

Ivan Puhachov

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I am a PhD-student working on geometry processing, optimization and machine learning with applications to natural drawings and sketches.

PUBLICATIONS

- **Reconstruction of Machine-Made Shapes from Bitmap Sketches** SIGGRAPH Asia 2023
Ivan Puhachov, Cedric Martens, Paul G. Kry, Mikhail Bessmeltsev [project page] [tbd]
TLDR: 3D shape reconstruction from natural sketch
Optimization to align geometric primitives to drawn contours.
- **Stability-Aware Simplification of Curve Networks** SIGGRAPH 2022
William Neveu, Ivan Puhachov, Bernard Thomaszewski, Mikhail Bessmeltsev [project page] [acm]
TLDR: design a curve network on a shape by worst-case stability criterion.
Simplified mixed-integer semi-definite programming to an efficient greedy algorithm.
- **Keypoint-Driven Line Drawing Vectorization via PolyVector Flow** SIGGRAPH Asia 2021
Ivan Puhachov, William Neveu, Edward Chien, Mikhail Bessmeltsev [project page] [acm]
TLDR: novel PolyVector flow aligns curve to a smooth cross-field over bitmap image.
Combined with ML detection to vectorize drawings.

EXPERIENCE

- **Research Engineering Intern** Montreal, Canada
Quantum Technology Recruiting Inc. on assignment with Huawei Canada Oct 2021 - Present
 - **Research, part-time internship:** Successful submission to SIGGRAPH Asia
In collaboration with Prof. Mikhail Bessmeltsev and Prof. Paul G. Kry
- **Machine Learning Research Intern** Kharkiv, Ukraine
MobiDev Feb 2019 - Aug 2019
 - **ID Verification system:** Image quality assesment system; fine-tuning verification system; QA pipeline
 - **Object detection:** Proof-of-Concept demo for multiple object detection
 - **Sales forecast:** Time-series analysis

SKILLS SUMMARY

Languages: Python, C++, bash, Matlab

Frameworks: PyTorch, NumPy, SciPy, CGAL, libigl, Eigen, pyomo, Ipopt

Tools: git, Blender, Ubuntu, Blender scripting, Adobe Illustrator scripting

EDUCATION

- **Université de Montréal** Montreal, Canada
PhD in Computer Science, DIRO, LIGUM Sept 2019 - 2024 (expected)
Research supervisor: Mikhail Bessmeltsev
- **University of L'Aquila & Kharkiv National University** L'Aquila, Italy
MSc (cum laude) in Mathematical Engineering; GPA: 3.93 / 4.0 Sept 2017 - June 2019
Joint MSc Programme Intermaths
Thesis: "Catacaustics of surfaces" (advisor: Alexander L. Yampolsky)
- **V.N. Karazin Kharkiv National University** Kharkiv, Ukraine
BSc in Mathematics, School of Mathematics and Informatics, Geometry; GPA 3.66 / 4.0 Sept 2013 - June 2017

ACTIVITIES

- **Volunteer, FoieGraph 2022 Annual Ontario-Quebec-Maritimes pre-SIGGRAPH Workshop** Fall 2022
Website dev, discord admin, presenter [website]
- **Teaching Assistant, IFT 6113 "Geometric Modeling and Shape Analysis"** Fall 2022, 2021, 2020
Homework code templates, assessment, face-to-face evaluation, tech support, forum moderation [course page]
- **Project IFT 6756 "Game Theory and Machine Learning"** Spring 2021
Trained a GAN models to generate vector images, short comparison with regular raster GANs [project page]
- **Project IFT 6010 "Modern Natural Language Processing"** Spring 2021
Recurrent Neural Network with attention to generate simple drawings [project page]

HONORS AND AWARDS

- PhD Excellence Scholarship, DIRO, UdeM – April 2021
- PhD Excellence Scholarship, DIRO, UdeM – April 2020