Haozhe (Hank) Si

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EDUCATION

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN FALL 2018-SPRING 2022

Bachelor of Science in Computer Engineering

GPA: 3.97

HONORS: James Scholar; Dean's List of College of Engineering (All Semester); the O. Thomas and Martha S. Purl Scholarship

RELATED COURSEWORK: Artificial Intelligence; Transfer Learning; Algorithms; Data Structure; Computer Vision; Linear Algebra and Diff. Eq.; Probability; Signal Processing; Natural Language Processing; Machine Learning for Signal Processing; Robotics

RESEARCH PROJECTS

ISR: INVARIANT SUBSPACE RECOVERING SUMMER 2021

- Worked with Professor Han Zhao and Professor Bo Li on domain generalization; Purposed a novel post-processing method to recover the invariant subspace of features and improve the robustness of models;
- Tested the algorithm on both synthetic and real-world image datasets for domain generalization; Outperformed the algorithms including IRM and Group-DRO;

PACB: PROBLEM AGNOSTIC CLUSTER-BASED AUDIO PRETRAINING FALL 2021

- Proposed a novel self-supervised training scheme to better leverage the large corpus of unlabeled audio data; Designed a problem-agnostic cluster-based pretext task to pretrain the feature extractor;
- Tested the scheme on source separation and speaker classification datasets; the models converge faster and result in higher accuracy in both tasks.

FEDERATED DOMAIN GENERALIZATION FALL 2021

- Proposed a novel federated learning scheme making use of the data distribution of public and private data and can handle the out of distribution data on the clients;
- Designed the training framework for the proposed scheme; Designed a problem setting on CelebA and constructed the dataset for federated learning that requires domain generalization; Outperformed the FedAvg optimizer on both i.d. and o.o.d accuracy.

HAODE-NET: OBJECT DETECTION IN HAZY ENVIRONMENT SPRING 2021

- Utilized continual learning, multitask learning and knowledge distillation to propose a novel network architecture targeting object detection in a hazy environment; Tested on the SSD and the RTTS datasets;
- Performed extensive experiments and ablation studies verifying the superiority of the proposed framework.

ACDEMICRANK SPRING 2021

- Worked in the FORWARD Data Lab with professor Kevin Chang; Conducted research on calculating the rank of academic works about a given keyword according to their importance;
- Formalized the task into a weighted Personalized PageRank problem with multiple nodes values; Re-processed 3 datasets for the task to shrink the data size and speed up calculation;
- Designed a fast-ranking algorithm that works on citation relation graphs that can calculate the ranking of a graph with more than 10 billion edges in about 1 hour; Generated convincing results.

CLASS PROJECTS

ASPHALT ON FPGA FAll 2021

- Designed & coded car chasing game on FPGA board using System Verilog for game logic and C for keyboard communication;
- Implemented a player's car as the chaser, an AI car as the target and car streams in different direction and with different speeds as obstacles; Realized collision detection so that the AI car can avoid obstacles autonomously.

INTELLIGENT BEER-PONG ROBOT SPRING 2020

- Designed & coded a beer-pong robot that could pick balls on the table and throw it into a remote cup;
- Used computer vision algorithms to detect the position of the ball on the table;
- Implemented inverse kinematics and forward kinematics solver for the robot to pick up and throw the ball; Calculated and designed precise trajectories robot follows.

LINUX-LIKE OS KERNEL SPRING 2020

- Designed and coded a kernel for a simple Linux operating system. Worked in a team of 2 and wrote over 14000 lines of code in C and x86 assembly in total;
- Implemented features like multi-process scheduling, multi-terminals, virtual memory, video memory mapping, etc. Able to handle device interrupts and over 20 types of exceptions.

"HUNT THE WUMPUS"-LIKE, WORD ADVENTURE GAME IN CLOJURE FALL 2019

- Designed and coded a word adventure game with 12 game props, 10 rooms, and 5 incidents using Clojure; Wrote the story of the game; Support more than 10 operations and a console UI.

EXPERIENCE

VOKATECH MAY 2021-OCTOBER 2021

- Researched on 3D reconstruction from few-shot image; Reproduced SOTA works including pixelNeRF, DeepSDF and PIFu and performed ablation studies on them; Analyzed the effectiveness of position encoding, transformer, and diet loss in improving reconstruction quality;
- Proposed a network architect with a novel global feature extractor that can make use of the semantic information of input images to improve the consistency of output 3D mesh; Tested on the NMR and the DTU datasets.

XIAOMI CORPORATION JULY 2020-AUGUST 2020

- Worked in Camera Department, Software Group; Researched on the principle of CMOS image sensor and the mainstream products; Compared image sensors from three suppliers and generated a report highlighting each one's feature;
- Coded a development tool that can extract information from topology graphs written in XML to CSV files; Designed the GUI for it; Distributed it to all the other colleagues.
- Performed daily camera tests on the phones under development about all the camera functions; Recorded the abnormal software performances; Reported the issues and possible causes to the manager;
- Researched the mechanism of OIS and wrote an 8-page essay about it; Researched image quality (IQ) evaluation and prepared slides introducing the IQ attributes and evaluation criteria. Held presentations to share the researches with the colleagues;

ILLINI MOTORSPORTS, ELECTRONIC GROUP PROJECT LEAD SEPTEMBER 2018- JANUARY 2021

- Took in charge of the manufacturing of PCBs for the race season; Held the soldering orientation for new members in the team; Managed the schedule and quality of manufactured boards;
- Designed and manufactured the wiring harness for Engine Control Module in lab tests and on race car;
- Designed and programmed the DRS board and ETC board on the race car; Held the research on programming boards via CAN.

ERICSSON(CHINA) COMMUNICATION COMPANY LTD. MAY 2019-JULY 2019

- Worked for Wireless Innovation Lab and Demonstration Center (WILD-C) at Shanghai Branch; Researched on controlling the remote driving car through Bluetooth; Designed and coded the GUI for the remote driving car to simplify the controlling;
- Provided technique supports for Ericsson's and China Telecom's Booths during MWC Shanghai; Set up and introduced 4 demos including 5G Remote Engraving Machine and 5G Remote Driving Car;
- Edited promotion videos for 5G Unmanned Boat and 5G Intelligent Fire Extinguishing System; Made slides of 5G Unmanned Boat for the demonstration in MWC Shanghai.

SKILLS

DEEP LEARNING FRAMEWORKS

- PyTorch; Scikit-learn; Jax; TensorFlow;

PROGRAMMING LANGUAGE

- Python; C/C++; LaTex; SQL; System Verilog; x86 Assembly; Clojure; HTML; MATLAB;

APPLICATIONS

- Microsoft Office; Photoshop; Premiere Pro; Autodesk; V-REP; ROS.