europass Curriculum Vitae

PERSONAL INFORMATION

Mojtaba Moattari

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Sex Male | Date of birth 19/09/1991 | Nationality Iranian

WORK EXPERIENCE

2018 - 2020 — Software developing and Machine Learning

Shiraz research and development center.

- Biological Data Analysis, Artificial Intelligence, Computer Vision, Interface design

Business or sector : sector

2015 - 2017 — Cognitive Trace Data Analysis, Machine Learning

Amirkabir University of Technology, Signal Analysis Lab.

- EEG Signal Processing, Paradigm Study, Statistical / Supervised Model Inference

Business or sector : sector

2011 - 2013 — Projects Management

Image Analysis Projects, Object Detection, Shiraz university Radio-Amatory & Machine Vision Lab.

- Ultrasonic, touching calculator, anti-theft device, Visualization, Car Plaque Detection, Text2speech

Business or sector : business

EDUCATION

2009 – 2013 — B.Sc. in Electrical Engineering

Shiraz University, Shiraz, Iran

- 1274th out of 200K participants in nation-wide exam
- Thesis Score: 3.80 / 4.00
- Last two terms were on leave.

B.Sc. Project
- Persian text to speech converter. **Supervisor**: Dr. R. Sameni (Full Professor)

Also Passed In B.Sc
- Machine Vision (18/20), Biological Signal Processing (17.75/20), Statistical Pattern Recognition (Audit), Programming Basic (19.8/20)

2014 – 2016 — M.Sc. in Bioelectrical Engineering

Polytechnic University, Tehran, Iran

- 299th out of 8709 participants in nation-wide exam

M.Sc. Project
- Thesis Score: 4.00 / 4.00 **Supervisor** : Dr. MH. Moradi (Full Professor)
- : EEG classification performance improvement in speech imagery BCI using dictionary learning.

Passed In M.Sc
- My master thesis presentation in English: Click Here
- Estimation and Detection theory (19.5/20), Fuzzy Systems (17 / 20), Advanced DSP (17 / 20)

PERSONAL SKILLS

Mother Tongue(S): Farsi

Other Language(S)

UNDERSTANDING		SPEAKING		WRITING
LISTENING	READING	SPOKEN INTERACTION	SPOKEN PRODUCTION	
28 / 30 (TOEFL)	26 / 30 (TOEFL)	27 / 30	20 / 30 (TOEFL)	25 / 30 (TOEFL)

English
(Dec 2019 TOEFL score : 99/120)

Communication Skills
- Substantial teamwork experience developed during at least 4 years of mutual projects development
- Interactive teaching skills due to listening to huge number of scientific talks (i.e. TED, …) and dialogues.

Job-Related Skills
- Deep knowledge of brain cognition, psyche, along with insights in statistics, informatics and Artificial Intelligence, has made me an innovative researcher and developer to ideate computational technologies from neuroscience and cognitive science.
- Persistent devotion of my week time to understand art and creative technological designs, has helped me invent, innovate and design out of the box.

Digital Skills

SELF-ASSESSMENT				
INFORMATION PROCESSING	COMMUNICATION	CONTENT CREATION	SAFETY	PROBLEM SOLVING
PROFICIENT	PROFICIENT	PROFICIENT	PROFICIENT	PROFICIENT

Software Skill

7 years experience: MATLAB (Statistics and Machine Learning) | Python Programming (Machine Learning and Big Data) | Python Libraries: PyTorch/Tensorflow/ Numpy/ Scipy/ Pandas / Tensorboard | EEGLAB, ACT-R | VB6 / VB-Script / Office

Over 4 years: C++ / Objective C (Visual Studio/DevC) | Open-CV library

Under 2 year: GUIDE (Matlab GUI programming) | Linux (BASH script) | Java | PHP and Wordpress (Web development with background of managing two websites)

Other Skills

Teaching Over 4 years to students/children, experiencing the way they form concepts

Poetry Using natural attractions to generate poems to teach geometry concepts to children

Memes Educational memes to clarify Machine Learning Concepts (ex. Statistical Inference, …)

Driving Licence B

TEACHING EXPERIENCES

2018 Teaching — Dimensionality Reduction Workshop, Tehran, Iran

2012-2014 Teaching — Radioamatory, Shiraz University, Shiraz, Iran. Holding a number of workshops on MATLAB, C programming, AVR microcontrollers programming, at Shiraz University.

