Nianchao Wang
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EDUCATION

- **Northeastern University** — San Jose, CA
  Master of Science in Computer Science — *Sep. 2024 – Dec. 2026*
- **Texas A&M University** — College Station, TX
  Master of Science in Biomedical Engineering — *Sep. 2019 – May. 2024*
- **Johns Hopkins University** — Baltimore, MD
  Master of Science in Chemical Engineering — *Sep. 2017 – May. 2019*

EXPERIENCE

- **Texas A&M University** — College Station, TX
  Software Development Researcher & Algorithm Researcher — *Sep. 2019 – Jan. 2024*
  - **U-Net Based Convolutional Neural Network (CNN) for Cell Segmentation**
    - Developed a **U-Net** based **CNN** model using **TensorFlow** and **Keras**, achieving 90% segmentation accuracy and 95% **Intersection over Union (IoU)** for T cell datasets.
    - Preprocessed input images using **OpenCV** for contrast enhancement with methods like **adaptive histogram equalization (CLAHE)** and **gamma correction**.
    - Automated the segmentation pipeline with real-time performance monitoring and model checkpointing using **TensorFlow Callbacks**, reducing training time through **Early Stopping** and **ReduceLROnPlateau**.
    - Applied the **watershed algorithm** to derive the final masks of cells based on distance transform outputs, ensuring high accuracy in separating closely adjacent cells.
  - **CPPA: Python-based Post-Processing Algorithm for Biomedical Images**
    - Designed and developed a **Python-based** post-processing algorithm (CPPA) integrated with **Cellpose** to enhance instance segmentation for biomedical images.
    - Achieved F-measure values of 0.89, 0.87, and 0.94 for quiescent T cells, activated T cells, and MCF7 cells, respectively, demonstrating the algorithm's high accuracy for challenging biological data.
    - Developed a desktop application with **Tkinter** to facilitate the visualization and analysis of segmentation results, adopted by researchers and labs and improved user engagement.
  - **POSEA: Multi-Object Image Segmentation Algorithm**
    - Developed the Per-object segmentation evaluation algorithm (POSEA) algorithm for multi-object image segmentation using **Python**, **OpenCV**, and **NumPy**, improving segmentation evaluation.
    - Applied **connected component analysis** and **morphological operations** to accurately identify and retain the largest segmented objects, improving multi-object dataset evaluation.
    - Visualized segmentation results using **Matplotlib**, providing researchers with detailed performance evaluations.

PROJECTS & PUBLICATIONS

- **HydroUnet**: Hybrid deep learning model combining U-Net and watershed algorithms for cell segmentation.
- **CPPA**: Python-based post-processing algorithm with a Tkinter-based GUI for improving cytoplasmic segmentation accuracy. (Publication in Computers in Biology and Medicine; GitHub)
- **POSEA**: An evaluation algorithm in Python to assess instance segmentation performance. (Publication in PLOS ONE; GitHub)

PROGRAMMING SKILLS

- **Languages**: Python, C, C++, Java, R, JavaScript, HTML/CSS, SQL
- **Frameworks**: Django, Node.js, Spring Boot, Angular, TensorFlow, PyTorch, Keras
- **Tools/Technologies**: OpenCV, Tkinter, NumPy, scikit-learn, Matplotlib, Git, AWS, Docker
- **Database**: MySQL, MongoDB