# Sadegh ALIAKBARIAN

## Computer Vision and Machine Learning Researcher | PhD Student

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**Research areas of expertise and interest :** I'm interested in computer vision and machine learning in general, but, more specifically, I'm interested in sequence learning and modeling, generative models and variational inference, invertible and flow-based models, adversarial machine learning, video understanding, multiple object tracking, and human motion prediction.

## EDUCATION

~August 2020 – July 2016 | **PhD, COMPUTER SCIENCE, The Australian National University**
- **Thesis** : Deep Sequence Learning for Video Anticipation : From Deterministic to Stochastic
- **Supervisors** : Dr. Lars Petersson, Dr. Mathieu Salzmann, Dr. Basura Fernando, Prof. Stephen Gould

September 2013 – October 2009 | **BSc, COMPUTER SOFTWARE ENGINEERING, Isfahan University of Technology**
- **Thesis** : Machine Learning Techniques for Internet Traffic Classification
- **Supervisor** : Prof. Abdoreza Mirzaei

## (RECENT) PROFESSIONAL EXPERIENCE

\- – July 2020 | **Research Intern | Facebook, PITTSBURGH, PA, United States**
- **Research area** : Working on Facebook's photorealistic telepresence project.
- Working on generative modeling of natural sequences of 3D human pose and shape.
- Internship did not continue further due to COVID-19 outbreak and border closure.

July 2020 – January 2020 | **Research Intern | FiveAI, OXFORD, United Kingdom**
(FiveAI is a UK-based self-driving startup. Five raised $41 million just in 2020.)
- **Research area** : Adversarial machine learning. Analysis of the robustness of neural networks under adaptive adversarial attacks.
- Building a robust classifier via learning the image representations in lower rank.
- Designing strong adaptive attacks to evaluate the robustness of the proposed classifier.

October 2018 – May 2018 | **Research Intern | Qualcomm AI Research, AMSTERDAM, The Netherlands**
- **Research area** : Sequence analysis for human intention forecasting via analysing motion.
- Building SotA deterministic human motion prediction.
- **Outcome** : One US Patent, entitled *Predicting Subject Body Poses and Subject Movement Intent Using Probabilistic Generative Models.*

Now – November 2017 | **Associate Researcher | Australian Centre for Robotic Vision (ACRV), CANBERRA, Australia**
- **Research area** : Generative models, with the focus on VAEs and conditional VAEs. Also working on multiple object tracking in videos.
- Building SotA generative model to predict multiple plausible continuations of human motions.
- Building the state-of-the-art geometry-based online multiple object tracking.
- **Outcome** : SotA diverse human motion prediction model. SotA MOT. A CVPR 2020 paper.

December 2019 – July 2016 | **Research Assistant | Smart Vision Systems, CSIRO, CANBERRA, Australia**
- **Research area** : Deep sequence learning for (stochastic and deterministic) video anticipation.
- Building a generative model that mitigates posterior collapse in conditional generative models.
- Building SotA action anticipation pipeline for general actions in videos.
- Creating a large-scale driving action anticipation dataset, covering diverse set of scenarios, weather conditions, daytimes, and locations, with realistic subset of annotations.
- **Outcome** : ACCV 2018 paper, ICCV 2017 paper.

March 2016 – June 2015 | **Research Intern | National ICT Australia (NICTA), CANBERRA, Australia**
- **Research area** : Urban scene semantic segmentation under various illuminations.
- Designing domain (daytime) invariant deep semantic segmentation network.
- Designing weakly-supervised semantic segmentation given only image/video-level tags.
- **Outcome** : An ECCV 2016 and a TPAMI 2018 paper (continuing collaboration resulted in ICCV 2017 and ECCV 2018 papers).