2009-2011 Teaching Assistant — Shiraz University, Iran. C-Programming /Tearcher: Prof. A. Rabiee (T.A. : Oct2009- Jan2010 |Mar2010- June2010 |Oct2011- Jan2012.)

2012 — Matlab GUI Programming Workshop, Shiraz University, Iran

RESEARCH INTERESTS

Multimodal fusion of textual trace data, cognitive time-series, and images. Cognitive NLP and Computational Linguistics.

Word Sense Disambiguation, Hybrid Rule_Based-Learning_Based models, Domain Adaptation

Knowledge Engineering, Word2Vec, Knowledge Graph Embedding, Hybrid Rule-Learning-Base

Data Driven (un)supervised Dictionary Learning, Statistical Inference Models

Educational Technology, Innovative, Creative, and Intelligent tutoring systems

Cognitive constraints and bioinspired structural biases to improve Statistical/Machine Learning tools (Shannon Lower bound optimality, MaxEnt, RNN, Zipf, Occam's Razor, modularity, Graph Complexity Hierarchy, organization, and multi-scale constraints, Independency, Factorization, sparsity, …)

Equivalence of Social/Cognitive Science concepts with Computer Science

PUBLICATIONS

5 SCOPUS-indexed, 5 submitted, and 3 under preparation

Publish

Moattari, Mojtaba, et al. Independent Component Analysis Approach Using Higher Orders of Non-Gaussianity. Electrical Engineering (ICEE), 2017 23rd Iranian Conference on. IEEE, 2017.

- Reformulating Independent Component Analysis (ICA) in a more powerful data-driven way suited for nonlinearities and dynamicity of brain trace data. Link to Download PDF

Roshandel, Emad, and Mojtaba Moattari. "Genetic-TLBO Algorithm to Solve Non-Linear Complex Problems for Life Quality Improvement.", Current Signal Transduction Therapy, 2019.

- Combining Genetic Algorithm (GA) with Teaching-Learning-Based-Optimization to improve intensification of GA. Link to Download PDF

Roshandel, Emad, and Mojtaba Moattari. "Novel line search based parameter optimization of multi-machine power system stabilizer enhanced by teaching learning based optimization." Electrical Engineering (ICEE), 2015 23rd Iranian Conference on. IEEE, 2015. Link to PDF

Improving Teaching-Learning-Based-Optimization by a line-search method to tune a control system

Moattari, M., Moradi, M., 2020. Conflict Monitoring Optimization Heuristic Inspired by Brain Fear and Conflict Systems. International Journal of Artificial Intelligence, 7(A11), pp.125.

- New meta-heuristic inspired by cognitive and neuroscientific aspects of Brain. Link to Download PDF

Moattari, Mojtaba, et al. "Novel Optimization Metaheuristic Model Inspired by Fear and Conflict System in Brain." Biomedical Engineering (ICBME), 22th Iranian Conference, 2015.

- Conflict Resolution System in ACC cooperates with Fear System in Amygdala to list, reevaluate and reorder suitable programs for survival. Ideated on this, I proposed a meta-heuristic that optimizes an objective function using series of clues measuring danger (i.e. closeness to plateu, reduction in fitness raise,…). Link to download PDF (Persian language/ Not in English)

Submitted

Bilinear biased ProjE improves Knowledge Graph Completion in linear and bilinear models.

- Increasing relation-entity features-interrelations by proposing a bilinear biased variation of ProjE Knowledge-Graph Embedding. Link to Download PDF

A New Approach for Optimizing Highly Nonlinear Engineering Problems Based on the Observer Effect Concept

- A Gradient Descent Initializer, inspired by a cognitive effect called Observer-Actor-Bias. Implementation on EEG classification task shows that spatial filter performance is improved in capturing stationarity between EEG sessions. Available on Arxiv. Link to Download PDF.

