Qingyang Tan

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Research Interests

Computer Graphics, Computer Vision, Robotics, Machine Learning

Education

University of Maryland, College Park (UMD), MD, U.S. 2018 – Present
Ph.D. Student in Computer Science Advisor: Prof. Dinesh Manocha GPA: 4.0/4.0

University of Chinese Academy of Sciences (UCAS), Beijing, China 2014 – 2018
B.Eng. in Computer Science and Technology GPA: 3.9/4.0 Rank: 1/61

Massachusetts Institute of Technology (MIT), MA, U.S. 2017
Special Student in EECS GPA: 5.0/5.0

Publications and Manuscripts

Active Learning of Neural Collision Handler for Complex 3D Mesh Deformations
Qingyang Tan, Zherong Pan, Breannan Smith, Takaaki Shiratori, Dinesh Manocha
arXiv:2110.07727, 2021

LCollision: Fast Generation of Collision-Free Human Poses using Learned Non-Penetration Constraints
Qingyang Tan, Zherong Pan, Dinesh Manocha
AAAI Conference on Artificial Intelligence (**AAAI**), 2021

Mesh-based Variational Autoencoders for Localized Deformation Component Analysis
Qingyang Tan*, Ling-Xiao Zhang*, Jie Yang, Yu-Kun Lai, Lin Gao
IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), 2021

Multiscale Mesh Deformation Component Analysis with Attention-based Autoencoders
Jie Yang, Lin Gao, **Qingyang Tan**, Huang Yihua, Shihong Xia, Yu-Kun Lai
IEEE Transactions on Visualization and Computer Graphics (**TVCG**), 2021

DeepMNavigate: Deep Reinforced Multi-Robot Navigation Unifying Local & Global Collision
Qingyang Tan, Tingxiang Fan, Jia Pan, Dinesh Manocha
IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2020

Realtime Simulation of Thin-Shell Deformable Materials using CNN-Based Mesh Embedding
Qingyang Tan, Zherong Pan, Lin Gao, Dinesh Manocha
IEEE Robotics and Automation Letters (**RA-L**), 2020
Also presented at International Conference on Robotics and Automation (**ICRA**), 2020

Variational Autoencoders for Deforming 3D Mesh Models
Qingyang Tan, Lin Gao, Yu-Kun Lai, and Shihong Xia
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018

Mesh-based Autoencoders for Localized Deformation Component Analysis
Qingyang Tan, Lin Gao, Yu-Kun Lai, Jie Yang, and Shihong Xia
AAAI Conference on Artificial Intelligence (**AAAI**) (Spotlight), 2018

Research Experience

Adobe Research Remote, U.S. May 2021 – Aug 2021
Research Intern Mentor: Dr. Yi Zhou

Generating Collision-Free Human Poses

UMD MD, U.S. Jan 2020 – Present

Research Course Advisor: Prof. Dinesh Manocha

- Implemented a fast neural network collision detector based on penetration depth
- Used learned attention wegiht to decompose collision penetration energy and to fit the locality of self-collisions
- Fused regresion loss, margin ranking loss, and classification loss to boost performance
- Built a constraint optimizer for collision response using neural network

Facebook Reality Labs Remote, U.S. May 2020 – Aug 2020

Research Intern Manager: Dr. Takaaki Shiratori

Robot Navigation System

UMIACS, UMD MD, U.S. May 2019 – June 2020

Research Assistant Advisor: Prof. Dinesh Manocha

- Implemented a navigation system using deep reinforced learning
- Unified global and local observation

Cloth Simulation through Neural Network

UMIACS, UMD MD, U.S. June 2018 – Jan 2020

Research Assistant Advisor: Prof. Dinesh Manocha

- Implemented feature to vertex neural network layer to enhance cloth embedding accuracy
- Added physics-based loss to achieve more deformation details
- Predicted cloth deformation sequence using stateful recurrent neural network

Recognition of Isolated and Continuous Sign Language

Institute of Computing Technology (ICT), CAS Beijing, China Sept. 2017 – June 2018

Bachelor Thesis Advisors: Prof. Xilin Chen, Prof. Xiujuan Chai

- Developed end-to-end and multi-task framework to classify sign language video
- Designed spatial and temporal attention residual learning

Geometry Deep Learning on Shape Deformation

ICT, CAS Beijing, China May 2016 – Sept. 2017

Research Assistant Advisors: Prof. Lin Gao, Prof. Yu-Kun Lai, Prof. Shihong Xia

- Combined neural network and intrinsic mesh feature to analysis and generate 3D data
- Defined new tunable parameters for the network to capture most important deformations in certain dimensions
- Applied graph-based Convolutional Neural Networks (CNN) on the irregular 3D mesh surface
- Added distance-based sparsity constraint to autoencoder framework

Teaching Experience

Teaching Assistant, CMSC424 Database Design, UMD Fall 2021 / Spring 2022

Teaching Assistant, CMSC320 Introduction to Data Science, UMD Fall 2020 / Spring 2021

Teaching Assistant, CMSC420 Advanced Data Structures, UMD Spring 2020

Skills

- Hands on experience of Machine Learning and Neural Network libraries including TensorFlow, PyTorch, scikit-learn, Theano, Caffe
- Fluent in C, Matlab, Python
- Knowledge of SQL, Verilog, HTML

Academic Services

- CVPR Reviewer 2019 / 2020 / 2021 / 2022
- AAAI Reviewer 2020 / 2021 / 2022
- ICCV Reviewer 2019
- ECCV Reviewer 2020
- WACV Reviewer 2020 / 2021
- UMD CS Graduate Program Admission Reviewer 2019 / 2020

♡ Honors and Awards

UMD Computer Science Department Dean's Fellowship 2018-2019
Beijing Excellent Graduate June 2018
UCAS Excellent Graduate June 2018
UCAS Excellent Bachelor Thesis June 2018
UCAS First-Class Academy Fellowship Oct. 2015 / Oct. 2016 / Oct. 2017
UCAS Excellent Undergraduate Research-Intern Report Nov. 2015 / Apr. 2016

Miscellaneous

- Languages: English - Fluent, Mandarin - Native speaker
- Hobbies: Swimming, Science Fiction
- Extracurricular Activities:
  - Asian International Model United Nations, Peking University, Beijing, China Apr. 2016
  - Editor for UCAS Undergraduate Social Platform, UCAS, Beijing, China Sept. 2015 – June 2016
  - Volunteer Science Teacher, Hua-Ao School, Beijing, China Oct. 2014 – Jan. 2015