Erfan Alimohammadi

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Research Interests

• Computer Vision • Machine Learning • Big Data • Algorithm Design and Data Structures

Education

Politecnico di Milano — *Milan, Italy*

M.Sc. in Telecommunication Engineering (Computer Science track) — *Fall 2021 - present*

Shahid Beheshti University — *Tehran, Iran*

B.Sc. in Computer Engineering — *Fall 2015 - Winter 2020*

- One of Iran's 4 top universities
- Selected courses: Fundamentals of Programming (20/20), Advanced Programming (20/20), Discrete Mathematics (19.75/20), Data Structures (20/20), Design and Analysis of Algorithms (19/20), Computer Graphics (18.5/20), Bachelor's Thesis Project (20/20)

Research Experience

Detecting Unnecessary Code, as a Research Intern at KTH Royal Institute of Technology — *Summer 2020 (Stockholm, Sweden)*

- This research internship was done under the supervision of Prof. Monperrus for using graphs and machine learning in program analysis.
- I analyzed static call graphs to detect code that can be deleted without affecting the software's project expected functionality.
- I designed a framework for Java programmers, which is available on GitHub.

Thatcher Illusion and Its Effects on the Face Recognition Problem (Using VGGFace2) — *2020*

- Done by me as a Shahid Beheshti University Computer Vision Group member.
- Awarded as the best bachelor's thesis project in the university.
- The paper is being prepared to be submitted to Perception Journal, under the supervision of Prof. Ebrahimi Moghaddam.
- A small part of its source code (only the dataset generator) is available on GitHub, and its presentation slides are available here.

Supervised and Unsupervised Methods for Satellite Images Super Resolution — *2020*

- Done in Balad Maps company to create larger satellite images for Iran maps to be used in production.
- After testing new ideas on this and this papers, I compared different methods on real large (300+ GB) datasets, based on PSNR metric.

Using Planar and Bipartite Graphs for Map Merging — *2019*

- Done under the supervision of Prof. Amin Gheibi as a computational geometric problem.
- Our purpose was to merge two maps of a city by modeling them to graphs and polygons (using NumPy, Matplotlib, and NetworkX).
- I presented this research as a guest speaker at the 21st ACM-ICPC Asia Tehran Regional Contest. The presentation slides are available here.

Professional Experience

Data Scientist — *Tehran, Iran*

Balad Maps — *Fall 2019 - Summer 2021*

- Balad is the most popular maps and navigation application in Iran, with a user-base of almost 5 million people.
- Wrote some ETLs and Improved the traffic prediction accuracy using time series forcasting models and PySpark (on big data servers).
- Used Variational Autoencoders in PyTorch, planar graphs, R-trees, etc., on real large (20+ GB) datasets.
- Interviewed many people and helped Balad set the hiring process (as a member of the hiring committee).

Software Engineer — *Tehran, Iran*

Cafe Bazaar — *Spring 2016 - Spring 2018*

- Cafe Bazaar is the most popular and successful Android application store in Iran, with a user-base of more than 40 million people.
- A member of the Inline Apps team and the App Discovery team (while handling more than 300000 requests per hour).
- Interviewed many people to help Cafe Bazaar with the hiring process.
- Developed an admin panel for the executive team of Cafe Bazaar, using Python Django, HTML, CSS, and Javascript.
- Developed a platform for Android developers to create Android apps, which there is no installation needed for them.

Online Courses

• Machine Learning by Stanford University • CS231n: Convolutional Neural Networks for Visual Recognition

Honors and Awards

ACM-ICPC and IOI related

2017	**Silver Medal**, ACM-ICPC Asia Tehran Regional Contest	*Tehran, Iran*
2017	**56th Rank**, ACM-ICPC World Finals (from among 133 teams chosen from a field of 46,381 contestants)	*South Dakota, USA*
2016	**1st Rank**, ACM-ICPC Asia Lahore Regional Contest	*Lahore, Pakistan*

Projects

2013	**The Best Project Award**, Allame Helli High School Seminar (for an AVR-programmed project)	*Tehran, Iran*
2011	**The Best Project Award**, 8th NODET Young Researchers Festival (for "Persian Letters OCR" project)	*Tehran, Iran*

Other

2021	**59th Rank**, The Nationwide Entrance exam of Iranian universities (from among 10000 graduated students)	*Tehran, Iran*
2019	**80th Rank**, Huawei Neural Networks Challenge (an onsite competition among 124 selected universities)	*Porto, Portugal*
2018	**Completed All Levels**, Google Foobar (a secret challenge by Google, to examine your Java or Python skills)	

Teaching and Mentoring Experience

Teaching Assistantship

Computational Intelligence, Dr. Malek, Determining and grading the course projects.	*Fall '20*
Design and Analysis of Algorithms, Dr. Ghavamizadeh, Held weekly TA sessions. Determined and graded numerous computer assignments.	*Spring '18, Fall '18, Spring '19*
Data Structures, Dr. Abin, Held all TA sessions. Determined and graded the course projects.	*Fall '17, Spring '18, Fall '18, Spring '19*
Statistics and Probabilities, Dr. Safaei, Handled general responsibilities.	*Fall '18*
Data Structures, Dr. Ebrahimi Moghaddam, Handled general responsibilities.	*Fall '18*
Advanced Programming, Dr. Vahidi-Asl, Held several TA sessions. Graded a computer assignment.	*Spring '17*
Discrete Mathematics, Dr. Safaei, Helped with handling several TA sessions.	*Spring '17*
Discrete Mathematics, Dr. Abdoos, Helped with handling several TA sessions.	*Spring '17*
Fundamentals of Programming, Dr. Abdoos, Held several TA sessions (with extra contents about Linux OS). Determined a computer assignment.	*Fall '16*

Other

Young Scholars' Club, Taught the medalist students of National Olympiad in Informatics	*Fall 2020*
Shahid Beheshti University, Coached a team which got a bronze medal at ACM-ICPC Asia Tehran Regional Contest (two times)	*Fall 2019. Fall 2020*
University of Tehran ACM Chapter, Taught algorithm design and data structures	*Fall 2018*
Allameh Helli High School, Prepared students for Iranian National Olympiad in Informatics	*Summer 2015*

Skills

Technical: C++, Python (Django, PyTorch, scikit-learn, PySpark, Cython), Java, Docker, Ubuntu, Bash, Raspberry Pi, Adobe Photoshop
Languages: Persian, English (Duolingo English Test: 130 equivalent to TOEFL iBT 110, GRE: quant 164 verbal 146 writing 3)

Selected GitHub Projects

Fake Job Posting Detection *2020*
- Classifying job postings with deep learning (using PyTorch, Pandas, Skorch, and scikit-learn basic NLP tools)

Commit Type Detection *2020*
- Classifying Git commits with deep learning (using PyTorch, Pandas, and scikit-learn basic NLP tools)

Map Coloring *2019*
- Backtracking on graphs for coloring a map with four colors (using NumPy, Matplotlib, and OpenCV)

Other Activities

Opensource Contribution: to a repository with more than 90000 users, as one of TheAlgorithms organization maintainers
International Problemsettings: CodeChef COOK104, HackerEarth March Circuits '19, CodeChef LTIME70, Codeforces #261