

Nikolay Nikolov

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Research Interests

Deep Reinforcement Learning, Robotics, Deep Learning, Computer Vision

Education

- 2014-2018 **Imperial College London**, *MEng Electronic and Information Engineering*.
First Class Honors 72.1/100%; US GPA equivalent: 4.0/4.0
Courses: *Robotics • Machine Learning • Computer Vision • Control • Operating Systems • Compilers • OOP • Mathematics • Networks • Databases • Algorithms and Data Structures*
- 2017-2018 **ETH Zurich**, *MEng Exchange Student*.
Courses: *Deep Learning • Probabilistic Artificial Intelligence • Dynamic Programming and Optimal Control • Machine Learning • Vision Algorithms for Mobile Robots*

Experience and Research

- Sep 2017 **Learning & Adaptive Systems Group**, *Research Assistant*, ETH Zurich.
-Present *Distributional Reinforcement Learning*
○ Supervisor: *Prof. Andreas Krause*
- July 2017 **Ocado Technology**, *Robotics Research Intern*, Hatfield, UK.
- Sep 2017 *Deep Reinforcement Learning for robot picking*
○ Implemented a Deep Reinforcement Learning algorithm for picking objects from a basket using a camera
○ Based on the visual servoing approach in *Learning Hand-Eye Coordination for Robotic Grasping with Deep Learning and Large-Scale Data Collection*, Levine et al.
○ Implemented in TensorFlow and deployed on a UR10 robotic arm
- Jan 2017 **Dyson Robotics Lab**, *Research Assistant*, Imperial College London.
- Sep 2017 *Bayesian Fusion for Volumetric SLAM based on Occupancy Mapping*
○ Supervisor: *Prof. Stefan Leutenegger*
○ Developed Bayesian formulation for volumetric occupancy fusion from depth camera
○ Prototyped real-time implementation for a CPU and a CUDA-enabled GPU
○ Demo: <http://nikonikolov.com/projects/bfusion>
○ Paper submission to IEEE RA-Letters and ICRA 2018
- June 2015 **Aerial Robotics Lab**, *Research Assistant*, Imperial College London.
- Dec 2016 Built a Bio-inspired Bimodal Walking Hexapod Quadcopter that can walk and fly
○ Supervisor: *Prof. Mirko Kovac*
○ Demo: <http://nikonikolov.com/projects/wkquad>

Publications

- in review **Efficient Octree-Based Volumetric SLAM Supporting Signed-Distance and Occupancy Mapping.** Emanuele Vespa, Nikolay Nikolov, Marius Grimm, Luigi Nardi, Paul H J Kelly, Stefan Leutenegger. IEEE International Conference on Robotics and Automation (ICRA), 2018.

Selected Projects

- 2017 **Autonomous Snack Delivery Android**, *Imperial College London*.
Baxter robot that autonomously delivers snacks indoors
○ Supervisor: *Prof. Petar Kormushev* (Robot Intelligence Lab)
○ Demo: <http://nikonikolov.com/projects/asda>
○ Built a ROS-based pipeline for localization, path-planning and environment manipulation
○ Implemented as part of a custom third-year group project at Imperial College
- 2017 **A2Z Drone Delivery**, *Brown University*, Providence, RI, US.
Raspberry Pi-operated DJI M-100 to deliver food in Brown University
○ Preliminary demo: <http://nikonikolov.com/projects/dronedelivery>
- 2017 **Eurobot 2017 Robotics Competition**, *Imperial College London*.
○ Built a robot to recognize, collect and move objects in order to construct a lunar base
○ Work involved ROS, Embedded Systems, Localization, State Estimation
- 2017 **Machine Learning for Movie Recommendation**.
Collaborative Filtering system for movie recommendation
- 2016 **HackZurich**, *Zurich, Switzerland*.
Image-processing and Optical Character Recognition (OCR) app that can scan grocery receipts to keep track of fridge contents. Implemented using OpenCV and Google OCR API
- 2016 **Autonomous Raspberry Pi Robotic Car**.
Autonomous car that uses Monte-Carlo localization to optimally navigate and recognize obstacles
- 2016 **C90 to MIPS compiler**.
Self-hosted C90 compiler implemented in C++, flex and bison
- 2015 **Eye tracking on FPGA**.
Real-time image-processing FPGA architecture that tracks human eye movements

Skills

Programming	C/C++ • Python • Java • Shell • MATLAB • JavaScript • HTML/CSS • SQL
Software	TensorFlow • ROS • gym • OpenCV • CUDA • scikit-learn • git • Linux • GNU
Research	Deep Reinforcement Learning • Robotics • Deep Learning • SLAM • Vision
Languages	English • Bulgarian • Russian

Honors and Awards

2015	Jessel Rosen Research Award	<i>London, UK</i>
2013	International Young Physicists Tournament - Bronze Medal	<i>Taipei, Taiwan</i>
2013	STEM distinction by the President of Bulgaria	<i>Sofia, Bulgaria</i>

Online Courses

Deep Reinforcement Learning, *Sergey Levine, UC Berkeley*.

Convolutional Neural Networks for Visual Recognition, *Andrej Karpathy, Stanford*.

Machine Learning, *Andrew Ng, Stanford*.

Affiliations

- 2014-Present Imperial College Robotics Society - Member
- 2007-Present Aikido - 1st Dan Black Belt
- 2015-2016 Imperial Entrepreneurs - Vice President