TIANYU WANG

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PROFILE

I currently work as a research assistant for Prof. Jin Huang in Physics&Geometry group, State Key Lab of CAD&CG, Zhejiang University. My research interest is mainly on physics-based forward simulation by numerical PDE solving and using numerical optimization for inverse physical or geometric design. I have some experience in solid(FEM based elasticity, mass-spring model , discrete rod model , discrete shell model, subspace acceleration) and fluid (SPH, grid, hybrid method, SWE model) simulation, geometry processing (smoothing, fairing, basic parameterization, geometric energy based deformation, subdivision, geodesic distance computation) and deep learning (CNN, GAN, super-resolution, style transfer).

EDUCATION

Zhejiang University, Hangzhou, China *September 2016 - Present*
M.Eng. in Computer Science Advisor: Prof. Jin Huang
Sichuan University, Chengdu, China *September 2012 - June 2016*
B.Eng. in Computer Science Overall GPA: 81.54/100

PUBLICATION

Jiong Chen, Hujun Bao, **Tianyu Wang**, Mathieu Desbrun, Jin Huang: Numerical Coarsening using Discontinuous Shape Functions. *ACM Transaction Graphics 37(4)(SIGGRAPH 2018)*, Vancouver, Canada, 2018

RESEARCH EXPERIENCE

Research Assistant,State Key Lab of CAD&CG,ZJU September 2016 - present
Advisor: Prof. Jin Huang *See below project section for details*

- **Numerical coarsening of FEM based solid simulation**
- **Cloth or solid simulation using mass-spring model**
- **Super-resolution of shallow water equation simulation based on GAN**

SELECTED GRAPHICS RELATED PROJECTS

Cloth or solid simulation using mass-spring model
Implement three versions of mass-spring based simulation: using classical Newton method, using local-global strategy based on the paper *Fast Simulation of Mass-Spring Systems*, using modified fast mass-spring based on the paper *A Chebyshev Semi-Iterative Approach for Accelerating Projective and Position-based Dynamics* with a CUDA version jacobi solver acceleration for sparse matrix.

Numerical coarsening of FEM based solid simulation
Research for numerical coarsening acceleration solving of FEM based solid simulation of heterogeneous materials with non-linear constitutive laws with coarse grid. See the paper *Numerical Coarsening using Discontinuous Shape Functions* for the algorithm details. In this process, I implemented a basic FEM based solid simulation framework quickly first and then did the major two papers' comparison experiments almost by myself. And the first author Jiong Chen and I frequently communicated to analyze the experiment results.

Heat flow based geodesic distance computation
An implementation of the paper *Geodesics in Heat:A New Approach to Computing Distance Based on Heat Flow* which uses heat flow to compute the geodesic distance for per mesh vertex or per points cloud's point to the specified mesh vertex or point on point cloud. The algorithm core is just solving a Poisson's equation which is elegant and concise in maths!

L1-based construction of polycube maps for mesh
An implementation of the core algorithm of the paper *L1-based Construction of Polycube Maps from Complex Shapes* which uses a L1 Polycube deformation based method for hexahedralization and the algorithm is mainly solving L1 norm optimization problem.

Super-resolution of shallow water equation simulation based on GAN
Research for SWE simulation data's super-resolution using GAN. My master thesis proposes to achieve the SWE data super-resolution using GAN. By taking account of the temporal smoothness demand, rotation equivalence requirement, the possible negative value, this thesis proposes some modifications to the state of the art and obtain verified better results. See the *report* for details.

HONORS AND AWARDS

Graduate of Merit/Triple A graduate, Zhejiang University, 2018
Award of Honor for Graduate, Zhejiang University, 2018
Wen Chixiang Scholarship, Zhejiang University, 2018
Silver Medal, ACM-ICPC China Provincial Programming Contest, Chengdu Site, 2013 and 2014
2nd University Scholarship, Sichuan University, 2013

SKILLS

English	TOEFL score: 94 (R: 26 L:21 S:21 W:26) GRE score: None
Programming languages	C/C++,Python,Latex,Java
Toolkit	Eigen,Boost,NumPy,Tensorflow,OpenGL,OpenCV,CUDA,OpenMP,ParaView, GIMP,Inkscape,CMake(Linux),Git,SVN
Platforms	Linux 16.04

EXTRA-CIRRUCULAR

I love basketball and play as a point guard skilled in shooting!

I love film and TV series and write film review on movie.douban.com!