Karaj, Alborz, Iran
+98 (921) 472-6815
aref.moqadam@gmail.com
arefmq.github.io
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Aref Moqadam Mehr

Profile

Until 2020, I had been working in CafeBazaar as a Software Engineer. I worked in two different roles, both as a Tech-Lead and as a Team-Leader. which helped me craft my practical and programming skills and my communication skills and teamwork. In CafeBazaar, I was working in App-Search Product. We tried a major architectural refactor in our Search-System, which let me gain valuable experience creating a reliable online platform while delivering it smoothly to our users. In the past year, however, I have been focusing on my master thesis project and my self-education.

Professional Experiences

2017–2020 **Tech-Lead, Software Engineer**, *Cafe Bazaar*, Tehran, Iran, link.

CafeBazaar is among the top 5 software companies in Iran. Its main product is an Iranian app store. I had been working in App-Search product in CafeBazaar as both a Tech-Lead and a Team-Leader. The App-Search product had over one million requests per day, for which we had developed a sophisticated python-based backend to handle this load. In this project, we tried to implement the best software architecture we can create that is reliable under pressure and easy to maintain. Besides, in the Team-Leader role, I have been attempting to employ agile principles, including KANBAN and Scrum, to increase the performance and productivity of our team.

2017 **Software Developer Internship**, *System Group.*, Tehran, Iran, link.

System Group Co. is among the largest software company in Iran. It provides enterprise software solutions that are based on C# and .Net Framework. Working in this position elevate my knowledge of C# and helped me learn many different design patterns.

2015–2016 **Team Leader**, *Nao Biped Lab.*, Qazvin, Iran.

The NAO-Biped lab was a research laboratory under the supervision of Qazvin Azad University. In this laboratory, we worked on NAO Bipedal robots and participated in RoboCup Standard Platform League Competition. Our team was comprised of 15 members at that time, and we implement an adaptation of the Scrum and XP principles to manage our works.

2015–2016 **Startup Founder and Developer**, *Negar Afarin Barajin (NAB)*, Tehran, Iran, link.

NAB was a startup where we developed an automated 3D reconstruction engine that uses sets of images or videos taken from an object and creates a 3D model from it using photogrammetry techniques.

2011–2016 **Computer Vision Team**, *Nao Biped Lab.*, Qazvin, Iran.

I start working in the NAO-Biped lab at Computer Vision Team. In this position, I have participated in designing and implementing a vision system for NAO humanoid robots to detect and recognize objects in a standard soccer field. We have used both classical methods and Machine Learning techniques to overcome the challenges in this field. Besides, real-time processing required us to develop the framework as efficiently as possible, which led us to learn many optimization techniques in C++ and computer vision tasks.

Selected Projects

2019 **App-Search Product**, *Cafe Bazaar*.
The App-Search product was designed using a microservice design scheme and included several projects. The projects formerly were hosted behind an Nginx server. In the redesign process, the projects moved on the Kubernetes platform. This product also benefits from multi-layered cache implementation using Redis Clusters. After analyzing the queries with different NLP approaches, the core project query the Elasticsearch based on the user query and generate the results accordingly.

2019 **Fully Automated Rescue Robot**, *Robotic Summer School*, ETH Zürich.
The main goal of the Robotic Summer School was to develop an autonomous and semi-autonomous agent capable of driving a standard rescue robot equipped with several RGBA cameras, LIDAR, GPS, and several other sensors. The project is developed based on the ROS platform and composed of different modules including, the Vision module, Localization and Mapping module, and the behavior and control modules.

2019 **Autonomous Vehicle**, *Cafe Bazaar*, link | video.
This project was part of a hackathon event held by Cafe Bazaar. In this project, we tried to control a modified vehicle to drive autonomously by providing the steering input. We achieved this goal by using a pre-trained ResNet as the base structure and train an MLP network on top of it. The ResNet created a semantic-segmentation image from the input camera, and then the MLP outputs the corresponding steering outputs. As a result, the car drove few miles in an open street.

2017 **Ball Detection with Deep Learning**, *Bachelor Thesis*, link.
This project aims to solve object recognition problems in the soccer field, specifically for NAO bipedal robots in the RoboCup humanoid and SPL environment. It includes implementing different modules to detect the soccer ball as well as other objects such as field lines, using Convolutional Neural Networks. Couping with varying light conditions and the dynamicity of a soccer field environment was the main challenge in this project.

Education

2018–2020 **Master of Computer Science**, *Shahid Beheshti University (SBU)*, Tehran, Iran.

