Zhengyi(Zen) Luo

(+1) 215-313-5163 | zluo2@cs.cmu.edu | Pittsburgh, PA, 19104 | zhengyiluo

Research Interests

My research lies at the intersection of computer vision and computer graphics. Scientifically, I'm particularly interested in the understanding video signals involving human/object motion, their interactions, and ultimately a holistic interpretation of the scene. Practically, I am super excited about applying vision to mixed reality (AR/VR).

Education

Carnegie Mellon University — *Advisor: Prof. Kris Kitani*

M.S in Robotics, GPA: 4.00/4.00 — *Aug 2019-Present*

University of Pennsylvania — *Advisor: Prof. Kostas Daniilidis*

B.S.E in Computer Science, GPA: 3.94/4.00 — *Aug 2015-May 2019*

Publications

Publications

[1] **3D Human Motion Estimation via Motion Compression and Refinement [paper] [video].**
Zhengyi Luo, S. Alireza Golestaneh, Kris M. Kitani
Fifteenth Asian Conference on Computer Vision (ACCV), 2020, Oral Presentation

[2] **Cross-Domain 3D Equivariant Image Embeddings [paper].**
Carlos Esteves, Avneesh Sud, **Zhengyi Luo**, Kostas Daniilidis, Ameesh Makadia
Thirty-seventh International Conference on Machine Learning (ICML), 2019

[3] **Cloud Chaser: Real Time Deep Learning Computer Vision on Low Computing Power Devices [paper][video]**
Zhengyi Luo, Austin Small, Liam Dugan, Stephen Lane
The Eleventh International Conference on Machine Vision (ICMV), 2018

[4] **The rural–urban stress divide: Obtaining geographical insights through Twitter [paper]**
Kokil Jaidka, Sharath Chandra Guntuku, Jane H Lee, **Zhengyi Luo**, Anneke Buffone, Lyle H Ungar
Computers in Human Behavior, 2020: 106544

[5] **Visual Analytics Approach to Vessel Behaviour Analysis [paper]**
Liang Jin*, **Zhengyi Luo***, Shu Gao (∗ indicates equal contribution)
Journal of Navigation, 2018,71(5): 1195-1209

Pre-prints

[1] **Kinematics-Guided Reinforcement Learning for Object-Aware 3D Ego-Pose Estimation [paper].**
Zhengyi Luo*, Ryo hachiuma*, Ye Yuan, Shun Iwase, Kris M. Kitani (∗ indicates equal contribution)
In submission, 2020

[2] **Learning Shape Representations for Clothing Variations in Person Re-Identification [paper].**
Yu-Jhe Li, **Zhengyi Luo**, Xinshuo Weng, Kris M. Kitani
arXiv:2003.07340, 2020

Research Experience

KLab, Carnegie Mellon University — *Pittsburgh, PA*

PI: Prof. Kris Kitani — *Sept 2019-Present*

- Research on human motion estimation and generation, human object interaction, and action recognition.

GRASP Laboratory, University of Pennsylvania — *Philadelphia, PA*

PI: Prof. Kostas Daniilidis — *Jan 2018-May 2019*

- Worked on object pose estimation using 3D rotational equivariant embeddings learned from spherical convolutional networks; applied learned embeddings to object pose estimation and novel view synthesis.

SIG Center for Computer Graphics, University of Pennsylvania — *Philadelphia, PA*

PI: Prof. Stephen H. Lane — *May 2016-Jan 2018*

- Surveyed 3D object pose estimation based on mesh representation; created interest point detector based on 3D mesh using Harris3D in C; built an interactive app for pediatrician that overlaid baby manikin with animated 3D model on Microsoft HoloLens.

World Well Being Project, University of Pennsylvania *Philadelphia, PA*

PI: Prof. Lyle Ungar *Sept 2017-May 2018*

- Measured regional variance of stress based on Twitter Language through Latent Dirichlet Allocation topic modeling, Logistic Regression, and Random Forest.

Industry Experience

Apple Inc. *Cupertino, CA*

3D Software Engineer Intern, Technology Development Group, Applied Research For Reality Composer *May 2019-Aug 2019*

- Built physics based motion controller for physical realistic humanoid using Bullet Physics and deep reinforcement learning, capable of switching/blending between motions on demand and changing heading directions (steerable).
- Prototyped architecture for motion composition and blending, goal-based heading, and lookahead trajectory projection.

Apple Inc. *Cupertino, CA*

3D Software Engineer Intern, Technology Development Group, Applied Research For Reality Composer *May 2018-Aug 2018*

- Built CNN-based sentence intent evaluator; developed pos tagger and grammar based keyword extractor; designed word2vec, phonetics, and ConceptNet based context awareness engine.
- Prototyped architecture for 3D voice command system capable of intent evaluation, keyword extraction, and context awareness.

Bentley Systems *Philadelphia, PA*

Software Engineer Intern, Strategic Advancement Group *May 2017-Aug 2017*

- Prototyped Distributed Schema Editing (crate, read, update, remove) backend API for proprietary Building Information Modeling (BIM) schemas through iModelHub (powered by Azure) Services, supported commit, push, pull, and merge workflow with fully covered API proving functionality including tests and error paths.

Teaching Experience

Teaching Assistant

Computer Vision (16-720B), CMU	Instructors: Kris Kitani & Srinivasa Narasimhan	*Fall 2020*
Deep Learning (CIS-700), UPenn	Instructors: Konrad Kording	*Spring 2019*
Data Structures and Algorithms (CIS-121), UPenn	Instructors: Rajiv Gandhi	*Fall 2016 & Spring 2017*

Awards

PENNAPPS XVII, Ranked 1/160, Grand Prize, Best Use of Cloud: Cloud Chaser

Philadelphia, PA, Jan 2018

Raspberry Pi based robot that utilizes cloud computing for real time deep learning object detection in 15 FPS: **[link]**

Course Projects

Project for CIS 680 at UPenn (Vision & Learning): Faster R-CNN and Mask R-CNN

Oct 2018-Nov 2018

Implementation of CNN architectures (regressor & classifier), ROI pooling, and per-pixel classification in PyTorch

Final project for CIS 460 at UPenn (Computer Graphics): Mini Minecraft

Sept 2016-Dec 2016

Mini version of Minecraft with walking, block building/removing, weather system, terrain generation, AI/NPCs, built using Qt with C++.

Skills & Interests

Programming Languages: Python, C++, C, Swfit, Java, C#, Javascript, SQL, OCaml, Matlab

Platforms & Tools: PyTorch, Tensorflow, Spacy, Unity3D, Hololens, xcode, Raspberry Pi, Android Studio, Git, Solidworks

Interests: Sci-Fi, Biographies, Cooking , Cycling, Tech Gadgets

Organizations: Eta Kappa Nu (IEEE-HKN) UPenn Lambda Chapter