Bill Y Sun

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EDUCATION

Columbia University, New York, NY — Aug 2020 – present
- Major: Computer Science

Georgia Institute of Technology, Atlanta, GA — Aug 2018 – May 2020
- GPA: 4.0/4.0 (unweighted)
- Dual Enrollment Coursework: Linear Algebra, Multivariable Calculus, Applied Combinatorics, Differential Equations

Walton High School, Marietta, GA — Aug 2016 - May 2020
- GPA: 4.0/4.0 (unweighted), 4.635 (weighted)
- Activities and Societies: Chamber Orchestra, Math Honor Society, Science National Honor Society
- Awards: 2020 Regeneron Science Talent Search Top 300 Scholar, National Merit Finalist, 2019 USABO Semifinalist

RESEARCH EXPERIENCES

Summer Intern, Tissue Mechanics Lab, Georgia Institute of Technology, Atlanta, GA — Summer 2017, 2018
- Project – "K-Means Clustering for classification of aortic valve structures from patient CT scans"
  - Used MATLAB to pre-process collection of 176 aortic valve CT image sets
  - Developed K-Means clustering algorithm in Python to obtain geometric means of valve annulus and sinus diameter of dataset

Summer Intern/Independent study, Computer Science Dept., University of Miami, Miami, FL — Aug 2018 - present
- Project – "Machine learning as a surrogate for stress analysis in artificial heart valve design"
  - Compared performance of autoencoder-based neural network and feed-forward neural network in predicting stress and deformation of aortic valves under systolic pressure using MATLAB, Python, Keras, and Tensorflow
- Project – "Deep Convolutional Neural Networks for Malaria Parasite Identification in Thin Blood Smear Images."
  - Developed You-Only-Look-Once object detection algorithm to segment individual blood cells from entire smear image
  - Used standard convolutional neural network to classify individual cells as either infected or uninfected by malaria parasite
  - Created web app using Flask library in Python to host these deep learning models

Summer Intern, Bioinformatics and Bio-Imaging Lab, Georgia Institute of Technology, Atlanta, GA — June 2019 – July 2019
- Project – "Universal Lesion Detection through the You-Only-Look-Once Algorithm"
  - Used Faster RCNN, You-Only-Look-Once, and other object detection algorithms to detect and classify various types of lesions (e.g. bone, liver, lymph) from assorted CT images using Keras and Tensorflow

PROJECTS

X-Malaria (malariadiagnosis.pythonanywhere.com)
- Developed web app with Flask Python backend that performs deep learning-based malaria diagnosis from blood smear images

StyleTransfer (styletransfer1.pythonanywhere.com)
- Created web app with Flask Python backend that automatically styles user images with various famous artwork styles via open source neural style transfer algorithm

BirdFinder
- Developed Mask-RCNN algorithm using Pytorch and OpenCV in Python to perform instance segmentation on bird images

PUBLICATIONS

1. Liang L and **Sun B** "A Proof of Concept Study of Using Machine-Learning in Artificial Aortic Valve Design: From Leaflet Design to Stress Analysis", Bioengineering. 2019 Nov 8;6(4). pii: E104. doi:10.3390/bioengineering6040104.
2. **Sun B** and Liang L, "Robustness of Convolutional Neural Networks For Malaria Parasite Identification In Thin Blood Smear Images With Adversarial Image Noise", The 2019 Summer Biomechanics, Bioengineering, and Biotransport (SB3C) Conference, Seven Springs, Pennsylvania, June 25-28, 2019
3. **Sun B** and Liang L, "Towards a robust and affordable approach for automated malaria diagnosis from microscopy images," Eighth International Conference on Learning Representations (ICLR), Addis Ababa, Ethiopia, April 26-30, 2020

SKILLS

Programming/Software Languages: HTML, CSS, JavaScript, Java, MATLAB, Python, Git
- Python Libraries: SciPy, NumPy, Pandas, Pillow, OpenCV, Matplotlib
- Machine learning Python Libraries: Scikit-Learn, Keras, TensorFlow, PyTorch
- Web design: HTML, CSS, Bootstrap3, JavaScript (React.js, Node.js, Express, Mongoose), Flask (in Python)