XIAOYAN LI

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EDUCATION

Michigan State University, *GPA: 3.79/4.00* *Expected Dec 2022*
Ph.D. in Computational Mathematics, Science & Engineering
Dual Ph.D. in Environmental Engineering
MS in Computer Science & Engineering

Carnegie Mellon University, MS in Civil & Environmental Engineering, *GPA: 3.66/4.00* *Jan 2015*

EXPERIENCE

Project leader *May 2018 - Present*

Water Contaminants Quantification by Transformer-U-Net model project

- Developed a **novel low-cost (from hundred dollars to one dollar) and fast (from days to seconds) deep learning model (Transformer-U-Net CNN)** to **recognize and quantify** tap water contaminant concentrations based on cell phone image. Built the model by **transfer learning** with 625 Coffee-Ring Effect nanochromatography images and corresponding 4200 Energy-dispersive X-ray spectroscopy (EDS) mappings.
- Project awarded **$6700** from CEE department

Data scientist intern of Xie's AI Lab, Lansing, MI *May 2021 - Present*

- Developed a **Heterogeneous Graph Neural Network** model to remove **batch effects** in single-cell-seq datasets integration. Built the **first model** by incorporating gene pathway in message passing information to improve gene expression prediction.

RESEARCH & PROJECTS

Tap Water Fingerprinting by CNN model with Coffee-Ring Effect *Jul 2016 - Aug 2018*

- Built a CNN model to classify water samples nanochromatography pattern into 6 classes and achieved comparable accuracy as human clustering on water treatment method with **76.7 ± 3.0%** accuracy.

Human Expression recognition *Sep 2018 - Dec 2018*

- Collaborated with teammates to build and tested Logistic Regression Classifier **(60.1%)**, Multi-layer Perception Classifier **(60.4%)**, SVM Classifier **(60.2%)**, CNN Classifier **(90.0%)** on the CK+ (1.7GB) and AffactNet (55GB) dataset with image gray-scale transformation and Gaussian Blur.

Wireless Mesh Network Channel Assignment *Jan 2020 - May 2020*

- Generated random graphs with 10 to 100 nodes and tested the FNI performance based on proposed algorithm and base algorithm. Helped to designed a scoring function to determine which channel to assign and the new model reduced the Fractional Net-work Interference (FNI) around 50% than the base algorithm.

Database Functions Implementation *May 2021 - Aug 2021*

- Implemented a validation-locking schedule function to validate the schedule of the legality, two-phased locking, and consistency errors in the actions and the conflict-serializable function to verify the schedule is serializable. Implemented a transaction concurrency control scheduler based on wait die protocol.

WORK EXPERIENCE

Teaching assistant for Engineering Modeling *Aug 2016 - Present*

- Collaborated with coworkers to develop lesson plans. Managed classroom of 30 students independently using positive behavior management strategies. Designed a MATLAB module for calculating walking distance by steps data.

TECHNICAL STRENGTHS

Python, C^{++}, MATLAB, R, Pandas, PyTorch, Tensorflow, Keras, Matplotlib, Numpy, cv2, Seurat, MySQL, Sqlite, S3, Docker, PyTorch Geometric

SELECTED PUBLICATIONS

- Li X, Sanderson AR, Allen SS, Lahr RH. Tap water fingerprinting using a convolutional neural network built from images of the coffee-ring effect. Analyst. 2020; 145(4):1511-1523. doi:10.1039/c9an01624d
- Wang X, Wang W, Lowry G et al Preparation of palladized carbon nanotubes encapsulated iron composites: highly efficient dechlorination for trichloroethylene and low corrosion of nanoiron. R Soc Open Sci 5:172242. https://doi. org/10.1098/rsos.172242