Ilia Karmanov

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OVERVIEW

Staff Research Scientist at Qualcomm. Recent research has involved (3D) Computer Vision topics such as 3D positioning and pose estimation (using various modalities such as video, WiFi, and 5G). I have 12 patent applications and 3 conference publications related to this specific track. Also experienced with self-supervised learning, efficient video architectures and object detection.

EXPERIENCE

Staff Research Scientist, Qualcomm AI Research 2021-present

- Developing hardware-efficient architectures for 4K video-to-video processing (e.g. denoising on device)
- Developing efficient Mixture-of-Experts architecture for conditional compute track

Senior Research Scientist, Qualcomm AI Research 2020-2021

- Developing new architectures to solve perception-based problems across various modalities (Video, mmWave, WiFi, TV-L1 Optical Flow)
- Created first-ever unsupervised approach for 3D person-localisation (on video and WiFi data), which changed the direction of our team's research-track: youtu.be/8QuqVBhKZU
- 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
- Initiated a large community project: github.com/ilkarman/DeepLearningFrameworks(1.7k stars, 366 forks) to benchmark many deep-learning frameworks with a common codebase 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 Gavrilyuk, 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/xNmnqCsvMTU, (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