Huimin Zhuge

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OBJECTIVE

- I am seeking an Intern position, where I can apply my 5+ years of research experience in biomedical engineering and computer science fields. My expertise include fundamental research in machine learning, data analysis, software engineering, computer vision, and good communication skills with scientists and engineers from different backgrounds.

EXPERIENCE

Tulane University Translational Biophotonics Laboratory, New Orleans, USA
Graduate Researcher   (09/2017—Present)

- Developed Cycle Generative adversarial networks(GANs) models for paired and unpaired images achieve up to 5x super-resolution in both patch level and large-scale image level for histopathology whole slide image, results are in progress with IEEE Transactions on Medical Imaging.
- Established a cross-modality image translation deep learning model, translated wide-field images to structured illumination microscopy (SIM) images by Pix2Pix GANs in 2D and 3D applications, without reconstructing optical sections from multiple patterned images using special hardware, achieving 92% similarity comparing with ground truth images, results published in OSA 2020 and Biomedical Optics Express.
- Organized PathCAM(real-time adaptive resolution histological slide imaging) project, integrating hardware and video mosaicking algorithms for seamless capture search pattern at each magnification level with global alignment, improved the traditional clinical workflows, results in scientific paper and potential patent publications.
- Built up a web-based multi-resolution viewer based on OpenSeadragon and Girder platform, collaborated with pathologists on digitized human slide reviewing, created variable resolution whole slide images to reduce the storage size more than 95%, applied neural networks to predict the next interaction with viewport and zoom level based on the search pattern with 89% hit rate, results published in SPIE 2019.
- Developed an object segmentation and active contour algorithm to detect positive margin automatically by separating prostate perimeter and parenchymal contour of the traditional histopathology images of radical prostatectomy specimens, achieving 86% accuracy comparing with pathologist's result, results published in SPIE 2019.
- Accomplished multiple machine learning and computer vision related projects, including video-game database analysis(SQL), auto-diagnosis system from medical anamnesis with NLP(natural language processing)(Tensorflow), atrial fibrillation map prediction from 3D MRI cardiac image(Pytorch), viewing pattern visualization tool (d3&javascript), distributed chat room(Java), election system(JavaRMI), Asteroid game(HTML&C++), Raytracer(HTML&C++), 3D interactive weather model(VTKPython), face detection and alignment(PyTorch).

Tulane University School of Science & Engineering, New Orleans, USA
GSSA Representative and Teaching Assistant   (09/2017—present)

- Tulane Graduate Studies Student Association(GSSA) representatives and event committee: organize assembly meetings and graduate events including social, academic, and career enhancing opportunities.
- Electric Circuits(Fall 2017 & 2020):office hours, review sessions, exam preparation for 120 students.
- Matlab(Spring 2018):office hours, exam preparation, lab instructions for 60 students.
- Biomedical Electronics(Spring 2021):office hours, electronics lab instructions for 50 students.

- Totally mentored 5 undergraduate and 2 master students to help complete their Honor Thesis and research projects.

Columbia University Neural Engineering and Control Laboratory, New York, USA
Undergraduate Researcher   (09/2016–04/2017)
- Fabricated a wearable UV sensor device based on ATmega chip loaded with accelerometer and analog light sensor, stored data in TF card, connected with phone by Bluetooth, built an Android App, predicted where the device is carried by convolution neural network(CNN), contributing to undergraduate thesis.
- Demonstrated motor imagery by brain computer interface, recorded EEG signal with OpenBCI ganglion board, using linear regression in the continuous signal to do feature classification to control Tetris.

SUSTech Electrical Engineering laboratory, Shenzhen, China
Undergraduate Researcher   (11/2015—05/2017)
- Assessed the segmental contribution to the non-intrusive intelligibility prediction of noise-suppressed speech by using the SRMR measure, results published in EMBC 2016.
- Assessed the effect of applying commonly-used single channel noise-reduction (NR) algorithms (Wiener, logMMSE, MB, KLT) to improve the intelligibility of low-pass filtered speech, results published in EMBC 2016.

EDUCATION

Tulane University, New Orleans, LA
Ph.D. Biomedical Engineering   (09/2017)-(12/2022)

Tulane University, New Orleans, LA
M.S. Computer Science   (09/2020)-(05/2022)

Southern University of Science and Technology of China, Shenzhen, China
B.S. Biomedical Engineering   (09/2013)-(06/2017)

SKILLS

`Python` `JavaScript` `C++` `MATLAB` `HTML` `MySQL` `OpenGL` `ParaView` `VTK` `COMSOL` `TensorFlow`

PUBLICATIONS

- **H.Zhuge**, K.Ashman, B.Summa and JQ.Brown, "Unsupervised Super Resolution on Whole Slide Image(WSI) with Paired and Unpaired Images by Generative Adversarial Networks(GANs)." (In progress with IEEE Transactions on Medical Imaging)
- **H.Zhuge**, B.Summa, J.Hamm and JQ.Brown, "Deep learning 2D and 3D optical sectioning microscopy using cross-modality Pix2Pix GAN image translation." (Biomedical Optics Express)
- **H.Zhuge** and JQ.Brown, "A web-based multi-resolution viewer to measure expert search patterns in large microscopy images: towards machine-based dimensionality reduction." (Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XVII)
- **H.Zhuge**, B.Summa and JQ.Brown, "Dynamically Focus Recovery on Whole Slide Image(WSI) by Unsupervised Generative Adversarial Network." (In progress with Biomedical Optics Express)
- K. Ashman, **H.Zhuge,** B. Summa, S. Fox and JQ. Brown, "Towards Integrating Histopathological Slide Digitization into the Clinical Workflow." (In progress with Diagnostic Pathology)
- **H. Zhuge,** L. Wang, F. Chen and D. Zheng, "Assessing the effect of noise-reduction to the intelligibility of low-pass filtered speech." (IEEE Engineering in Medicine and Biology Society (EMBC))