## Skills

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| **Programming** | Python, familiar with C#, C++, and Matlab |
| **Frameworks/Libraries** | PyTorch, OpenCV, Unity3D, familiar with tf.Keras |

## (Recent) Publications

### Patents

US Patent 2020 — **S. Aliakbarian**, A. Habibian, K. Van de Sande, *Predicting subject body poses and subject movement intent using probabilistic generative models* [US20200160535A1]

### Peer-Reviewed

CVPR 2020 — **S. Aliakbarian**, F. Saleh, M. Salzmann, L. Petersson, S. Gould, *A Stochastic Conditioning Scheme for Diverse Human Motion Prediction*

CVPR 2020 — M. Shoeiby, A. Armin, **S. Aliakbarian**, S. Anwar, L. Petersson, *Mosaic Super-resolution via Sequential Feature Pyramid Networks* (Workshops)

WACV 2020 — M. Shoeiby, L. Petersson, M. Armin, **S. Aliakbarian**, A. Robles-Kelly, *Super-resolved Chromatic Mapping of Snapshot Mosaic Image Sensors via a Texture Sensitive Residual Network*

TPAMI 2018 — F. Saleh, **S. Aliakbarian**, M. Salzmann, L. Petersson, J. Alvarez, S. Gould, *Incorporating Network Built-in Priors in Weakly-supervised Semantic Segmentation*

ACCV 2018 — **S. Aliakbarian**, F. Sadat Saleh, M. Salzmann, B. Fernando, L. Petersson, L. Andersson, *VIENA$^2$ : A Driving Anticipation Dataset*

ECCV 2018 — F. Saleh, **S. Aliakbarian**, M. Salzmann, L. Petersson, J. Alvarez, *Effective Use of Synthetic Data for Urban Scene Semantic Segmentation*

ICCV 2017 — **S. Aliakbaria**n, F. Sadat Saleh, M. Salzmann, B. Fernando, L. Petersson, L. Andersson, *Encouraging LSTMs to Anticipate Actions Very Early*

ICCV 2017 — F. Saleh, **S. Aliakbarian**, M. Salzmann, L. Petersson, J. Alvarez, *Bringing Background into the Foreground : Making All Classes Equal in Weakly-supervised Video Semantic Segmentation*

ECCV 2016 — F. Saleh, **S. Aliakbarian**, M. Salzmann, L. Petersson, J. Alvarez, S. Gould, *Built-in Foreground/Background Prior for Weakly-Supervised Semantic Segmentation*

IEEE PacRim 2013 — **S. Aliakbarian**, F. Saleh, A.Fanian, TA. Gullivar, *Optimal supervised feature extraction in internet traffic classification*

ICEE 2013 — **S. Aliakbarian**, A.Fanian, *Internet traffic classification using moea and online refinement in voting on ensemble methods*

### Preprints

ArXiv 2020 — F. Saleh, **S. Aliakbarian**, M. Salzmann, S. Gould, *ArTIST : Autoregressive Trajectory Inpainting and Scoring For Tracking*

ArXiv 2020 — **S. Aliakbarian**, F. Saleh, M. Salzmann, L. Petersson, *Semantically Plausible and Diverse 3D Human Motion Prediction*

ArXiv 2016 — **S. Aliakbarian**, F. Saleh, B. Fernando, M. Salzmann, L. Petersson, *Deep Action- and Context-Aware Sequence Learning for Activity Recognition and Anticipation*

## Grants, Honors and Awards

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| CVPR 2020 | **Outstanding Reviewer Award**, CVPR 2020 |
| Qualcomm Inc. | Recipient of €18K grant for R&D from Qualcomm AI Research, 2018 |
| ANU/CSIRO | Recipient of full scholarship award from ANU of $94K, Australia, 2016 |
| ANU | Recipient of travel grant award from ANU of $7K, Australia, 2016 |
| CSIRO | Recipient of CSIRO Top-up Award of $35K, Australia, 2016 |
| NICTA | Recipient of NICTA Project grant of $10K, Australia, 2016 |

## Academic Activities

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| Talk | Talks on Variational Autoencoders, Normalizing Flows, and Adversarial ML at ANU CVRG Seminars. |
| Reviewer | TPAMI, CVPR18, CVPR19, CVPR20, ECCV18, ECCV20, ICCV19, AAAI20, ECCVW16, ECCVW18, ICIP17, ICIP18 |
| Workshop | Program Committee of CVRSUAD 2019 at ICCV 2019, CVRSUAD 2018 at ECCV'18, CVRSUAD 2017 at ICCV'17 |
| Lab Instructor | Python Programming for Scientists, Australian National University, 2017 |
| Workshop | Deep Learning with Python and Keras, Data61, CSIRO, 2017 |
| Tutor | Introduction to Programming, Algorithms and Data Structures, Software Engineering, IUT, 2012-2013 |