Yongxu JIN

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RESEARCH INTERESTS

Computer Graphics, Computer Vision, Machine Learning

EDUCATION

Shanghai Jiao Tong University *Sept. 2015 - June 2019 (Expected)*

Bachelor in **Software Engineering**

Overall GPA: **88/100** Major GPA: **90/100**

SKILLS

Languages: Python, JAVA, C/C++, MATLAB, HTML, CSS, JavaScript, SQL, UML

Machine Learning: Numpy, Sklearn, Caffe, Tensorflow, Keras

Graphics / Vision: OpenGL, GLSL, Unity, ODE (Open Dynamics Engine), OpenCV, Skimage

English Proficiency: TOEFL: 104 (R29 L28 S23 W24) GRE: 328 (V158 Q170 AW 3.5)

RESEARCH EXPERIENCES

Codimensional Fluid Simulation by Solving Partial Differential Equation on Surface *Sept.2018 - Present*

Advisor: Dr. Bo ZHU, Department of Computer Science, Dartmouth College

- Studied grid-based and particle-based fluid simulation, used closest point method (CPM, i.e. extending points on the surface to 3D space) to solve partial differential equation (PDE, like Navier-Stokes equations) on surface
- Computed level set function from surface, solved Poisson equation on 3D grid, interpolated pressure and velocity value from closest points on the grid to surface, and calculated advection using particles on the surface
- Adopted non-manifold grid to handle situations where two surfaces are close to each other
- Future research focuses on refining this method, solving problems in special conditions and applying this technique to simulate codimensional fluid phenomena in real life, like soap film and bubbles

Skills Involved: C++, OpenGL, GLFW, GLSL, Eigen, PDE, Numerical Methods

Optimal Gait and Form for Animal Locomotion *July 2018 - Sept. 2018*

Advisor: Dr. Weiwei XU, State Key Lab of CAD&CG, Zhejiang University

- Systematically studied numerical optimization and multibody dynamics simulation, optimized gait and form for animal locomotion using a derivative-based inner loop (Sequential Quadratic Programming) and a sample-based outer loop (Covariance Matrix Adaptation)
- Derived the momentum equation of multibody and the optimization function of inner loop, computed their derivatives by two methods (manual computation and automatic differentiation)
- Implemented the code using rigid body simulation library and numerical optimization library

Skills Involved: C++, Rigidbody Simulation, SQP, Automatic Differentiation

Cartoon Image Dataset Collection and Classification using customized DNN *Sept. 2017 - June 2018*

Advisor: Dr. Xubo YANG, Digital ART Lab, Shanghai Jiao Tong University

- Obtained the basal dataset of the cartoon images from the web crawler and expanded the dataset (from 4000 to 10000+) with three methods:
  - Wrote NPR shader on the 3D models online and obtained the snapshots from various angles

- Used texture mapping and color remapping algorithms to give cartoons the texture of pencils or crayons and collected image data in different styles
- Converted the 2D image to 3D via MagicToon (AR application) and collected all snapshots

- Proposed a targeted DNN architecture to improve cartoon image recognition (10% error reduction):
  - Inputs Unified Stylization (IUS)-- unified styles of the input images to reduce the complexity of training
  - Feature Inserted Network (FIN)-- inserted special features of images into neural networks to improve accuracy
  - Network Plus Network (NPN)-- used multiple neural networks for concurrent training

Skills Involved: Python/MATLAB, MagicToon, Unity Shader, OpenCV, Tensorflow

Simultaneous Visual Recovery of 3D Human Pose and Shape *Mar. 2017 - Mar. 2018*

Group Leader, Advisor: Dr. Xu ZHAO, VisionLab, Shanghai Jiao Tong University

- Systematically studied mechanism of OpenPose and SMPLify, took charge of the overall task arrangement, and implemented a system which could reconstruct 3D human model from a human image
- Extracted a 2D human pose skeleton from an image, fit a 3D human model with shape and pose on the 2D skeleton
- Developed an application which could automatically measure the height and BWH of a person from an image based on the 3D human model reconstruction system

Skills Involved: Python/C++, OpenPose, SMPLify, Caffe

Morphological Classification of Amazon Rainforest via Satellite Data *Sept. 2017 - Nov. 2017*

Advisor: Dr. Mike TAMIR, School of Information, UC Berkeley

- Conducted data pre-processing, including haze removal, data augmentation, etc.
- Implemented dataset extension, image contrast optimization and dimensionality reduction
- Chose VGG-16 as the DNN for classification after comparing precision and recall of three different DNNs, tuned hyperparameters, and achieved the F2 score of 0.90254 (World Highest 0.93317)

Skills Involved: Python, PCA, Deep Neural Network, OpenCV, Keras

PUBLICATIONS

Zhou, Yanqing; **Jin, Yongxu**; Luo, Anqi; Chan, Szeyu; Xiao, Xiangyun; Yang, Xubo. **ToonNet: A cartoon image dataset and a DNN-based semantic classification system**, *ACM SIGGRAPH International Conference on Virtual-Reality Continuum and its Applications in Industry (VRCAI 2018)*

INTERNSHIPS

Shanghai Cloudpense Co., Ltd. *Dec. 2017 - Feb. 2018*

Computer Vision Engineer Intern, R&D Department

- Took charge of the invoice picture processing and OCR recognition with OpenCV and Baidu OCR framework
- Conducted Gaussian blur, Canny edge detector, and contour finding to the original invoice picture, found the outer bound of the invoice with convex hull algorithms, and repositioned the invoice using perspective transform

Skills Involved: JAVA, OpenCV, OCR

HONORS AND AWARDS

National Second Prize for National College Students Software Innovation Contest	*2017*
Huawei Scholarship (**Top 5**)	*2017*
Scholarship for Academic Excellence (**Top 10**)	*2016, 2017*
4th Place of HackXSJTU NVIDIA Intelligence Car Innovations	*2017*
Outstanding Students Award (**Top 3%**)	*2016*