

# CHIAO-WEI HSU

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## EDUCATION

### Stanford University (Auditing Courses)

Digital Nomad at Startup House 🌐

Palo Alto, CA

Since Sep. 2024

- AI Agents and Simulations (Individual/Group/Population-Level Generative-Agent Based Model and Simulation and Equilibria), Parallel Computing (CUDA, CUTLAS, SIMD, RDD), Big Data Systems (nanoDB, transaction scheduling and synchronization).

### Northwestern University

GPA: 3.88/4.0

Evanston, IL

Master of Science in Computer Science

Since Sep. 2023

- Thesis: “Scaling Law for Deep Learning” supervised by Han Liu 🌐.
- Seminar Project: “Financial LLMs and FinGPT” supervised by Han Liu 🌐.
- ML: Minimax, Bayesian Learning, Causal Inference, Decision Tree, Logistic Regression, EM Algorithm, Naive Bayes, Knowledge Representation and Reasoning, Deep Reinforcement Learning: A2C, PPO.
- DL: Quantization, LoRA, Retrieval-Augmented Generation, Diffusion Model, Linear RNN (Mamba), Transformer with RLHF, Mixture of Experts.
- CV/Graphics: Color Constancy, In-Pixel/On-Sensor Computation, Coded Aperture, Lensless Imaging.

## EXPERIENCE

### Machine Learning Intern

Himax Imaging Corp.

Irvine, CA

Jun. 2024 – Sep. 2024

- Engineered a unified model for Emotion, Attention, Body Detection, Face Expression model based on YOLO with TFLite and Vela.
- Utilized Model Pruning, Quantization, and Quantization-aware Training to obtain a compression ratio of 46% on an endpoint AI device (milliwatts).
- Implemented Task Automation with Natural Language Commands by a fine-tuned LLM and Text-to-Speech and Speech-to-Text for AIPC.

### Machine Learning Engineer (Research)

Taiwan

Academia Sinica

Nov. 2018 – Dec. 2022

- Engineered a Knowledge-driven Multi-Modal QA System integrating vision, speech, and text data, advancing capabilities in cross-modal information processing [3].
- Enhanced state-of-the-art performance by 4% on the Named Entity Recognition (NER) task through strategic fine-tuning of Transformers, applying Multi-Task and Incremental Learning techniques, and leveraging Data Augmentation [1][2].
- Designed a Hierarchical Multi-Head Multi-Layer Attention mechanism from the ground up, enhancing model interpretability and performance.
- Implemented Adaptive Boosting for Ensemble Learning.

## PROJECTS

### Stock Trading using Deep Reinforcement Learning 🌐 VIDEO

Mar. 2024 – Jun. 2024

- Trained a Stock Trading Agent by A2C and PPO to obtain an annual return of 29%.

### Information Retrieval and Multi-Document Analysis 🌐 CODE

Jan. 2019 – Jan. 2021

- Implemented Entity Linking and Relation Extraction for Wikidata Knowledge Graph.
- Incorporated K-Mean and Hierarchical Clustering algorithms to group similar documents.
- Improved the Re-ranking model of an Information Retrieval System by 0.24 f1-score.
- Implemented a BERT-based Query Generation model and threshold-tuning P-R curve.
- Extracted syntactic patterns based on Dependency Parsing and Part-of-Speech Tagging based on LSTM.

## PUBLICATIONS

- [1] Hsu et al., “A Redundancy-Enhanced Framework For Error Correction in Named Entity Recognition”, pre-print '24.
- [2] Hsu et al., “GlobalNER: Incorporating Non-local Information into Named Entity Recognition”, pre-print '23.
- [3] Liang et al., “A Flexible and Extensible Framework for Multiple Answer Modes Question Answering”, ROCLING '21.

## HONORS

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- ❖ **First Place** at the 2020 Formosa Artificial Intelligence Grand Challenge; developed a Multi-Round Dialogue System and Question Answering System.
- ❖ Led the team of 4 students to **top 11%** in 2024 eBay Machine Learning Competition.

## OTHER PROJECTS

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**AI-Driven Grocery Logging and Recipe Suggestions App**   Sep. 2023 – Apr. 2024

- Adopted **ReactJS**, **Vite**, and **Firebase**; conducted tests using **Cypress**.
- Developed a **Serverless RESTful API** with **ExpressJS** as back-end deployed with **AWS ElasticBean**.
- Incorporated **API Gateway** with **AWS Lambda Functions**.
- Engineered **prompts for GPT-4 Vision**, deployed **OCR** to scan receipts, and implemented features to send expiry notifications and receipt suggestions.

**AI-Powered Driver Companion Mobile App**   Mar. 2024 – Apr. 2024

- Incorporated AI models, **YOLOv4**, **GPT-4**, **Text-To-Speech**, **Speech-To-Text**, to streamline from image recognition to natural language processing.
- Adopted **Django** as back-end, and **React Native**, **Expo** for mobile development.