

WENBO HU

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EDUCATION

University of California San Diego

Bachelor of Science in Data Science

Minor in Business

Main Curriculum:

COGS108(Data Science in Practice)(**A+**), CSE151A(Intro to **Machine Learning**)(**A**), CSE152A(Intro Computer Vision)(**A+**), CSE151B(Deep Learning)(**A+**), DSC102(Scalable Analytics Systems)(**A+**), DSC190(Perception & Navigation)(**A**), MATH173B(**Optimization**)(**A**)

Graduate-Level Course:

CSE 291(Hao, Su Machine Learning Meets Geometry)(**A**), CSE 250A(AI: **Probabilistic Reasoning** & Learning)(**A**), CSE 258/158(**A+**)(Recommender System)

Sept.2019 - Present

Major GPA: 3.916

Total GPA: 3.88

RESEARCH / WORK

Undergraduate Researcher Supervised by Tsui-Wei Weng

Sept.2022 - Present

- Worked on zero-shot contrastive image representation learning under natural language supervision; Research focus on improving **Vision-Language** models such as CLIP by Prompt Engineering and image feature adapters.

Research Intern at Hao Su Lab at UCSD

Feb.2022 - Present

- Worked closely with Ph.Ds and developed rigid body environment of **ManiSkill 2022 Challenge**, a large-scale robotic manipulation challenge seeking to benchmark generalizable robotic agents.

- Worked on rigid body environment and enabled environment fully-simulated dynamic interaction, supporting multiple observation modes such as(**point cloud**) and multiple controllers.

- Researched minimizing **simulation to real** robot transferability gaps; Experimented with motion planning using **Xarm** 7 joint robot arm.

- Enabled vision perception by implementing **hand-eye** calibration algorithm with **Intel Realsense** camera; Transformed Xarco to URDF by **Docker&ROS**; Trained **RL policy** in the simulated environment aiming for real transfer.

- Implemented and explored front-end 2D and 3D Computer vision models to relate all domains' research insights such as **DETR**, **WGAN-GP**, and **NeRF**.

- Practiced projects in solving forward and inverse Kinematics problems, Motion Planning tasks(RRT, PRM), **PID control** and Reinforcement Learning algorithms such as **PPO**, **SAC** using a **SAPIEN environment** based on an Open AI gym environment.

Deep Learning Research Intern at Synthesis Electronic Technology

June.2021 - Aug.2021

- Worked in **Computer Vision Group** and researched lightweight **object detection** models such as Yolo Series to compress and accelerate deep learning models to run on small devices (CPU chip / mobile end).

- Improved standard Yolov5s model with **5% mAP@.5 increase** by utilizing in-depth data augmentation and TTA, finetuning, and applying **Transformer to Yolov5** after reading **10 papers** in Transformer domain.

- Independently innovated a question of whether adding the semantic meaning of class labels improves accuracy; Experimented by designing **loss function** to consider semantic related classes, post-processing bounding box, and trying embedding matrix.

- Converted models from different frameworks to NCNN, ONNX, and TensorRT that can run on mobile devices and deployed **int 8 quantized yolov5s** on intel i5 CPU with speed **180ms in 1920*1080 video**.

Software Engineer Intern at Inspur Groups

July.2020 - Sept.2020

- Launched project with MyBatis and SpringMVC framework under Maven and Tomcat.

- Provided apple big data back-end development and support including writing **SQL** to select data series from database, developing controller, dao, data, and service layer by **JAVA** to achieve requests from the front end.

PROJECTS/ COMPETITIONS

Kaggle SIIM COVID-19 Detection Competition - Top 15% (1416 Teams)

June.2021 - Aug.2021

- Identified and localized COVID-19 abnormalities on chest radiographs with a dataset comprising **6,334** chest scans in DICOM format (**119.68 GB**).

- Employed packages: Albumentations, **Timm**, **MMdetection**, and **Detectron2**.

- Employed Transfer Learning; Trained and finetuned classification models such as Densenet121, EfficientNet.

- Ensembled detection models such as Yolov5x6, Cascade RCNN and edited their architectures; Implemented WBF to postprocess bounding box (better than SoftNMS).