Yao LU

PhD of Computer Science
San Jose, CA 95132
luy161616@hotmail.com
2024360086

• PhD of Computer Science, focusing Computer Vision and Machine Learning, theory and application.
• Master in 3D reconstruction (Simultaneous Localization and Mapping, i.e., SLAM).
• Great hands-on experience in C++, MATLAB, Python, CUDA, OpenCL, TensorFlow, Keras, Numpy, Scikit-learn, Pandas, OpenCV, OpenGL, Maya.

GitHub link:
https://github.com/Southparketeer/YaoLu.github.io

Work Experience

Graduate Research Assistant

George Washington University - Washington, DC
May 2014 to May 2019

1. Hierarchical Multi-view Heterogeneous Large-scale 3D Reconstruction System (Computer Vision, SLAM) 2014 -2015

• • Project description: Fuse measurements from a wide variety of sensors modalities including infrared optical motion capture, depth camera, color cameras and laser range-finders in real-time.
• • Contribution: Addressed updating the map with moving sensor and the static sensors; Developed a GPU based real-time camera tracking, volumetric fusion and volume rendering system.
• • Key techniques: SLAM, CUDA, OpenCL, C++, OpenCV, GPU performance optimization.

Project link:
https://github.com/Southparketeer/SLAM-Large-Dense-Scene-Real-Time-3D-Reconstruction

2. Accurate 3D Human Body Surface Reconstruction (Computer Vision, SLAM, 3D Reconstruction) 2015 - 2017

• • Project description: Build an accurate 3D surface reconstruction system using two depth sensors.
• • Contribution: Take fully charge of back-end development, including pre-processing, i.e., depth images to partial 3D meshes using real-time volumetric fusion algorithm, and post-processing, i.e., multi-stage non-rigid registration.
• • Result: Accuracy has been validated with large-scale subject test, outperform state-of-the-art.
• • Key techniques: SLAM, CUDA, C++, OpenCV, solving non-linear optimization problems.

Project link:
https://github.com/Southparketeer/3D-Human-Body-Surface-Reconstruction-System

3. 3D Shape-based Cardiovascular Metabolic Disease Risk Prediction (Machine Learning, Deep Learning) 2017 - 2019

3.a. Feature Analysis: Convert 3D geometry features to effective trainable features.
• • Key techniques: Haar-wavelet, Fourier Analysis, Principle Component Analysis, B-Spline, Functional Feature Analysis, Hierarchical Clustering, Self-Organizing Map, Convolutional Neural Networks, Transfer Learning, Cylinder Mapping, Quadric Fitting Mean Curvature Mapping.

3.b. Model Training, Evaluation, Comparison: Explore supervised learning models for cardiovascular metabolic disease risk and adiposity distribution prediction. Compare models w.r.t accuracy and interpretability.
• • Key techniques: Neural Networks, Probabilistic Graphical Models, Support Vector Machines, Gaussian Processes, Functional Data Analysis, K-fold Cross Validation with Holdout, Dropout, Bootstrapping.

3.c. Research in New Method to Conquer Overfitting: Proposed a highly innovative method to evaluate the risk of overfitting for feature and model selection.
• • Key techniques: Monte Carlo Simulation, Statistic Learning, LASSO, Ridge, Elastic-Net.
• • Result: Outperform LASSO, Ridge, Elastic-Net in most benchmark datasets.

Project link:
https://github.com/Southparketeer/3D-Geometry-Deep-Learning-for-Cardiovascular-Metabolic-Risk-Prediction

Education

Doctorate in Computer Science
George Washington University - Washington, DC
August 2014 to May 2019

Master's in Computer Science
George Washington University - Washington, DC
August 2012 to May 2014

Bachelor's in Electrical Engineering
Communication University of China - Beijing, China
September 2008 to July 2012

Skills

C++ (7 years), Python (2 years), MATLAB (3 years), TensorFlow (1 year), Keras, Numpy, Scikit-learn, Panda, CUDA (5 years), OpenCL (5 years), OpenCV (5 years), 3D Reconstruction (6 years), SLAM (5 years), OpenGL (7 years), Maya (3 years), Computer Vision (7 years), Computer Graphics (7 years), Machine Learning (5 years), Deep Learning (2 years), Algorithm (7 years), Data Structure (7 years), Virtual Reality (2 years)

Publications

3D shape-based body composition inference model using a Bayesian network
March 2019

Yao Lu, James K Hahn, and Xiaoke Zhang
IEEE Journal of Biomedical and Health Informatics

Region of interest extraction for continuous feature
2019

Qiyue Wang, Yao Lu, Xiaoke Zhang, and James K Hahn
Neurocomputing

A novel hybrid model for VAT prediction using shape descriptors
July 2019

Qiyue Wang, Yao Lu, Xiaoke Zhang, and James K Hahn
The 41th Annual International Conference of the IEEE Engineering in Medicine and Biology Society

3D shape-based body composition prediction model using machine learning
July 2018

Yao Lu, Scott McQuade, and James K Hahn
The 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society

Accurate nonrigid 3D human body surface reconstruction using commodity depth sensors
February 2018

Yao Lu, Shang Zhao, Naji Younes, and James K Hahn
Computer Animation and Virtual Worlds

Shape-based three-dimensional body composition extrapolation using multimodality registration
February 2019

Yao Lu and James K Hahn
SPIE Medical Imaging

The effect of visualization realism on body self-perception
2019

Geoffrey Hudsona, Yao Lu, Xiaoke Zhang, James Hahn, Johannah Zabal, Finza Latif, and John Philbeck
Psychological Assessment

3D human body surface reconstruction and composition assessment
May 2019

Dissertation