

# Ilia Karmanov

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## OVERVIEW

Staff Research Scientist at Qualcomm, interested in working on real-world CV/ML problems. I have worked on unsupervised positioning across several modalities (video, WiFi, 5G) with 7 patent applications and 3 conference publications related to this track. Also experienced with self-supervised learning, efficient video architectures and object detection. Prior to this I was an Applied Scientist at Microsoft for almost 4 years.

## EXPERIENCE

*Staff Research Scientist, Qualcomm AI Research* 2021-present

- Developing hardware-efficient architectures for 4K video-to-video processing
- WiFi positioning work featured by Qualcomm: [youtu.be/8Qu-qVBhKZU](https://youtu.be/8Qu-qVBhKZU)

*Senior Research Scientist, Qualcomm AI Research* 2020-2021

- Developing new architectures to solve perception-based problems across various modalities (mmWave, WiFi, Video, TV-L1 Optical Flow)
- Created first-ever unsupervised approach for passive person localisation from WiFi data, which resulted in 7 patent applications 3 conference publications and changed the direction of our research-track
- Created hand-gesture classification architecture for mmWave data (high-frequency radio), to be run on-device and in real-time
- Ensuring good team engineering practices (tests, profiling, docker, dataset, and GitLab management)

*Senior Applied Scientist, Microsoft* 2018-2020

- Semantic segmentation: Fully and self-supervised approaches for pretraining on various data modalities like X-rays and seismographs
- Object detection: Supervised object counting for pipes in a photo and store-shelf product identification
- Video action recognition: Real-time person action recognition and localisation in time for refueling at petrol-stations
- Synthetic data pipelines: Improving generalisation of models trained on synthetic-data through inductive biases (such as focusing on low-frequency/shape signals) rather than domain randomisation

*Applied Scientist, Microsoft* 2016-2018

- Linear Programming: Collaborating with MSR on Z3 theorem-prover to solve plane-gate allocations for Dubai Airport
- Created a large open-source project: [github.com/ilkarman/DeepLearningFrameworks](https://github.com/ilkarman/DeepLearningFrameworks) (1.7k stars, 366 forks) to benchmark many deep-learning frameworks with a common code-base across single-node and multi-node on Azure (BatchAI), received contributions from framework creators

*Senior Associate, Charles River Associates* 2014-2016

- Causality: Econometric analysis of cross-sectional, time-series and panel data-set (e.g. assessing regression specifications and general robustness of estimators)

- Network/graph theory to understand store-customer relationships (e.g. clusters, cliques) for optimal divestments
- Computational geometry and other geo-spatial algorithms (mainly for merger analysis) e.g. Delaunay triangulation, minimum spanning-tree, travelling-salesman, isochrones, etc.

*Research Economist, University of Oxford/LSE*

2013-2014

- Contributed to the International Growth Centres' research theme of firm capabilities (large firms, entrepreneurship, trade and farms)
- Identifying and communicating cross-country research, policy findings and insights

*Research Assistant (to Professor Frank Cowell, LSE)*

2013-2014

- Data generation and simulations in Matlab and Stata examining singular and multi-dimensional measures of inequality
- Empirical causality work in R (diff-in-diff) examining how changes in European identity affect preferences for redistribution
- Resulted in publication: European Identity and Redistributive Preferences, Costa-Font, Joan and Cowell, Frank, 2015

## PUBLICATIONS

FG Zanjani, **I Karmanov**, H Ackermann, D Dijkman, S Merlin, M Welling, F Porikli, Modality-Agnostic Topology Aware Localization, NeurIPS 2021

**I Karmanov**, FG Zanjani, S Merlin, I Kadampot, D Dijkman, WiCluster: Passive Indoor 2D/3D Positioning using WiFi without Precise Labels, IEEE GLOBECOM 2021

K Gavriluk, M Jain, **I Karmanov**, CGM Snoek, Motion-Augmented Self-Training for Video Recognition at Smaller Scale, ICCV 2021

Y Ren, J Lu, A Beletchi, Y Huang, **I Karmanov**, et al. Hand gesture recognition using 802.11 ad mmWave, IEEE WCNC 2021

## SELECT TALKS

**I Karmanov**, FG Zanjani, S Merlin, I Kadampot, D Dijkman, Demonstrating accurate RF sensing with Qualcomm Wi-Fi Technology, [youtu.be/xNmnpCvMTU](https://youtu.be/xNmnpCvMTU), (MWC 2021)

L Zhang, T Wu, X Xie, A Argyriou, **I Karmanov**, K Lian, Building Production-Ready Recommendation System at Scale, ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2019)

M González-Fierro, D Dean, M Salvaris, **I Karmanov**, Microsoft AI Transformation, 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018)

**I Karmanov**, M Salvaris, M González-Fierro, Distributed Training on Multi-Node Multi-GPU of Deep Neural Networks, Open Data Science Conference (ODSC 2018)

**I Karmanov**, F Boylu-Uz, Linear Programming on Azure for Plane-Gate Optimisation, Machine Learning and Data Science Conference (MLADS 2018)

**I Karmanov**, M Salvaris, M González-Fierro, Distributed Training of Deep Learning Models, Strata Data Conference London (STRATA 2018)

## EDUCATION

*London School of Economics*

*Master of Science*, Economics, with Merit

2012-2013

*Thesis Title*: Optimal Control Analysis for Tax Avoidance

*Advisor*: Professor Frank A. Cowell

*Description*: Created a stylised model, inspired by Starbucks' corporation tax donation pledge. Investigated necessary conditions for efficiency of name-and-shame policy to reduce tax avoidance by modelling firm's optimisation problem in an infinite horizon setting and introducing reputation as an accumulated asset, solved with Hamiltonian in a optimal-control setting

*Bachelor of Science*, Economics, with First Class Honours

2009-2012

## SKILLS

*Programming Languages*: Python, R

*Deep Learning Libraries*: PyTorch, Tensorflow, Chainer, Gluon

## ACHIEVEMENTS

- Highest final-year average in BSc Economics course (78%)
- Youngest person ever to pass an Economics A-Level (BBC News - 2005)
- Youngest person ever to pass a Computer Science A-Level (BBC News - 2002)
- Recipient of 2015 CRA Innovation Grant: \$20k prize for developing new geospatial analytical tools and visualisation methods