Wilson Ting
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EDUCATION & COURSEWORK

Northwestern University | Evanston, IL | Expected Graduation in 2026, Current Senior matriculating into MS
Major: Biomedical Engineering | Minor: Data Science and Machine Learning | BS/MS Candidate in Computer Science
Cumulative GPA: 3.582/4.0 | Honors: Winter 2022, Winter 2024
Relevant Courses: Data Structures/Algorithms, Biomedical Stats, Physics Statics/Dynamic Systems, Multivariable Calc, Linear Algebra, Machine Learning, Computational Genomics, Cardiovascular/Endocrine/Neuro Physiology, Mechanics of Materials, Signal and Systems

SKILLS & INTERESTS

Computer: Java, Python, C/C++, Matlab, R, ABAQUS, CAD, Racket, SQL, FEA, Jira, Git, BitBucket, Docker, AWS, Google Suite

RELEVANT EXPERIENCE

Biomedical Software and Machine Learning Intern
Align Technology *San Jose, CA* *June 2024 - Sep 2024*

- Re-interned in the R&D Biomedical Software team of Align Technology where I designed a machine learning tool in Python with $R^2 > 0.96$ to augment time-consuming and computationally expensive FEA simulations for treatment planning purposes
- Implemented a machine learning/reverse optimization pipeline for the BME team so they can test efficacy/retention for novel aligner designs in a more efficient manner that makes their workflow faster by 99.9% compared to simulation based methods
- ML part of pipeline uses Pytorch framework and generalizes the training process for the user so that only investigated teeth parameters have to be inputted while automating 3D model/training data generation, using CUDA-enabled GPU for faster computations
- The user can choose to specify various hyperparameters to control the model training process but otherwise the pipeline uses a neural network (NN) model and handles hyperparameter tuning via random grid search, regularization, and early stopping
- Reverse optimization component of pipeline uses the NLOPT optimizer framework and allows the user to use trained NN models for relevant teeth as part of the objective function to interpolate the optimized set of tooth feature parameters that satisfy initial target force/moment conditions as well as specified boundary constraints as defined by the user
- Developed comprehensive unit testing for entire pipeline and used Jira and Bitbucket version control tech stacks for pull requests and to interface with fellow team members
- Collaborated with R&D teams of other disciplines to clarify problem statement and user needs, and for user testing
- Presented the finished product to execs of other technical and non-technical departments, communicating in an easily digestible manner

R&D Engineer Summer Intern
Align Technology *San Jose, CA* *June 2023 - Sep 2023*

- Worked in the R&D Core Products team of Align Technology in a 12 week summer internship where I researched, designed, and developed novel methods to improve the retention of the Invisalign aligner and Vivera retainer products
- Modulated the structural parameters of the aligner to assess the impact on its efficacy through finite element analysis (FEA), including the biomechanics behind how the aligner retains arch shape or transfers energy to the teeth via tooth movement
- Scripted in Python to automate FEA simulations based on ABAQUS/internal treatment planning software to provide evidence of increased aligner retention and efficacy of proposed aligner design changes
- Performed lab testing to validate simulations using force sensor apparatus to record the force output data of stereolithography printed and thermoformed aligners that I designed using CAD-like software and scanned using micro-CT scanner to confirm dimensional accuracy
- Attained patents for aligner designs that my team and I developed with simulation and experimentally proven outcomes
- Developed an ML algorithm with a correlation coefficient of 0.9 on the test set using a neural network with optimized hyperparameters to predict and maximize canine rotational movement based on 4 aligner design and staging parameters

TECHNICAL PROJECTS

Heart Disease Prediction and Patient Segmentation with Data Engineering Automation
Northwestern University Data Eng Final Project *Evanston, IL* *March 2024 - June 2024*

- Developed an end-to-end data science pipeline for heart disease prediction using Apache Airflow for data engineering automation, integrating both Scikit-learn and Apache Spark workflows on AWS
- Implemented parallel workflows in Airflow with branches for EDA using Scikit-learn and data processing with Spark on AWS EMR.
- Conducted data cleaning, transformation, and feature engineering for heart disease prediction using external datasets, with data stored and accessed via AWS S3 and PostgreSQL databases
- Trained machine learning models (Logistic Regression, SVM) with 5-fold cross-validation, optimizing for low bias/high interpretability
- Automated web scraping for enriching datasets and implemented Docker for scalable, reproducible workflows
- Deployed final models on AWS EMR, enabling scalable/cost-effective execution for predicting heart disease for targeted healthcare

Center for Advanced Regenerative Engineering (CARE) 3D Printed Stent Project
Northwestern University McCormick School of Engineering *Evanston, IL* *March 2022 - April 2023*

- Utilized ABAQUS/Solidworks software to analyze and simulate 3D stent structures under torsions and stresses
- Assembled the μCLIP continuous liquid interface production microstereolithography printer
- Formulated/refilled resin mixtures of mPDC and photoinitiator, and solvent into μCLIP to photopolymerize the solvent into biocompatible and bioresorbable stents for damaged/narrowed artery/blood vessels
- Designed a model in CAD for dimensional accuracy tests for various resin types using the Form 3 SLA printer to compare the strengths/differences of each resin for specific uses
- Performed stress tests on printed stents using radial crimping mechanism to simulate stent deployment for pig field tests and to create a stress strain curve to estimate compression load/strength