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 simulation by numerical PDE solving and using numerical optimization for visual computing problems. I have some experience in solid and fluid simulation, geometry processing and deep learning.

EDUCATION

Zhejiang University, Hangzhou, China *September 2016 - Present*
M.Sc. in Computer Science Advisor: Prof. Jin Huang
Sichuan University, Chengdu, China *September 2012 - June 2016*
B.Sc. 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**

GRAPHICS RELATED PROJECTS

Solid deformation and simulation related:
Cage based deformation using ARAP energy or moving least square
Deform mesh based on coarse cage and use as-rigid-as-possible energy or moving least square method extending the paper *Image Deformation Using Moving Least Squares* to 3D.

FEM simulation of solid using different constitutive models
Dynamics or quasi-static simulation of solid using finite element method and using different constitutive models such as linear elasticity, co-rotational linear elasticity,St. Venant-Kirchhoff model and Neohookean elasticity with tetrahedron mesh or hexahedron mesh.

Cloth or solid simulation using mass-spring model
Implement three versions of mass-spring based simulation: using classical newton method, using fast mass-spring method 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.

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 details.

Geometry processing related:
CatmullClark subdivision of surface mesh A course project.

Some discrete operator measuring curvature, normal on arbitrary triangle mesh
Junior training based on the paper *Discrete Differential-Geometry Operators for Triangulated 2-Manifolds*, knowing the cotangent form curvature operator and practice of halfedge structure, mesh curvature measure and mesh smoothing based on the mean curvature flow.

Surface mesh fairness using different energy
A implementation of the paper *An Intuitive Framework for Real-Time Freeform Modeling*, deforming mesh using different Laplace based energy: membrane surface energy, thin-plate surface, minimum variation surface energy with some fixed point constraints.

Heat flow based geodesic distance computation
A implementation of the paper *Geodesics in Heat:A New Approach to Computing Distance Based on Heat Flow*. The algorithm core is just solving a possion equation!

L1-based construction of polycube maps for mesh
A implementation of the core algorithm of the paper *L1-based Construction of Polycube Maps from Complex Shapes*.

ARAP parameterization of triangle mesh
A implementation of the paper *A Local/Global Approach to Mesh Parameterization*.

Fluid simulation related:
Shallow water simulation with weakly two-way coupling with rigid body Practice.

Water simulation based on SPH method
A implementation of the earliest SPH based water simulation paper *Particle-Based Fluid Simulation for Interactive Applications*.

FLIP or PIC based water simulation with boundary correction
A simplified FlIP or PIC fluid solver with the boundary correction based on the paper *A Fast Variational Framework for Accurate Solid-Fluid Coupling*.

Deep learning related:
Image style transfer
Pretend to be Vencent using the paper *A Neural Algorithm of Artistic Style*!

Handwriting number generation based Generative Adversarial Networks(GAN)
A simple implementation of the paper *Generative Adversarial Networks* with just full connection layer on the handwriting number generation application.

Super-resolution of shallow water equation simulation based on GAN
Research for SWE simulation data's super-resolution using GAN. See the *report* for details.

Rendering related:
A naive path tracing solver A course project.

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

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!