Chaoyi Hu

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EDUCATION

Simon Fraser University Vancouver, Canada, Sep 2022 - Nov 2023
Completed 9 credits towards Professional Masters in Computer Science. | GPA: 4.0/4.0.

Beihang University Beijing, China, Sep 2017 - Jun 2021
Bachelor of Engineering in Biomedical Engineering | GPA: 3.7/4.0.

EXPERIENCE

Open Source Contributor Dec 2023 - present

- Pandas: Added features and fixed bugs related to HDFStore, MultiIndex. My code was merged into the v3.0 release.
- Matplotlib: Added type checks for mappable objects and resolved issues related to colormap custom parameters, contributing to the v3.9 release.
- AntColony: Investigated and fixed a JWT user authentication issue on a server-side TypeScript application.

Student Intern, Columbia University New York, Dec 2019 - Jul 2020
Laboratory of Neural Engineering and Control

- Developed a video processing pipeline in Python that successfully analyzed video recordings by tracking movement of mice in a maze, utilizing computer vision libraries such as OpenCV.
- Enhanced data processing efficiency 10x by developing automation tools in Python to batch process video recording backlog data, automatically generate statistical summaries of the results, and publish them to front-ends like Excel and user-friendly GUIs.
- Improved user experience by developing interfaces for data collection and visualization in Python.

Student Intern, Beihang University Beijing, Jul 2018 - Oct 2019
Laboratory of Biomechanics and Mechanobiology

- Led a student team in prototyping an assistive glove, using Arduino and STM32 microcontrollers to control motors and process data obtained from Inertial Measurement Units for movement analysis.
- Assisted in 3D modeling from heart CT images and 3D printing of a heart model using Mimics and Formlabs.
- IEEE Publication: https://pubmed.ncbi.nlm.nih.gov/30969927/

ADDITIONAL INFO

- **Developer Skills:** Linux/Bash; Python (Libraries: PyTorch, scikit-learn, Pandas, NumPy, OpenCV, Matplotlib, Jupyter Notebook, Selenium, PyTest, etc.); MATLAB; JavaScript/NodeJS; TypeScript; C++; SQL (PostgreSQL); Redis; Docker; Git; CI/CD (GitHub Actions); Web framework (Tornado, Django, Express); HTML/CSS; React; Next.js; AWS;
- **Domain Skills:** Digital Signal Processing (DSP); Computer Vision; Product Prototyping;
- **Certification:** AWS Certified Solutions Architect - Associate
- **Location:** WA, United States. Open to relocation.
- **Work Eligibility:** US Permanent Resident, no visa sponsorship required.

PROJECTS

chaoyihu.github.io | Web Development

- Designed and built a blog website using TypeScript, Next.js, and React. Created animation and responsive components in React.

Semantic segmentation of ultrasound images | Image Processing; Computer Vision

- Collaborated with clinicians at Beijing Anzhen Hospital to build a modified U-Net that segments anatomical structures in apical 4-chamber view echocardiographic images.

Detection of Alzheimer's Disease Based on fMRI Data | Image Processing; Computer Vision

- Developed models to classify Alzheimer and cognitively-normal patients based on extracted medically-meaningful metrics from fMRI scans.
- Visualized voxels in brain atlas to interpret the results from an anatomical perspective.

Drowsiness detection from EEG signals | Signal Processing; Machine Learning

- Used Python and MATLAB to preprocess EEG signals and extracted frequency-domain features.
- Established machine learning classifiers including Logistic Regression, SVM, and Gbdt, as well as a CNN model to identify human EEG signals in alert vs drowsy states.

Facial Landmarks Detector | Desktop Application; Computer Vision

- Established a deep learning model with ResNet backbone using Pytorch, integrated with a MediaPipe facial detector, to predict coordinates of 68 keypoints on facial images.
- Developed a Python desktop application, using OpenCV, that runs real-time facial landmark predictions at above 20 FPS on consumer devices using webcam inputs.

Virtual prototyping and performance evaluation of an auxetic tracheal stent | Product Prototyping; Mechanics

- Researched literature on auxetic structural design and its application in stent implants.
- Produced 3D models of auxetic and non-auxetic stent designs, as well as a simplified human trachea, using SolidWorks. Refined and optimized mesh using Hypermesh.
- Performed Finite Element Analysis (FEA) to quantify the deformation and stress distribution of stent models during the simulated interaction between stents and trachea.

Sprinting: Web-Based Sprint Planning and Collaboration | Full-stack Development

- Designed and built a dynamic web application to streamline sprint planning, sprint events hosting and progress sharing among team members, leveraging Python with Tornado web framework for backend development, JavaScript for responsive frontend interfaces, and Redis for efficient data storage.
- Utilized Redis pub/sub for seamless team communication via instant messages.
- Utilized Docker for containerization and seamless deployment on Amazon EC2, configuring NGINX as a reverse proxy to manage HTTP and WebSocket connection requests.

Vocabbler: Language Learner Helper App | Full-stack Development

- Developed a language-study app for vocabulary management and interactive quizzes, using NodeJS with Express web framework for backend, JavaScript for frontend, SQLite as database engine, and Amazon EC2 for deployment.