

Jiahui Zhu

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EDUCATION

Boston University

Boston, MA

Master of Science in Electrical and Computer Engineering-GPA 3.65/4.0

Sep 2021 - Present

- Completed coursework: Machine Learning, Software Design, Deep Learning, Advanced Optimization Theory and Methods, Computational Tools for Data Science, Discrete Stochastic Models, Product Design, Discrete Mathematic

Zhengzhou University

Zhengzhou, China

Bachelor of Science in Computer Science-Top 10

Sep 2017 - Jun 2021

- Honors: 3rd Excellent Scholarship (2017-2018), 1st Excellent Scholarship (2019-2020), Merit Student of Zhengzhou University (2019-2020), The 3rd Prize in the 2nd Henan English Talent Show Contest (Drama Group)(04/2018)
- Completed coursework: Calculus, Linear Algebra, Probability Theory, Data Structure, Database, Discrete Mathematics, Functions of Complex Variable and Integral Transforms, Control Theory

PUBLICATION

Jiahui Zhu, Y. Chen, Q. Fu, J. Zhang, **A Real-time Anomaly Detection Algorithm for Taxis Based on Trajectory Big Data**, *DSIT 2020: Proceedings of the 3rd International Conference on Data Science and Information Technology*, July 2020, <https://doi.org/10.1145/3414274.3414511>

Y. Chen, Q. Fu, **Jiahui Zhu**, **Finding Next High-Quality Passenger Based on Spatio-Temporal Big Data**, *2020 IEEE 5th International Conference on Cloud Computing and Big Data Analytics*, 10 April 2020, DOI: 10.1109/ICCCBDA49378.2020.9095695

ACADEMIC RESEARCH

Deep Learning for Computational Imaging Translation(Virtual Staining)

Research Assistant Advised by Professor Lei Tian

July 2022 - Present

Computational Imaging Systems Lab, BU

- Utilized the close relation of the two modalities to develop the generative adversarial network (GAN)-based framework. Then, built CycleGAN as basic model to generate virtual staining images using unpaired images.
- Divided per original image into six small images during training, each of which could be processed and trained by CycleGAN and solved the image size problem. In the display section, these six small images were stitched together again and shown as whole image.
- Changed different normalize methods, including Instance Norm and Batch Norm. The results shown Batch Norm gained better staining images
- Tuned hyper-parameters of the current framework, which finally found a proper parameter set to get promising virtual staining images.
- Computed quantitative metrics for the model, such as FID score. Improvements to framework can be achieved by exploring more meaningful priors and formulating them as training regularizers.

Neural Networks for Fluorescence Lifetime Imaging Microscopy Processing

Research Assistant Advised by Professor Lei Tian

Feb 2022 - June 2022

Computational Imaging Systems Lab, BU

- Extracted FLIM Parameters from Measured High Resolution 6-bit Dataset and down Sample measured dataset to lower resolution(1-5-bit).
- Split data into Training and Testing set. For data processing, scaled all input features around 0 and 1 using the MinMaxScaler function.
- Set up Multi-layer Perceptron (MLP) as main skeleton and replaced the standard activation function ReLu with Sigmoid, which Sigmoid performed better. Tried different optimization methods, including SGD, Adam, RMSProp, which Adam was best choice.
- Added L2-Regularization to avoid over-fitting.
- Tuned parameters and tested the model with mean absolute error(MAE). The model only had 8% mean absolute error, which gained perfect results.

Tsinghua-Cambridge-MIT Low Carbon Alliance Future Transport Research Center

Beijing, China

Volunteer Research Assistant

Jul 2019 - Oct 2019

- Divided the map of Beijing into a certain number of small pieces within the Fifth Ring Road, and then used GPS data for the location of each car.
- Calculated the location of the vehicle based on many different time-stamps of each vehicle's driving route.
- Obtained the OD pair data of each vehicle based on the time sampling. Used the algorithm to judge according to the data of these vehicles, every key node on each path is the importance of each intersection.
- Built a neural network, which the input is OD pair data, and to use back-propagation algorithm to calculate the weighted average, and finally get the importance of nodes and each intersection.

COURSE PROJECT

Object Detection with Transformers

Team Leader

Feb 2022- May 2022

- Pre-processed images of COCO Dataset. Compose, random resize and random size crop are randomly selected in order to make images universal, which achieved data augmentation with limited data.
- Set up Detection Model: DETR. It contains Backbone, Transformer(encoder-decoder) and Feed-Forward Network (FNN) three main part. Backbone worked for learning a 2D representation of an input image, which was a pre-trained ResNet model. Used Transformer to learn global features that could be used for recognizing objects in images. FNN worked for prediction.
- Designed loss function with Hungarian loss and GiOU loss, which were responsible for Classification loss and Bounding Box loss
- Due to computational expensive, used distributed computing over 4 GPUs with 1 hour for epoch, which will cost 4 hours for 1 epoch if only use CPU to train.
- Test and Evaluate. Show an test image with Correct bounding box and prediction label with IOU scores over 90%. Used Average Precision and Average Recall to evaluate model and achieved 41% AP which was a perfect result.

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Deep Learning Methods for Inverse Problems in Imaging

Team Member

Oct 2021 - Dec 2021

- Set up inverse model called AUTOMAP and train it with brain MRI images for the task of reconstructing images.
- Build JMONSEL to create new data that need for inverse process.
- Fine-tuned AUTOMAP to learn the inverse of JMONSEL using the training part of the dataset have created.

Nanotechnology and Deep Learning in Early Cancer Detection and Treatment

Team Leader

Sep 2021 - Nov 2021

- Make Dictionary of images and labels. Then pre-processing Data: Fill the null values by their mean. Resize images: Original dimension of images are 450 x 600 x3, so resize it into 100 x 75 in order to handle images easily. Label Encoding: Labels are 7 different classes of skin cancer types from 0 to 6. We need to encode these labels to one hot vectors.
- Build different deep learning models for comparing classification results. And ResNet50 gave a best classification accuracy near 99%.
- Find data where carbon nanotubes are used as sensors to figure out a way sense Bio-Information.

PROJECT CODE DEMO

Object DETection with TRansformers: <https://github.com/JingmeiY/DL523DETR>

Nanotechnology and Deep Learning in Early Cancer Detection and Treatment: <https://github.com/cdhuynh/Nanotechnology-and-Machine-Learning>

TEACHING ASSISTANT EXPERIENCE

Product Design in Electrical and Computer Engineering(EC601)

Boston, USA

Supervisor: *Osama Alshaykh*

Sep 2022 - Present

Responsibilities:

- Made full preparations and collected previewing materials related to class topics.
- Explained important machine learning or deep learning model choices, and guided students throughout the whole project process.
- Checked up students' project reports and presentations and organized teaching activities like query time and class discussion

EXTRACURRICULAR ACTIVITIES

Electrical and Computer Engineering Master Student Ambassadors

Boston, USA

Supervisor: *Yang Chen*

Sep 2022 - Present

Responsibilities:

- Answered general questions about the ECE MS program and overall student experience at Boston University
- Participated and organized social events, such as Fenway Park Tour, Bowling Events

Chief Drummer & Leader of University Guitar Club

Zhengzhou, China

Supervisor: *Qiang Zhao*

Sep 2022 - Present

Responsibilities:

- Organized rehearsals and performances for school events and welcome parties.
- Communicated between departments to promote the progress of events.

SKILLS & OTHERS

Skills: C++, Java, Matlab, Python, Deep Learning(Expert), PyTorch(Expert), TensorFlow, Optimization, Computer Vision, Data Science

Interests: Basketball, Drum, Swimming, Cooking