Javad Amirian

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Research Interests

- Computer / Robot Vision
- Deep Learning and Generative Models
- Crowd Simulation and Motion Prediction

Education

• ***PhD Candidate*** **in Robotics and Artificial Intelligence** Jan. 2018 - Now
Inria Rennes (Rainbow Team), France
Thesis: Short-term Pedestrian Motion Prediction for Robot Navigation in Crowd (CrowdBot)
Supervisor: Dr. Julien Pettré
Co-Supervisor: Dr. Jean-Bernard Hayet

• ***MSc*** **in Computer Engineering (Artificial Intelligence)** Sept. 2012 - Sept. 2014
Sharif University of Technology, Tehran, Iran (1st Rank University in Iran)
Thesis: Dynamic Motion Planning and Obstacle Avoidance for Simulated Autonomous Car in Webots
Supervisor: Dr. Mansour Jamzad
GPA: 16.66/20

Graduate Courses: Machine Learning, Statistical Pattern Recognition, Computational Intelligence, Image Processing, Planning in Artificial Intelligence, Speech Processing, Stochastic Processes.

* Ranked 11th in nationwide M.Sc. university entrance exam for Artificial Intelligence, Iran 2012

• ***BSc*** **in Electrical Engineering (Electronics)** Sept. 2007 - Sept. 2012
Shahid Behesti University (National University of Iran), Tehran, Iran
GPA: 15.44/20

* Top 0.6% nationwide entrance exam of Iranian Universities among ∼300,000 participants. 2007

Professional Experience

Doctoral Researcher @ CrowdBot (European H2020 Research Project) Jan. 2018 - Jun. 2021
CrowdBot focuses on developing platforms and algorithms to ensure safe navigation of social robots. My main task is to develop tools for *Motion Prediction* of pedestrians around the robot, to improve robot navigation in crowd. I'm working on Crowd Simulation algorithms and Deep Learning models. As a result I developed a model called "Social-Ways" that uses Generative Adversarial Networks (GAN) to take agent's observed trajectories and predict multi-modal distribution of their future trajectories.

Computer Vision Engineer @ PixBall May 2015 - Dec. 2017
PixBall is an AI startup providing smart solutions for sports video analysis. My task was developing image processing and machine vision algorithms and providing high-level API for UI layers. I contributed to PixArt, a video processing software for embedding graphical overlays and virtual advertisements into sports contents. One of the most challenging parts was to estimate the camera calibration parameters in near real-time. In this process only rotation and intrinsic parameters need to be updated, since the camera location is usually fixed, during a game. We used Matlab symbolic toolbox to derive the tracking equations and convert it to

C++ instructions. Then we used a Levenberg–Marquardt solver with a set of tracked keypoints to find the parameters.

Computer Vision Engineer @ Spad System Co. Apr. 2016 - Nov. 2017
At Spad-system I started a project for automatic recognition of Iranian license plates (Didbaan). I developed a ALPR engine based on an open-source software (OpenALPR). We collected and annotated +5k plate images and trained the system to detect plates and recognize Persian letters. This software has been in use to manage the entrance and exit of cars from parkings in multiple sites.

Co-Founder and Team Leader @ Cyrus (Team of Small-Size Soccer Robots) Jul. 2010 - Apr. 2015
I co-founded **Cyrus** under the supervision of Dr. Eslam Nazemi, during my undergrad study. I collaborated with more than 20 undergrad and graduate students that joined the team to develop hardware and software of the robots and prepare them for Robocup competitions. My main role was in the technical management of the project. Moreover, I contributed to designing the electronic boards, programming the robot firmware, and latterly developing codes for motion planning and playing of the robots. As research results of the project, we presented a new approach to improve the robot movements and compensating inaccuracies in robot building using a Fuzzy approach. We also proposed a new motion-planning algorithm for the robots, that is able to adapt the navigation parameters by optimizing multiple objectives, simultaneously.

Teaching Experience

- *Teaching Assistant* of Numerical Optimization course — Spring 2017
  Dr. S. Hamid Amiri (Shahid Rajaee University)
- *Teaching Assistant* of Machine Vision course (CE-40687) — Spring 2014
  Dr. Mansour Jamzad (Sharif University of Technology)
- *Teaching Assistant* of Digital Design course — Spring 2010, Spring 2011
  Dr. Somayeh Timarchi (Shahid Beheshti University)
- *Lecturer* of Introduction to AVR Microcontrollers — 2009-2011
  At Scientific Association of Electrical Engineering (Shahid Behshti University)

