Zhuoheng Li

+1 916-490-1633 | pipli@ucdavis.edu | linkedin.com/andy-zhli | andy-lzh.github.io | Davis, CA 95616

RESEARCH INTERESTS

Deep Learning, Computer Vision, Semi-Supervised Learning, Multimodal Learning

EDUCATION

University Of California, Davis — Davis, CA
B.S in Computer Science; GPA: 3.52/4.00 — *Sep 2020 - June 2024*
Relevant Coursework: Deep Learning, Advanced Deep Learning(graduate level), Computer Vision

RESEARCH EXPERIENCE

UC Davis Coffee Center — Oct 2021 - Present
Research Assistant; Advised by Prof. William Ristenpart — *Davis, CA*
- Launched RoastPic, a mobile coffee analytic app that leverages computer vision and ML solutions to improve traceable quality control across coffee supply chains; secured **$250K** in seed funding.
- Developed iOS and Android apps using React Native, enabling users to access the solutions provided by RoastPic.
- Leveraged Amazon S3 to store images, coffee beans contour/masks, and defect labels to create train/test dataset.

RUbiNet Lab — Aug 2022 - Feb 2023
Research Assistant; Advised by Prof. Chen-Nee Chuah — *Davis, CA*
- Proposed a novel domain adaptation method for fine-tuning **CLIP** to downstream tasks using limited labeled data, achieving an **26.26%** accuracy improvement over Zero-Shot CLIP when fine-tuned with only **10%** of labeled data.
- Performed baseline experiments on CLIP, CoOp, ResNet-18/50, and Mobile-ViT neural networks in building a performance reference on lymph node metastasis classification task, leveraging **PyTorch** and **Scikit-Learn**.
- Summarized findings into a manuscript, prepared tables, visualized model architecture, and revised manuscript.

PUBLICATIONS AND TECHNICAL REPORT

- Z. Lai, J. Chauhan, **Z. Li**, L. Cerny Oliveira, C-N. Chuah, "Path-CLIP: Efficient Adaptation of CLIP for Pathology Image Analysis with Limited Data", under review by IEEE TPAMI

- M. Suresh, **Z. Li**, "DeepCoffee : Coffee Flavors Prediction Using Deep Learning",
  Technical Report for ECS 289G Advanced Deep Learning

INDUSTRY EXPERIENCE

RoastPic Inc. — June 2023 - Sep 2023
Software Engineer Intern; Founding Member — *Davis, CA*
- Contributed to a engineering team of 4, taking the lead in designing a scalable backend and **MLOps** pipelines.
- Designed databases sync methods to ensure seamless data updates between the local database and cloud database.
- Developed a ML image analysis API, using Django to handling HTTP requests and structuring responses.
- Containerized the ML API using Docker, ensuring a consistent and portable run-time environment across hosts.

Collimate — Mar 2021 - Jan 2022
Software Engineer — *Davis, CA*
- Collaborated with an engineering team of 11 to implement a real-time chat application aimed at helping students find classmates during Covid-19; helped **300+** students find classmates under remote instruction.
- Developed Homepage UIs on Android and iOS Apps, implementing React Native and Realm Database.

TEACHING INTEREST

ECS 197T - Tutoring in CS — Jan 2023 - Mar 2023
- Worked in an tutoring team of 13, responsible for tutoring lower-division Object-Oriented Programming class(ECS 36A, ECS 36B) and high-division Deep Learning class (ECS 189G) in a 3-hour weekly session.

ECS 289G - Advanced Deep Learning — June 2022 - June 2022
- Conducted a presentation on SOTA in generative models titled "GIRAFFE: Representing Scenes as Compositional Generative Neural Feature Fields" to a graduate-level class.

Research Projects

Auto-Adapter | *Python, PyTorch*   June 2023 - Present
- Identified a significant performance bottleneck in the language encoder component during the analysis of **CLIP**'s zero-shot performance in downstream classification tasks, while the vision encoder maintained robust.
- Conducted an extensive literature review on recent advancements in **domain adaptation** and **Open-Vocabulary Learning** of vision-language models, focusing on findings that address the challenges of transferring knowledge across vision and language domains.
- Performed baseline experiments on state-of-the-art domain adaptation methods and foundation models including CoOP, CLIP-Adapter, Tip-Adapter, CLIP(Zero-Shot and Linear-Probe), and ResNet-18, ResNet-50 to gain insights into the problem and establish a performance reference for the newly developed approach.

DeepCoffee | *Python, TypeScript, OpenAI, React.js, Material UI*   April 2022 - June 2022
- Built a DeepCoffee Model with an accuracy of **83.2%** in coffee flavor prediction task using GPT-3 text-davinci-002 Engine fine-tuned with limited coffee flavor data of only **1300** entries.
- Customized Material UI's **autocomplete component** to enable enhanced auto complete function via OpenAI API and DeepCoffee model, using user input as prompt and model-predicted information as autocomplete results, thereby improving user experience.
- Summarized the project into technical report, taking primary responsibility for crafting the methodology and result sections, ensuring clarity and coherence.

Class Projects

AI Tonight | *Python, PyTorch, Hugging Face*   Feb - Mar 2022
- Pre-Processed Short Jokes Dataset consisting 0.2M lines of jokes to improve model performance.
- Built a novel NLP model that generates jokes with pre-trained GPT-2 Model fine-tuned with Short Jokes Dataset, using Python, PyTorch and Hugging Face.

Budget Portal | *Node.js, React.js, D3.js, HTML5, CSS, JavaScrip*   May 2021
- Visualized UC Davis' annually budget expenditure in an interactive pie chart using react and D3.
- Utilized Cookies to store user input values, allowing the user to generate budget expenditure diagram dynamically.

Fitness Tracker | *JavaScript, HTML/CSS, Express, REST API, Passport.js, GCP, SQLite3*   Mar 2021
- Developed a comprehensive fitness tracking web app using H5/CSS/JavaScript, leveraging AJAX requests for seamless data retrieval and updating, and implementing media queries for responsive design.
- Implemented RESTful API to perform CRUD operations on fitness-related activity records, took advantage of Express.js to perform SQL query in response of request.

Technical Skills

Languages: Python, TypeScript/JavaScript, C/C++, Java, HTML/CSS, SQL, Bash, regex
Technology: PyTorch, scikit-learn, sciki-image, OpenCV, Hugging Faces, Weights & Biases, Pandas, Docker, Kubernetes, AWS, React Native, D3.js, GraphQL, Django
Database: SQLite, PostgreSQL, MongoDB, Firebase, Realm, Redis