# Javad Amirian

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## Education

**• PhD in Computer Science (Robotics and AI)** Jan. 2018 - Jul 2021
Inria Rennes (Rainbow Team), France
Thesis: Human Motion Trajectory Prediction for Robot Navigation (CrowdBot)
Supervisors: Dr. Julien Pettré , 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

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

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## Professional Experience

**• Postdoctoral Researcher @ ISIR (Robotics Lab - Sorbonne University)** Sep. 2023 - Present
Working on Social Robot Navigation using Machine Learning and Computer Vision techniques. This research is part of the euROBIN project, which aims to advance AI tools for Robotics in a reproducible approach.

**• CTO and Head of AI @ Vive Robotics** Mar. 2021 - June 2023
As the CTO and Head of AI at Vive Robotics, I led the development of the Vive Tennis Robot a tennis-ball-retriever robot that utilizes advanced Computer Vision and AI algorithms to efficiently navigate on the court, locate tennis balls, and identify players. My primary responsibility has been to oversee the delivery of an MVP, by setting specific numerical targets for each principle. I guided the AI team in developing a high-fps embedded video processing pipeline that maximizes the robot's agility while ensuring cost-effective hardware solutions to maintain an affordable device price.

**• Co-Founder of DecorAR @ Inria Startup Studio** April. 2022 - Mar. 2023
DecorAR is a tech project incubated at Inria Startup Studio to bring AI and Visual Recommendation to Augmented Reality environments. "*Interior Design by AI*" is the first platform being developed by DecorAR and it addresses the problem of finding compatible pieces of furniture among a vast database of products from different categories and brands. As a CTO, my job was to build ML models and develop the stack to make the PoCs accessible to early testers.

**• Doctoral Researcher @ Inria** (EU H2020 Project) Jan. 2018 - Jul. 2021
I contributed as a doctoral researcher to developing tools for *Motion Prediction* of pedestrians around the robot, enhancing its navigation in crowded environments. Utilizing crowd simulation algorithms and deep learning models, I created the innovative "Social-Ways" model. By leveraging GANs, this model accurately predicted multi-modal distributions of future trajectories based on observed agent trajectories. Throughout the project, I gained expertise in deep learning frameworks such as PyTorch and Keras and honed my skills in large-scale data analysis, neural network training, and visualization.

• **Computer Vision Engineer @ PixBall** (Previously Sepehr) May 2015 - Dec. 2017
At PixBall (formerly Sepehr), an AI startup specializing in sports video analysis, I played a crucial role in developing image processing and machine vision algorithms. My primary responsibility was to create high-quality APIs that facilitated seamless integration between the algorithms and the UI engineers. One notable achievement was my contribution to PixArt, a powerful video processing software designed specifically for embedding graphical overlays and virtual advertisements into sports content, with a focus on soccer matches. During the project, I encountered a significant technical challenge related to camera calibration parameters, particularly the variation of lens distortion at different zoom values. To address this, I devised an algorithm that systematically collected and validated samples and established a linear regression relationship between the focal length and the radial distortion. This approach yielded remarkable improvements in the precision of overlay placement. To optimize the calibration process, I employed a Levenberg–Marquardt solver, which efficiently converged to the optimal solution. This achievement exemplifies my expertise in overcoming complex challenges in computer vision and applying advanced numerical techniques to achieve superior results.

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## Selected Publications

- Gheisari, M., **Amirian, J.**, Furon, T. Amsaleg, L., **"AggNet: Learning to Aggregate Faces for Group Membership Verification,"** (**Preprint-2022**).
- 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-2022**).
- **Amirian, J.**, Hayet, J. B., Pettré, J., **"What we see and What we don't see: Imputing Occluded Crowd Structures from Robot Sensing,"** (**Preprint-2021**).
- **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.
- **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.

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## Technical Skills

- **Software Development:** Proficient in **Python** and **C/C++**, employing best practices in software development. Skilled in architecting, implementing and debugging robust and scalable code using **object-oriented design (OOD)** and modular approaches.
- **Version Control & Project Management:** Extensive experience with **Git** and **GitHub**, utilizing version control best practice principles and workflows to streamline development processes and leveraging **CI/CD** pipelines for automated testing and deployment.
- **Deep Learning:** Proficient in **PyTorch** / **Keras** and experience designing and optimising NN models. Leveraging ML tools like **W&B** and **FiftyOne** for data/model management, versioning, and

experiment tracking. Experience in visualizing model performance, analyzing data distributions, and streamlining machine learning workflows.

- **Computer Vision & 3D Perception:** Proficient in leveraging **OpenCV** and ML solutions for extracting insights from visual data and perform **Object Detection**, **segmentation** and **tracking**. Experience in multiple **Camera Calibration** problems for **3D reconstruction** and **Localization**.
- **Robotics:** Proficient in working with **ROS**, deep experience with **Nvidia Jetson** family and its frameworks (DeepStream, TensorRT), and simulation environments like **Carla**, **Gazebo**, **Unity**, and **Webots** to prototype intelligent and autonomous robotic systems.
- **Cloud & Containerization:** Experience with **AWS** tools for scalable and reliable cloud solutions and **Dockers** and **Containerization** for efficient deployment. Extensive experience in real-time image processing pipelines on cloud, optimizing performance and ensuring reliable data processing.
- **Linux & Bash:** Expertise in Linux and **Bash scripting** for automation and system management. Skilled in developing and optimizing scripts and services for various tasks.
- **Web & App Development:** Skilled in **Django** web framework. Proficient in modeling **SQL databases**, UI design, and template development. Additionally, experienced in iOS app development using **Swift** for engaging user experiences and **Figma** for prototyping.

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**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