

Stefan Stevšić

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Summary

My research lies in the intersection of **Deep Learning** and **Robotics**, with the purpose of enabling robots to acquire new skills from human demonstration. I am focusing on **Computer Vision** and **Control Policy Learning** approaches to achieve this goal. More specifically, I am interested in **6D pose estimation** of objects from RGB images, which is useful in cases when tasks require object manipulation. Furthermore, I am focusing on learning control policies via **Reinforcement Learning** and **Imitation Learning**, which are helpful when a skill is learned from human motion data.

Publications

PREPRINTS

- [P1] **Spatial attention improves iterative 6D object pose estimation**
S. STEVŠIĆ, O. HILLIGES

JOURNAL PAPERS

- [J1] **Learning to Assemble: Estimating 6D Poses for Robotic Object-Object Manipulation**
S. STEVŠIĆ, S. CHRISTEN, O. HILLIGES
IEEE Robotics and Automation Letters (Proceedings of IEEE ICRA), (Volume: 5, Issue: 2), April 2020
- [J2] **Capturing Subjective First-Person View Shots with Drones for Automated Cinematography**
A. ASHTARI S. STEVŠIĆ, T. NÄGELI, J.C. BAZIN, O. HILLIGES
ACM Transactions on Graphics (Proceedings of ACM SIGGRAPH), (Volume: 39, Issue: 4), August 2020
- [J3] **Sample Efficient Learning of Path Following and Obstacle Avoidance Behavior for Quadrotors**
S. STEVŠIĆ, T. NÄGELI, J. ALONSO-MORA, O. HILLIGES
IEEE Robotics and Automation Letters, (Volume: 3, Issue: 4), October 2018
- [J4] **Optimizing for Aesthetically Pleasing Quadrotor Camera Motion**
C. GEBHARDT, S. STEVŠIĆ, O. HILLIGES
ACM Transactions on Graphics (Proceedings of ACM SIGGRAPH), (Volume: 37, Issue: 4), August 2018

CONFERENCE PAPERS

- [C1] **Demonstration-Guided Deep Reinforcement Learning of Control Policies for Dexterous Human-Robot Interaction**
S. CHRISTEN, S. STEVŠIĆ, O. HILLIGES
Proceedings of IEEE ICRA, May 2019
- [C2] **Airways: Optimization-Based Planning of Quadrotor Trajectories according to High-Level User Goals**
C. GEBHARDT*, B. HEPP*, T. NÄGELI, S. STEVŠIĆ, O. HILLIGES
Proceedings of ACM SIGCHI, May 2016
- [C3] **Towards Optimal Force Distribution for Walking Excavators**
M. HUTTER, P. LEEMANN, S. STEVŠIĆ, A. MICHEL, D. JUD, M. HOEPFLINGER, R. SIEGWART, R. FIGI, C. CADUFF, M. LOHER, S. TAGMANN
Proceedings of IEEE ICAR, July 2015

(* indicates equal contribution across marked authors)

Education

ETH Zurich

PHD COMPUTER SCIENCE

2015 - Present

MSc ROBOTICS, SYSTEMS AND CONTROL

2012 - 2014

University of Belgrade

BSc ELECTRICAL ENGINEERING

2008 - 2012

Experience

ETH Zurich (Advanced Interactive Technologies Lab)

RESEARCH ASSISTANT

May 2015 - Present

- Scientific research as PhD candidate with a focus on Deep Learning methods for Computer Vision and Control Policy Learning.
- Assistance in organising and running courses, and supervising students.

ETH Zurich (Autonomous Systems Lab)

RESEARCH ASSISTANT

September 2014 - January 2015

- Implementing the low-level controller for the walking excavator. Developing a new method for force control without direct force feedback.
- I was part of a research team working on the walking excavator project. Together with my colleagues, I was implementing and testing our approach on the real excavator.

ETH Zurich (Computer Vision Lab)

INTERN

January 2014 - May 2014

- Developing an active vision algorithm for ball search in a robot football competition, RoboCup.
- Working on different parts of the ETH RoboCup team codebase, that was used in German Open 2014. The codebase was written in C++.

Disney Research Zurich

INTERN

September 2013 - December 2013

- Building a real-world quadrupedal robot based on the simulation prototype.
- Implementing control approaches for different walking patterns (stand-up, static walking, trotting) on the quadrupedal robot. The implementation was done in C++.

Honors & Awards

2015 **Best Paper Award**
IEEE International Conference on Advanced Robotics

2012 - 2014 **Scholarship for Best Students at Universities Abroad**
Serbian Ministry of Youth and Sport

2012 **Scholarship for Best 1000 Students in Final Year of Studies**
Serbian Ministry of Youth and Sport

2012 **Best Student in Study Program: Signals and Systems**
Electrical Engineering Department, University of Belgrade

Academic Activities

I have been a reviewer for Robotics journals and conferences, and Computer Vision conferences such as IEEE RA-L, IEEE ICRA, IEEE IROS, IEEE CASE, BMVC.

Teaching

COURSES

Linear Algebra

TEACHING ASSISTANT

2015, 2016, 2017, 2018, 2019

Parallel Programming

TEACHING ASSISTANT

2016

Software Design

TEACHING ASSISTANT

2017, 2018

SUPERVISED THESES

Learning to Control Contact Forces in Robotic Manipulation

STUDENT: N. VULIN

Master Thesis

2020

Demonstration-Guided Deep Reinforcement Learning of Control Policies for Dexterous Human-Robot Interaction

STUDENT: S. CHRISTEN

Master Thesis

2018

Transfer Learning for Mapless Quadrotor Navigation Using Recurrent Neural Network

STUDENT: L. HSU

Master Thesis

2018

One-Shot Imitation Learning for Particle Reaching with Multiple Targets

STUDENT: S. ZHANG

Semester Thesis

2018

Skills

Programming	Python, C/C++, MATLAB, LabVIEW, Bash, LaTeX
Deep Learning Tools	Tensorflow, Pytorch, Keras
Graphics Tools	UnrealEngine, Blender, OpenGL
Robotics Tools	ROS, Gazebo, OpenAI Gym, MuJoCo
Other Tools & Libraries	OpenCV, Cython, Git, SVN, Jinja
Languages	English (fluent), Serbian (mother tongue)

References

Prof. Dr. Otmar Hilliges (Thesis Supervisor)

ASSOCIATE PROFESSOR, COMPUTER SCIENCE, ETH ZURICH

✉ otmar.hilliges@inf.ethz.ch

Prof. Dr. Javier Alonso-Mora

ASSISTANT PROFESSOR, MECHANICAL, MARITIME AND MATERIALS ENGINEERING, TU DELFT

✉ j.alonsomora@tudelft.nl