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Tianpei Gu Resume

Education

University of Maryland at College Park ***Expected: Dec 2020***

- B.S. in **Computer Science**, B.S. in **Mathematics-Statistic** Track (Double Major), Overall GPA: 3.7
- 2018, 2019 CMNS College Dean's List
- **TA** for ***CMSC131 Object-Oriented Programming***: designed course projects, led class discussions, held office hours, etc.

Research and Industry Experience

Perception and Robotics Group(http://prg.cs.umd.edu/), UMD Institute of Advanced Computer Studies (https://www.umiacs.umd.edu/)

Research Assistant, Supervisor: ***Prof. Yiannis Aloimonos (***http://users.umiacs.umd.edu/~yiannis/***)*** 08/2019-Present

Research Topic: ***Person Re-Identification and Multi-Object Tracking***

- Conducted literature review (100+ papers) and experimented with person re-id frameworks from groundbreaking papers.
- Proposed a novel CNN-based network to re-identify person based on their movement style.
- Built an online and in-memory system to re-identify people with 85% accuracy under clean image setting.
- The first system to process raw input of any tracking algorithm and integrate person re-id and tracking without extra training.
- A dataset paper is planned to submit in 11/2020

Research Topic: ***3D Reconstruction***

- Replicated results of top conference papers using state-of-the-art tools (Human Dynamic, SurfelWrap, OpenSFM)
- Customized existing 3D construction methods to fit our dataset and applied data augmentation and regulation methods to improve performance; maintained the human 3D reconstruction methods survey for the lab.

Computer Vision Team, Skywork Club, Tsinghua University

Software Team Lead 07/2020-Present

- Developed a human motion capture and analysis tool (5000+ lines of **C/C++** code) using ***Microsoft Kinect camera***.
- Used Kinect API to extract 3D point cloud of human motions from multiple views; used ICP algorithm to merge multi-view point cloud.
- Developed deep learning based human-pose estimation algorithm from point cloud of human, developed grading algorithm for comparing and evaluating the movement differences of two persons.
- Developed 3D human keypoint to BVH file converter.

Selected Course Projects

Text-based Person Search (2020)

- Proposed a novel **CNN-based** network for text-based person search, using **Resnet50** and **Bi-LSTM** as backbone network
- Improved performance by adding **Batch Normalization** and **Instance Normalization** layers into our network and employing the **triplet loss** as the loss function
- Outperformed current state-of-the-art methods on rank-5 and rank-10 by 1% and 2.3% and achieved comparable result on rank-1, using the **CUHK Person Description Dataset**, the only currently available dataset for text-based person search.

Panorama Stitching (2019)

- Stitching multiple images based on the texture they have in common, written in MATLAB.
- Implemented algorithms to find corner points, perform adaptive non-maximal suppression to detect corners that are equally distributed across the image, detect feature and match feature, use RANSAC to get robust homograph, etc.

Technical Skills

- **Programming:** Java, Python, C, C++, Assembly, MATLAB, Ruby, Rust, Ocaml, Git, Shell
- **Deep Learning frameworks:** Keras, TensorFlow, PyTorch