicting the next days direction of movement for the indices of S&P 500, NASDAQ, DJI, NYSE, and RUSSELL markets based on various sets of initial features. The evaluations show a significantly improvement in predictions performance compared to the state of the art baseline algorithms.

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M.Sc. Thesis **Hoseinzade E, Haratizadeh S."HCNNPred: CNN-based stock market prediction using hierarchy training and universal feature extractor"**, *Under preparation*, full length paper.

HCNNpred is a novel framework based on Convolutional Neural Network which consists of three sections. First, applying CNN which is trained in a regular manner on the input data (outperforms baseline algorithms). Second, improving accuracy of prediction using a hierarchy training of CNN (outperforms step 1). Third, prediction of stocks using universal feature extractor (outperforms baseline algorithms). To measure performance of HCNNpred, we have used 458 stocks in S&P 500 index as well as 5 major indices of U.S. market.

M.Sc. Thesis **Prediction of stock markets using semi-supervised models and deep learning**, Ongoing.

Main purpose of this undergoing project is to predict daily directional movement of various stocks and commodities around the world using graph-based semi-supervised models and feature representation based on deep learning.

Miscellaneous **Prediction of Dow-Jones Stocks using genetic algorithm and regression with Huber loss function**, *Under preparation*, Persian.

Prediction of financial markets is a difficult task due to it's noisy behavior. Technical Analysts have been able to get better results by taking advantage of empirical rules. However, human's limited ability in extracting complicated principles makes it useful to utilize artificial intelligence algorithms in order to find more valuable principles. Vast domain of prediction rules makes it almost impossible to search all of it and because of that researchers have used search techniques algorithms like genetic algorithm to does this search in a reasonable time. In this paper genetic algorithm is used to generate optimal principles for prediction of stock markets. Extracted rules as well as regression with Huber loss function that is appropriate for noisy data like stock market are responsible for evaluation of 30 stocks in Dow-Jones index. Then, one stock is chosen as the best one for investment in the next week. The proposed algorithm, not only outperformed baseline algorithms so that it is statistically proven, but also gained about 14% return during a period of 3 months.

Miscellaneous **Forecasting stock markets using text mining**.

In this project, 25 most important topics of each day were converted to feature vectors through text mining techniques. Different classifiers utilized extracted feature vectors for prediction of Dow Jones Industrial Average. Results showed up to 59% accuracy.

Miscellaneous **Prediction of Iran's stock market**.

Main purpose of this project was to predict sell and buy probability of 100 various stocks using different deep learning and machine learning approaches. Corresponding data came from Tadbir broker.

Miscellaneous **Prediction of Iranian presidential election**, *2017*.

Our team predicted presidential election using 1.5 million posts of various channels of the Telegram.The results were satisfying and relatively close to the actual results of the election.

Miscellaneous **Prediction of return of commodities**.

In this project, I used Naive Bayes to predict the returns of various commodities based on historical data. I got around 67% accuracy in forecasting the returns. Data of this of project came from Data Mining Cup (Germany-2014).

Experience

Research Assistant

2016-present As a member of KDD lab, I am working on Machine Learning, Deep Learning, Natural Language Processing, Graph Modeling and their applications in financial markets prediction.

Teaching Assistant

Fall 2018 **Machine Learning**, *Graduate*, Instructor: Dr. Saman Haratizadeh.

Spring 2018 **Mining of Massive Datasets**, *Graduate*, Instructor: Dr. Saman Haratizadeh.

Fall 2017 **Machine Learning**, *Graduate*, Instructor: Dr. Saman Haratizadeh.

Fall 2017 **Fundamentals of Soft Computing**, *Graduate*, Instructor: Dr. Hadi Veisi.

Spring 2016 Fundamentals of Computing Theory, *Undergraduate*, Instructor: Dr. Hadi Farahani.

Spring 2016 Theory of Computation, *Undergraduate*, Instructor: Dr. Hadi Farahani.

Fall 2013 Fundations of Programming, *Undergraduate*, Instructor: Dr. Kamyar Izadi.

Honors and Awards

2018 Full scholarship of the Big Data Economics summer school, Iran, See website

2016 Offered Admission to Computer Science M.Sc. Program at Shahid Beheshti University without Entrance Examination

2016 Ranked 10^{th} in National Graduate Entrance Examination in Computer Science (Decision Science & Knowledge Engineering), Iran

2015 10^{th} Place in Asia Regional ACM-ICPC (International Collegiate Programming Contest), Asia Tehran Site

Courses and Certificates

Online Courses

2017 **Machine Learning**, Stanford University, See Certificate

2017 **Neural Network for Machine Learning**, University of Toronto, See Certificate

2017 **Statistical Learning**, Stanford University, **with distinction**, See Certificate

2017 **Deep Learning 101**, IBM, See Certificate

2016 **Data Science Foundations** - Level 1, IBM, See Certificate

2015 Cryptography, University of Maryland, See Certificate

2015 Image and video processing, Duke University, See Certificate

2015 Compiler, Stanford University, See Certificate

2014 Cryptography I, Stanford University, **with distinction**, See Certificate

2014 Automata, Stanford University, **with distinction**, See Certificate

2014 Algorithms: Design and Analysis, Part 1, Stanford University, See Certificate

2014 Introduction to Logic, Stanford University, See Certificate

2014 Programming for Everybody-python, University of Michigan, **with distinction**, See Certificate

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M.Sc. Courses

- Machine Learning: 20/20
- Game Theory: 19/20
- Mining of Massive Datasets: 18.9/20
- Multiple Criteria Decision Making: 19/20
- Soft Computing: 20/20
- Statistical Methods in NLP: 20/20
- Statistical Learning: 16/20
- Advanced Numerical Methods: 18.3/20

Skills

Programming Languages: Python, Java, C++, R, MATLAB
Machine Learning: Keras, Tensorflow, Sklearn, NLTK, Weka, Hadoop, Pandas
Web Technologies: HTML, CSS, PHP, JavaScript
Operating System: Windows, Linux

Languages

Persian Native
English TOEFL : 102 (R:27, L:25, S:24, W:26)

Interests

- Playing chess
- Following NEWS
- Reading books
- Hiking

References

Available upon request

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