Modified swarm-based metaheuristics enhance Gradient Descent initialization performance: Application for EEG spatial filtering

- Introducing organization and hierarchical structures to PSO and ICA, two swarm-metaheuristics. This algorithm improved Gradient Descent in a subspace learning optimization, led to higher classification accuracy. Available on Arxiv. Link to Download PDF

Uncertainty Principle based optimization; new metaheuristics framework.

- Adaptive exploration and exploitation using a new uncertainty metric. Link to Download PDF

Precise classification of low quality G-banded Chromosome Images by reliability metrics and data pruning classifier

Improves the classification Precision of data using new reliability thresholding metrics, pruning classifier and deliberately engineered features. Link to Download PDF

Under Preparation

New Independent Component Analysis method and application to image denoising and word2vec

- Bringing about perfect independency without enforcing distribution assumptions, it improved accuracy of word-analogy task compared to LSA and GLoVe. This type of ICA is consistent with the idea of. It also outperformed SOTA ICA method in image decomposition.

Capturing shared space of multiple orders of Co-occurrences in Knowledge-Graph-Embedding: an MDMR variant

- Conducting Maximum Dependency Minimum Redundancy using ensembles of NICE models, which is an autoencoder-based ICA.

Info-theoretically Optimal Discrimination in Tree of Metrics of LMNN

- Per each edge of Decision Tree, it discriminates labels in two groups that not only dissects with highest information gain, but also familiarizes best labels with best features in decreasing degree of importance using a modified LMNN loss.

PROJECTS AND RESEARCHES

2010-2013 **Project and Development**, Shiraz University, Shiraz, Iran

- Age Progression of faces using Family similarities for Machine Vision Course
- Persian Text to speech using concatenative approach in MATLAB for B.Sc. Project
- Android software about speech based simplex optimization for Operational Research Course – Operational Research Final project
- Full Simulation of JMLR paper "Bounding the Probability of Error for High Precision Optical - Character Recognition over Shiraz Vehicles Plaque detection (Huang, 2012)", Project funded by Machine Vision Lab.
- Created OCR-Calculator using ATMEGA32 AVR Microcontroller and GLCD and Resistive Touch
- Automatic English-Persian sentence aligner in machine translation
- Manual object labeller for computer vision database creation
- Design and implementation of object governor and robot detector under OPENCV and robot movements using AVR
- Design and implementation of machine learning for food quality assessment by scratch sound – Instrumentation lecture final project
- Automatic plaque detection system under C# for transportation control service
- Face Morphing/warping/pre-processing toolbox development

2013-2017 **Project and Development**, Tehran Polytechnic University

- Training and testing on recurrent neural network for automatic speech classification (Neural networks lecture final project)
- Fuzzy mutual information used for density estimation (Fuzzy systems lecture final project)
- Statistical detection approach for discriminative classifier in BCI spellers (Simulation for final project: Detection and estimation lecture)
- Burst Analysis on dynamic synchronization of group neurons of more than 3 in brain – Electrophysiology lecture final project
- Stationary subspace analysis and spectral estimation of speech imagery EEG data – DSP II lecture final project
- Corpora development for machine learning based sentence translation
- Optimization metaheuristic toolbox
- Subspace learning brain computer interface toolbox
- Mixture model based independent component analysis toolbox
- Automatic parameter tuning toolbox for machine learning/optimization/signal processing applications

2018-2020 **Research and Software development**, Shiraz - Iran

- Classification Model and Software Design for semi-automatic Machine Translation
- High Precision for detecting low-quality visual objects by reliability metrics and data pruning classifier (Classifier: AlexNet + SVM)
- A neural knowledge graph embedding model for Relaxing ProjE Graph Embedding to tackle high entity-sensitivity to one relation and insensitivity to others. (Torch)
- Knowledge graph embedding model based on ICA to impose Maximum Dependency Minimum Redundancy among different scales of relations
- Ergonomic Machine Translation system
- Preprocessing and classification of parasites and Infected macrophages in Leishmaniasis patients using Faster RCNN and entropy-pruned Cascade Classifier

INVENTIONS

Nationally Registered — Anti-Theft adapter of all portable charging devices by sensing connection of charger to device

Lab. Samples Available — OCR based scientific calculator
Auto energy conserver for electrical devices transformers