June-2019 **Robotics Summer School**, *ETH Zürich*.

2011–2017 **Bachelor's of Computer Engineering - Software**, *Qazvin Azad University (QIAU)*.

2004–2011 **Diploma in Mathematics and Physics Discipline**, *National Organization for Development of Exceptional Talents (NODET)*.

Masters Thesis

Title **Gesture Recognition via Spike-Convolutional Neural Networks (S-CNN)** link

Supervisors Dr. Hadi Farahani, and Dr. Saeed Reza Kheradpisheh

Abstract Biological neurons use spikes to process and learn temporally dynamic inputs in energy and computationally efficient way. Unlike conventional Artificial Neural Networks, Spiking Neural Networks (SNN) tries to imitate this characteristic of the biological neurons to have advantages, such as energy efficiency. However, applying state-of-the-art gradient-based supervised algorithms to spiking neural networks is a challenge due to the non-differentiability of the activation function of spiking neurons. Employing surrogate gradients is one of the leading solutions to overcome this challenge. Although SNNs naturally work in the temporal domain, recent studies have focused on developing SNNs to solve static image categorization tasks. This paper employs a surrogate gradient descent learning algorithm to recognize twelve human hand gestures recorded by dynamic vision sensor (DVS) cameras.

Publications and Reports

2019 Mehr, A. M., Kheradpisheh, S. R., and Farahani, H., 2019 November, **Action Recognition Using Supervised Spiking Neural Networks**. CSICC 2020, Tehran, Iran. link

2016 Noury Z., Mehr, A. M., **MRL3D Simulation Soccer Team 2017** team report. link

2016 Mehr, A.M., et.al., **MRL-SPL. Team Description for RoboCup 2016**. link

2015 AmirGhiasvand, O., Shahroudi, N., Sharpasand, M.A., Mehr, A.M., et.al., **Team Description for RoboCup 2015**. link

2013 Mehr, A.M. and Shahroudi, N., 2013, April. **A debugger tool for vision on humanoid framework**. In AI & Robotics and 5th RoboCup Iran Open International Symposium (RIOS), 2013 3rd Joint Conference of (pp. 1-5). IEEE. link

2012 Hashemi, E., Jadidi, M.G., Yaghobi, M., Lashgarian, M., Shafiei, M., Shahmohammadi, M.R., Zarei, K., Shahroudi, N., Mehr, A.M. et.al., **Team Report and Code Release 2012**. link

Honors and Awards

2019 **The Winning Team** of the Summer School Robotic Challenge - ETH Zürich

2011-2016 Awarded for **Research Scholarship** from QIAU

2015-2017 Technical and Organization Committee Member of RoboCup Iran Open

2014 Make it up to Quarter Final in World RoboCup Championship

2014 **3rd** place of RoboCup German Open

2012‘13‘14 **1st** place of RoboCup Iran Open

2012‘14 Recipient of Iran Open Innovation Award

Talks and Presentations

2020 Gesture Recognition via Spiking-Convolutional Neural Networks - *SBU* link

2019 Introduction to Spiking Neural Networks - (Surrogate Gradient Based Approaches) - *SBU* link

2019 Probability Graphical Model (PGM) - *SBU* link

2019 Convolutional Neural Networks Tutorial - *SBU* link | video

2017 Clean Code - *Cafe Bazaar* link

2015 An Efficient Graph-Based Image Segmentation - *QIAU* link

2014 Active Vision and Head motion - *Iran Open Innovation Challenge*

2013 A Debugger Tool for Vision on Humanoid Framework - *Iran Open Symposium*

Skills

Languages Persian (Native), English (TOEFL: 94)

Core skills Python (5 years), C/C++ (5 years), Spiking Neural Networks (2 years), Deep Learning (4 years), C# (2 years)

Backend Django, Flask, Docker, Kubernetes, Nginx, Redis, MongoDB, Postgres, Celery, RabbitMQ, Elastic-Search, .Net Core, MVC

AI & ML PyTorch (2 years), Keras (3 years), TensorFlow, PySpark, OpenCV

Frontend Basic knowledge of JavaScript, jQuery, Bootstrap, HTML5 and CSS3

Social Skills Leadership, Executive Planning, Interviewing and recruitment (at CafeBazaar and NAO-Lab), Agile Principles and tools (including: Scrum and Kanban).

Misc Git, Protobuf, Shell Script, SQL, Qt SDK

References

upon request