ZHI TU

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EDUCATION BACKGROUND

University of Southern California *Aug.2020-Now*
Master of Science in Computer Science *Los Angeles, U.S.*
Cumulative GPA: **4.0/4.0** | Member of USC Honors Program

ShanghaiTech University *Sep.2016-Jun.2020*
Bachelor of Engineering in Computer Science *Shanghai, China*
Cumulative GPA: **3.66/4.0** | Ranking: **10/116** | TOEFL: **105** | My Best Score: **109** | GRE: **323+4.0**

University of California, Berkeley *Jul. 2017*
Summer Session | GPA: **4.0/4.0** *Berkeley, U.S.*

RESEARCH EXPERIENCE

Pretty and Shiny! Visual Saliency-guided Curiosity for Self-Supervised RL. *May.2021-Now*
Submitted to CVPR 2022 | iLab | Supervisor: Laurent Itti
Objective: To propose a deep reinforcement learning algorithm using saliency curiosity mechanism to improve the performance in exploring the environment.
Core contents:
- To propose a novel reward with saliency curiosity.
- To train the agent explore the environment mimicking the performance of human.
- To navigate the agent with the information retrieved by the exploration phase.

Speech Drives Templates: Co-Speech Gesture Synthesis With Learned Templates. *Sep.2020-Aug.2021*
Accepted by ICCV 2021 | SVIP Lab | Supervisor: Shenghua Gao
Objective: To propose a unified model to generate gesture of a talking person given the audio of the speech.
Core contents:
- To generate speech audio aligned talking gesture.
- To guarantee the generated gesture to be smooth with variety.
- To propose a valid metric to assess the quality of generated gesture.

Liquid Warping GAN with Attention: A Unified Framework for Human Image Synthesis *Sep.-Dec.2019*
Accepted by IEEE TPAMI | SVIP Lab | Supervisor: Shenghua Gao
Objective: This project is to improve the performance of the result of human image synthesis, in terms of higher resolution, more stable and smoother synthesized image. Based on the ICCV paper "Liquid Warping GAN: A Unified Framework for Human Motion Imitation, Appearance Transfer and Novel View Synthesis", we propose a more advanced network architecture to achieve these.
Core contents:
- We propose an Attentional Liquid Warping Block (AttLWB) to pursue more stable and smoother results.
- We apply one/few shot learning to improve the generalization of our proposed model.
- Our model can achieve higher resolution results (512 x 512) and the previous ICCV paper can only handle 256 x 256 resolution.

SUNet: A Lesion Regularized Model for Simultaneous Diabetic Retinopathy and Diabetic Macular Edema Grading
Accepted(oral) by IEEE ISBI 2020 | SVIP Lab | Supervisor: Shenghua Gao *Jan.-Jun.2019*
Objective: The approach is to propose a multi-task CNN to improve the performance of diabetic retinopathy and diabetic macular edema grading at the same time.
Core contents:
- Proposed a multi-disease network (SUNet) for simultaneous grading DR and its complication DME. As far as we know, this is the first work for simultaneous DR and DME grading;
- Introduced a lesion regularizer module into the disease detection network which enforces network concentrates on those lesions, meanwhile segmentation also provides a cue for a doctor to better understand the prediction results;
- Designed a SUNet to interleave feature maps for the multi-disease diagnosis and lesion regularization, and it is a novel multi-task learning framework, which can be readily applied to other multi-task learning scenarios.

Pattern-learning-based Noise Elimination Algorithm in Photoacoustic Sensing and Imaging *Nov.2017-Feb.2018*
Accepted(oral) by IEEE EMBC 2018 | HISLab | Supervisor: Fei Gao
Objective: The method is to eliminate the noise interference of photoacoustic signals by learning the pattern of the noise signal.
Core contents:
- Designed an algorithm to learn the pattern of the noise interference in photoacoustic imaging;
- Designed a method to locate the phase position of the noise signal;
- Evaluated our method with preceding methods.

PUBLICATIONS

[1] Shenhan Qian*, **Zhi Tu***, Yihao Zhi*, Wen Liu and Shenghua Gao, **"Speech Drives Templates: Co-Speech Gesture Synthesis With Learned Templates"**, accepted by *International Conference on Computer Vision (ICCV) 2021.* *Equal contribution.
https://arxiv.org/pdf/2108.08020.pdf

[2] **Zhi Tu**, Shenghua Gao and Kang Zhou et al., **"SUNet: A Lesion Regularized Model for Simultaneous Diabetic Retinopathy and Diabetic Macular Edema Grading"**, accepted (oral) by *IEEE International Symposium on Biomedical Imaging (ISBI) 2020.*
https://ieeexplore.ieee.org/abstract/document/9098673/

[3] Wen Liu, Zhixin Piao, **Zhi Tu**, Wenhan Luo, Lin Ma, and Shenghua Gao, **"Liquid Warping GAN with Attention: A Unified Framework for Human Image Synthesis"**, accepted by *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI).*
https://arxiv.org/pdf/2011.09055.pdf

[4] **Zhi Tu**, Boshi Wang, Tingyang Duan and Fei Gao, **"Pattern-learning-based Noise Elimination Algorithm in Photoacoustic Sensing and Imaging"**, accepted (oral) by *IEEE Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) 2018.*
https://ieeexplore.ieee.org/abstract/document/8513176/

PROFESSIONAL SKILLS

Programming Languages: Python, MATLAB, C/C++, Rust, MIPS
SDKs & Tools: pyTorch, Git, Linux Shell, OpenGL, MULTISIM, LaTeX

CONFERENCE EXPERIENCE

IEEE ISBI 2020 | Online, Oral Presentation — *Apr.2020*
MICCAI 2019 | Location: Shenzhen, China — *Oct.2019*
Undergraduate Student Travel Award
ASSIST 2019 | Location: Shanghai, China — *Aug.2019*
IEEE EMBC 2018 | Location: Hawaii, U.S. — *Jul.2018*

SELECTED COURSE PROJECT

Motion Planning for a 6-DOF robot-Python — *Fall 2021 at USC*
CSCI 545 Robotics

House Price Prediction-Python — *Spring 2021 at USC*
CSCI 567 Machine Learning

First-Order Logic Resolution-Python — *Spring 2021 at USC*
CSCI 561 Foundations of Artificial Intelligence

A Light Field Renderer-MATLAB — *Spring 2019 at ShanghaiTech*
CS276 Computational Photography (Master Level Course)

Construct 3D Model of a Human Face from 2D Pictures-MATLAB — *Fall 2018 at ShanghaiTech*
CS172 Computer Vision I

SOCIAL EXPERIENCE

Teaching Assistant of Viterbi School of Engineering at University of California — *Sep.2021-Dec.2021*
Teaching Assistant of School of Information Science and Technology — *Sep.2019-Jan.2020*
Management Assistant of School of Information Science and Technology — *Sep.2018-Jan.2019*
Volunteer of Campus Assessment Days of ShanghaiTech University — *2018-2019*
Member of department of new media of the Students Union — *Jan.-Mar.2018*
Editor-in-chief of a school magazine, Shuyuan NEWS — *Mar.2017-Mar.2018*
President of literature club of ShanghaiTech University — *Mar.2017-Mar.2018*