Publications

- **Amirian, J.**, Hayet, J. B., Pettré, J., **"What we see and What we don't see: Imputing Occluded Crowd Structures from Robot Sensing,"** International Conference on Intelligent Robots and Systems (**IROS-2021**) - [Under Review].
- Zhang, B., **Amirian, J.** Eberle, H., Pettré, J., Holloway, C., Carlson , T. **"Towards Safe Human-Robot Interactions in Crowds: Empirical Study of Pedestrian Dynamics with a Wheelchair and a Pepper Robot."** International Journal of Social Robotics (**SORO**) - [Under Review]
- **Amirian, J.**, Zhang, B., Valente Castro, F., Baldelomar, J., Hayet, J. B., Pettré, J. **"OpenTraj: Assessing Prediction Complexity in Human Trajectories Datasets."** In Proceedings of the 15th Asian Conference on Computer Vision (**ACCV-2020**), Nov-Dec. 2020.
- van Toll, W., Grzeskowiak, F., Gandía, A.L., **Amirian, J.**, Berton, F., Bruneau, J., Daniel, B.C., Jovane, A. and Pettré, J., "**Generalized Microscopic Crowd Simulation using Costs in Velocity Space**,", In Symposium on Interactive 3D Graphics and Games (**I3D-2020**), May 2020.
- **Amirian, J.**, Van Toll, W., Hayet, J. B., Pettré, J. **"Data-Driven Crowd Simulation with Generative Adversarial Networks."** In Proceedings of the 32nd International Conference on Computer Animation and Social Agents (**CASA'19**), Jul. 2019.
- **Amirian, J.**, Hayet, J. B., Pettré, J., **"Social ways: Learning multi-modal distributions of pedestrian trajectories with GANs,"** IEEE Conference on Computer Vision and Pattern Recognition (**CVPR-2019**) Precognition Workshop, Jul. 2019.

- (TDP) **Amiryan, J.**, Raeessi, S., Payandeh, P., Nadimi, B., Nouri, N., Kamali, M. R., Nazemi, E., **"CYRUS 2016 Team Description Paper,"** 2016.
- **Amiryan, J.**, Jamzad, M., **"Adaptive motion planning with artificial potential fields using a prior path,"** 3rd RSI International Conference on Robotics and Mechatronics (**ICROM**), 2015.
- Mazloum, J., Jalali, A., **Amiryan, J.**, **"A novel bidirectional neural network for face recognition,"** 2nd International eConference on Computer and Knowledge Engineering (**ICCKE**), 2012.

Professional Services

- **PC Member** of *ICRA Workshop on Long-term Human Motion Prediction* / 2021
- **Reviewer** @ *IROS-2021*
- **Reviewer** @ *IEEE Robotics and Automation Letters (RA-L)* / 2020
- **Reviewer** @ *Computer Vision and Image Understanding* / 2020
- **Reviewer** @ *IEEE Transactions on Neural Networks and Learning Systems* / 2020
- **Subreviewer** @ *SIGGRAPH-2020*
- **Subreviewer** @ *CASA'19* (Conference on Computer Animation and Social Agents)
- **PC Member** of CrowdNav-2018 (IROS 2018 Workshop on Robot Navigation in Crowd)
- **Subreviewer** @ *CASA'18* (Conference on Computer Animation and Social Agents)
- **Technical Committee** @ Robocup Iran Open - Small Size League / 2014 - 2017

Skills

- **Programming Languages:** Python, C/C++, Matlab.
- **Deep Learning:** Pytorch, Keras (TensorFlow) — RNNs, GAN
- **Version Control:** Git.
- **AI and Robotics Tools:** OpenCV, ROS.
- **Software Design:** OOD; Concurrent and Multithread; Modular Programming.
- **Graphic Tools:** Adobe Photoshop, Adobe Premiere; 3ds Max.

Activities

- Interested in soccer, hiking, power-lifting.
- Interested in football and fan of Perspolis club. Going to stadium and supporting my favorite sports team is one of my most exciting entertainments.

References

- **Dr. Julien Pettre**
  Research Scientist at Rainbow, Inria-Rennes, Brittany, France
  Email: julien.pettre@inria.fr
- **Dr. Jean-Bernard Hayet**
  Researcher at CIMAT, Department of Computer Science., Guanajuato, Mexico
  Email: jbhayet@cimat.mx
- **Dr. Mansour Jamzad**
  Department of Computer Engineering, Sharif University of Technology,Tehran, Iran
  Email: jamzad@sharif.edu
- **Dr. Eslam Nazemi**
  Department of Electrical and Computer Engineering, Shahid Beheshti University, Tehran , Iran
  Email: nazemi@sbu.ac.ir