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Anastasia Tkach

EDUCATION

09.14-current	PhD in Computer Science (Computer Vision, Hand Tracking) Swiss Federal Institute of Technology (EPFL), Switzerland
09.11-02.14	Master in Computer Science Swiss Federal Institute of Technology (EPFL), Switzerland, AGP 5.72/6.00
09.07-07.11	Bachelor in Robotics Bauman Moscow State Technical University (BMSTU), Russia, AGP 5.00/5.00

PHD THESIS - High Accuracy Real-Time Hand Tracking from Depth Sensor Data

- Advisors: Dr. Prof. Mark Pauly, Dr. Prof. Andrea Tagliasacchi
- Motivation: hand control of virtual or augmented reality devices
- Components of our real-time hand tracking system
 - Numerical optimization (finding pose and shape parameters of hand model given the data);*
 - Bayesian Modelling (online update shape parameters);*
 - Classification and Regression (hand detection; tracking failure detection);*
 - Real-time implementation (C++; GPU/CUDA; OpenGL for rendering);*
 - Latent space embedding (learning prior distributions on hand pose and shape);*

PUBLICATIONS

- A. Tkach*, A. Tagliasacchi*, E. Remelli, M. Pauli, A. Fitzgibbon. [“Online Generative Model Personalization for Hand Tracking”](#). ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia), 2017.
- E. Remelli*, A. Tkach*, A. Tagliasacchi, M. Pauli. [“Low-Dimensionality Calibration through Local Anisotropic Scaling for Robust Hand Model Personalization”](#). ICCV, 2017.
- A. Tkach, M. Pauly, A. Tagliasacchi. [“Sphere-Meshes for Real-Time Hand Modeling and Tracking”](#). ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia), 2016.
- A. Tagliasacchi, M. Schröder, A. Tkach, S. Bouaziz, M. Botsch, M. Pauly. [“Robust Articulated-ICP for Real-Time Hand Tracking”](#). Computer Graphics Forum (Proceedings of SGP), 2015.

SKILLS

- Programming C++, Python, Tensorflow, C#, MATLAB, Java
- Computer Vision, Numerical Optimization, Performance Capture, Machine Learning, Image Processing
- Data Structures and Algorithms

AWARDS

- Travel grant for HANDS workshop at CVPR 2016
- Best paper award at Symposium on Geometry Processing, Graz, 2015
- Computer Science School Fellowship, Swiss Federal Institute of Technology 2014-2015
- Google (Anita Borg) Scholarship finalist, June 2009

PATENTS

- A. Tkach, A. Tagliasacchi, M. Pauly, 2016, provisional patent "Convolution Models for Real-Time Hand Modeling and Tracking" (KS Ref. No. 2847-97161-01), filed 14.08.2016.

OPEN SOURCE PROJECTS

- <https://github.com/OpenGP/htrack>
- <https://github.com/OpenGP/hmodel>
- <https://github.com/OpenGP/honline>

INDUSTRIAL EXPERIENCE

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|-------------|--|
| 07.17-09.17 | <p>Google Corporation, Zurich, Switzerland
Research intern, Machine Perception team, supervisor Dr. Luciano Sbaiz</p> <ul style="list-style-type: none">■ <i>Trained a deep network for video quality prediction.</i>■ <i>Compared seven model architectures used for prediction from video input using single type of input features.</i>■ <i>Compared fusion architectures for prediction from several different input features.</i>■ <i>Implemented a tool for interpreting model results and examining causes of false positives and negatives.</i> |
| 07.16-09.16 | <p>Microsoft Research Cambridge, United Kingdom
Research intern, Machine Intelligence and Perception team, supervisor Dr. Prof. Andrew Fitzgibbon</p> <ul style="list-style-type: none">■ <i>Derived robust optimization procedure (in spirit of Kalman Filter) for calibrating hand model in real time to the user of hand tracking system.</i> |
| 04.14-08.14 | <p>Google Corporation, Krakow, Poland
Software Engineer intern, Google TV team</p> <ul style="list-style-type: none">■ <i>Developed the system that determines main idea for an input group of movies and recommends movies having the same idea.</i>■ <i>Enabled navigation in movies space by adding and subtracting attributes.</i>■ <i>Implemented a parallelized, cloud-based prototype working on massive amounts of data.</i>■ <i>To our knowledge, this is the first system of such kind. The system was approved to be put in production.</i> |
| 07.13-09.13 | <p>Microsoft Corporation, Redmond, USA
Software Development Engineer in Test intern, Common Language Runtime team, Visual Studio</p> <ul style="list-style-type: none">■ <i>Developed from the scratch an approach for predicting pass/failure of the tests on the current version of the software (accuracy 97.31%). The approach enabled breaking changes detection by order of magnitude faster.</i>■ <i>Implemented and validated with daily testing results a tool that is using the suggested approach.</i>■ <i>Prepared the tool for integration in test automation system of CLR team.</i> |
| 02.13-07.13 | <p>Sony Research, Stuttgart, Germany
Research intern on "Personalization and Recommendation" project</p> <ul style="list-style-type: none">■ <i>Implemented a recommendation system based on Matrix Completion using a recently published technique - Accelerated Proximal Gradient algorithm (APG).</i>■ <i>Adapted APG algorithm designed to work with ratings of the products for working only with a list of previous purchases, which does not require that customer explicitly rates a product.</i>■ <i>Improved the performance of recommendation system by 9.3 percent w.r.t previous approaches.</i> |

MASTER THESIS - Photorealistic Face Synthesis

- *Developed a pipeline for generating high resolution and complete facial texture given a geometry model and several low-resolution photos of an arbitrary face.*
- *Extended a state-of-art super-resolution algorithm by adding several stages of image quality enhancement. Tailored the algorithm to facial texture input. Implemented exemplar-based texture generation for the face regions missing from the input photos. Introduced adaptive exemplar sizes depending on missing area diameter thus speeding up the algorithm.*

INVITED TALKS

- ICCV 2017, PeopleCap: capturing and modeling human bodies, faces and hands

REVIEWED PAPERS FOR

- Computer Graphics Forum 2016
- ICCV workshop 2017
- Eurographics 2018
- Graphics Interface 2018