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Aref Moqadam Mehr

Research Interests

- Machine Learning
- Deep Learning
- Convolutional Neural Networks
- Spike-CNN
- Scene Recognition
- Scene Understanding
- Neuroscience
- Robotics and Computer Vision

Education

June-2019 **ETH Zürich**, Robotics Summer School.
One week long summer school focused on Computer Vision and Robot Motion Control in ROS framework.

2018–Present **Shahid Beheshti University (SBU)**, Master of Computer Science.
Ranked 33 in the entrance exam.
Thesis: Gesture Recognition via Spike-Convolutional Neural Networks (S-CNN) Co-Supervised by: Dr. Hadi Farahani, and Dr. Saeed Reza Kheradpisheh

2011–2017 **Qazvin Azad University (QIAU)**, Bachelor's Degree of Science in Software Engineering.
Ranked 6 in the entrance exam.
Thesis: Ball Detection in Soccer Playing Robots Using Convolutional Deep Neural Network

2004–2011 **National Organization for Development of Exceptional Talents (NODET)**, High School - Diploma in Mathematics and Physics Discipline.
Admitted over thousands of applicants.

Masters Thesis

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

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

Description Spike Neural Network are a great fit for processing time-series data. In this project, we are trying to make a Convolutional Network of these neurons in order to process visual data from DVS cameras.

Master Courses

- Advanced Topics in Data Mining: 18.5/20
- Statistical Machine Learning: 16/20
- Advanced Algorithms: 15.5/20
- Probabilistic Graphical Models: 13.5/20

Publications and Reports

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

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

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

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.

2013 Lashgarian, M., Mohammad Shafiei, R.N., Harandi, M.A.Z., **Mehr, A.M.**, et.al., **MRL-SPL Team Description 2013 Standard Platform League**.

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**.

Professional Experiences

2017–Present **Data Engineer**, Cafe Bazaar Co., Tehran.
Cafe Bazaar provides services to Persian-speaking users and offers more 25,000 download-able apps for gaming, social media, messaging and other uses. It gets roughly 20 million visits a week within Iran.

2017 **Software Developer Internship**, System Group., Tehran.
System Group Co. is Iran's largest private software company. The company provides enterprise software solutions and support to businesses of all sizes located across the country. The company was listed as one of the top 500 companies in Iran.

2015–2016 **Team Leader**, Nao Biped Lab., QIAU.
Management a team of 15 members, working on Aldebaran NAO robots in order to play soccer against other teams in RoboCup Standard Platform League Competition.

2015–2016 **Startup Founder and Developer**, Negar Afarin Barajin (NAB), Tehran.
NAB was an automatic engine to create 3D models from sets of images or videos taken from an object in any dimension using photogrammetry techniques. management a team of 5 members for development and maintenance of the To3D.net engine and website was my responsibility.

2013–2015 **Development Team Member**, Q-Grid Lab., QIAU.
Implementation of a grid computing system, based on BOINC platform, on about 100 office computers to recycle the dead time.

2011–2016 **Computer Vision Team**, Nao Biped Lab., QIAU.
Design and Implementation of NAO humanoid robot vision system in order to detect and recognize objects in a standard soccer field.

Selected Projects

2019 **Gesture Recognition via Spike-Convolutional Neural Networks (S-CNN)**, Master Thesis, SBU.
Spike Neural Network are a great fit for processing time-series data. In this project, we are trying to make a Convolutional Network of these neurons in order to process visual data from DVS cameras.

2019 **Autonomous Vehicle**, Hackathon event, Cafe Bazaar.
In a hackaton event held by CafeBazaar, we tried to stack a MLP Network on top a ResNet - which ran semantic-segmation algorithm on Image - then we tried to train this network in supervised manner. As the result the drove few miles in an open street. (video link)

2017 **Ball Detection with Deep Learning**, Bachelor Thesis, QIAU.
This project is aimed to be used as an integrated module to detect any given soccer ball in RoboCup environment. This project has specialized to be used in RoboCup humanoid and SPL leagues.

2016 **Shifting Organizational Culture and a Democratic Adaptation of Agile Software Engineering Paradigms for Research**, Mechatronics Research Laboratories, QIAU.
Adapting a combination of SCRUM and XP software development processes and team management systems for Research Labs and implementing it in Nao Biped Lab. which later followed by other MRL Labs. Designing a human resource management and recruiting framework for Nao Biped Lab.

2015 **Soccer Field Object Recognition**, NAO Biped Laboratory, QIAU.
Implementation of a module to detect every object in a soccer field such as goal posts, field lines, robots, and ball by using machine learning methods for a VGA camera in real-time applications in tight computation constraints. Utilizing a Convolutional Neural Network to recognize objects in a dynamic environment, independent from lighting.

2015 **Green SRC**, SRC.Systems, QIAU.
This project makes buildings more intelligent so that they can interact more with the individuals and be more energy efficient. The system learns the human reactions, preferences and behavior and tries to manipulate environment parameters according to these information.

2014 **Overt Visual Attention Control in Soccer**, NAO Biped Laboratory, QIAU.
A Module to calculate the best direction to look/go using the previous observations based on grid-base optimization methods.

2013 **Environment Modeling in a Soccer Game**, NAO Biped Laboratory, QIAU.
Estimation, filtering, positions tracking and prediction of detected objects. Model the environments by Bayesian approaches such as particle filter. Track robot self-location using Mont Carlo Particle Filter.

2012 **Semi-Automatic Sensor Calibration**, NAO Biped Laboratory, QIAU.
Calibration of robot cameras and gyro sensor displacement using Gauss-Newton optimization method. Correction results in determining object's position.

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

2017 Clean Code - CafeBazaar

2015 An Efficient Graph-Based Image Segmentation - QIAU

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(Fluent)

Social Skills Leadership, Executive Planning, Working with different personalities, Interviewing and recruitment.

Methodologies Neural Networks (SNN, CNN, RNN, NEAT), Machine Learning (SVM, Autoencoders, Tree-Based Methods), Stochastic Data Analysis (PCA, K-Means), Classic Computer Vision, Probabilistic Robotics

Programming Languages C/C++, Python, MATLAB, and C#

Familiar with Shell Script, SQL, Java, JavaScript, and PySpark

Misc Keras, PyTorch, TensorFlow, TFLearn, OpenCV, V4L2, git, Qt SDK, Kubernetes, Django, MongoDB, ElasticSearch, ROS

References

upon request