# -lao-Chun

POSTDOC · UNIVERSITY OF TÜBINGEN · MACHINE LEARNING SCIENTIST

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## **Professional Experience**

## **University of Tübingen / Donders Institute**

Postdoctoral Researcher, Machine Leanring

- Conducted research on Unsupervised 3D Representation Learning for robust Anomaly Detection in Medical Imaging.
- Improved psychosis detection by 6.7% AUROC through Self-Supervised Masked Surface Vision Transformer.
- Researched on Multi-Modal Foundation Model for Neurodegenerative Disease Detection.

#### National Health Research Institutes

Senior Machine Learning Scientist, Domain Transfer and Privacy

- Introduced Privacy-aware (FedCM) to enhance heterogeneity in Federated Learning for Multi-Source Alzheimer's Detection.
- Identified and differentiated key Regions of Interest (ROI) related to normal brain degeneration and Alzheimer's disease.
- Mentored students on robust multi-site ADHD detection using Conditional-adversarial Domain Adaptation Network (CDAN).

Machine Learning Scientist, Neurocognitive Assessment using Brain MRI

- Spearheaded MRI research pipeline: Data-Preprocessing (FreeSurfer, SPM), Modeling, and Explainable AI tools (GradCAM++).
- Increased 8.98% UAR for 3-class Alzheimer's detection using 3D Autoencoder with multi-view contrastive loss (BSEN).
- Attained STOA UAR of 80.2% in binary Face Processing Ability classification using Event-Contrastive Node2Vec Embedding.

### Behavioral Informatics & Interaction Computation Lab (BIIC)

Doctoral Researcher, Affective Electrophysiology Responses under Audio / Visual Stimuli

- Enhanced physiological emotion recognition by 3.5% UAR through Transformer-based Personalized modeling.
- Achieved an 8% UAR increase in personality recognition using Multi-Head Attention Graph Convolutional Network (GCN).
- Conducted in-depth studies on subjective/intended emotion reactions based on ECG/EDA/EEG signals with Shapley analysis.

# **Collaborated Projects**

# **C-Media Electronics, Inc.**

Senior Machine Learning Scientist

- Led a team of 5 developing a Real-Time Fully-Convolutional Speech De-reverberation engine with SRMR score 4.774.
- Oversaw the entire R&D pipeline: Data Collection/Synthesis, Model/Metric Design, Error Analysis, and Model Compression.
- Pioneered the development of speech cloning from previously unseen sources using Generative Adversarial Networks (GAN).

#### **Inventec Al Center**

Machine Learning Scientist, Cardiovascular Disease Detection

- Led the development of End-to-End Heart Disease Anomaly Detection system with Time-Series Multi-Lead ECG.
- Proposed Mixed-Domain Self-Attention Resnet (MDARsn) to handle missing data and outlier ECG for robust Multi-Label Detection.
- Received the Best Challenge Poster award in the PhysioNet/CinC Challenge 2021 and secured a US patent (US20230153575A1).

#### Institute for Information Industry (III)

Senior Machine Learning Engineer

- Led a team of 5 developing a deep video retrieval system to accelerate fake news screening.
- Proposed a novel video retrieval system with 95.1% retrieval precision and orchestrated with Docker.
- The system is adopted by two prominent NGO fake news checkers, Taiwan FactCheck Center and MyGoPen.

#### Gamania Digital Entertainment Co., Ltd.

Machine Learning Engineer

- Developed Multi-modal behavior profiling system utilizeing Speech, Face, and Gesture for AI-driven hiring recommendations.
- Designed and implemented a real-time, Multi-person Multi-modal data collection system to complement the profiling system.

## Education

## NTHU(National Tsing Hua University)

Ph.D., Electrical Engineering

• Got President Scholarship which is given to promising students in EE Dept.

## NTHU(National Tsing Hua University)

B.S., Electrical Engineering

# Skills

## Programming Python, SQL, C++, Matlab, Bash

DevOps | Cloud Git, Docker, Github Actions, Airflow | GCP, AWS DL | MLOps Pytorch, Tensorflow | Spark, MLflow, W&B, SLURM

Data Science Scikit-Learn, Numpy, Pandas, Matplotlib, SHAP Languages English, Chinese, (German)

## **National Tsing Hua University**

Teaching Assistant

- 10720IMS503100: Artificial Intelligence and Entrepreneurship
- 10710EE366200: Digital Signal Processing Laboratory
- 10620EE306001: Probability
- 10610EE648500: Computer Vision

Mar.2023 - Present

Germany / Netherland

Sep.2020 - Apr.2022

Taiwan

Taiwan

Sep.2018 - Apr.2022

Sep.2018 - Sep.2020

Taipei, Taiwan Jan.2020 - Dec.2021

Jan.2021 - Dec.2021

Taiwan

Taipei, Taiwan

Mar.2020 - Nov.2020

Taipei, Taiwan Sep.2016 - Sep.2018

Hsinchu, Taiwan

Sep.2016 - Apr.2022

Hsinchu, Taiwan Sep.2012 - Jun.2016

#### **Honors & Awards**

- 2022 **Program Committee Member**, IEEE ICKII, IEEE ICEIB, IARIA CENTRIC
- 2021 Best Challenge Poster, PhysioNet/CinC Challenge
- 2019 **Travel Grants**, 2019 ICASSP SPS Travel Grants
- 2018 **Scholarship**, Paper Presentation Scholarship
- 2018 Scholarship, Al Scholarship
- 2018 Scholarship, President Scholarship
- 2015 Scholarship, Summer Academic Exchange Program

#### Selected Publications (Google Scholar Profile)

#### JOURNAL

[1] Hao-Chun Yang and Chi-Chun Lee, "A Media-Guided Attentive Graphical Network for Personality Recognition Using Physiology" IEEE Transactions on Affective Computing 2021

#### PEER-REVIEWED CONFERENCE/WORKSHOP PAPER

- [1] Hao-Chun Yang, Thomas Wolfers, Ole Andreassen, Lars Tjelta Westlye, A.F. Marquand, and C.F. Beckmann, "Learning Cortical Anomaly through Masked Encoding for Unsupervised Heterogeneity Mapping" 2024 IEEE 21th International Symposium on Biomedical Imaging (ISBI) (under review)
- [2] Ya-Lin Huang, Hao-Chun Yang, and Chi-Chun Lee, "Federated Learning via Conditioned Mutual Learning for Alzheimer Disease Classification on T1w MRI"

43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society, EMBC 2021, (Virtual), Nov 1-5, 2021

- [3] Hao-Chun Yang, Wan-Ting Hsieh, and Pei-Chun Chen, "A Mixed-Domain Self-Attention Network for Multilabel Cardiac Irregularity Classification Using Reduced-Lead Electrocardiogram" Computing in Cardiology, CinC 2021, Brno, Czech Republic, September 12-15
- [4] Woan-Shiuan Chien, Hao-Chun Yang, and Chi-Chun Lee, "Cross Corpus Physiological-based Emotion Recognition Using a Learnable Visual Semantic Graph Convolutional Network" MM '20: The 28th ACM International Conference on Multimedia, ACMMM 2020, Virtual Event / Seattle, WA, USA, October 12-16, 2020
- [5] Wan-Ting Hsieh, Jeremy Lefort-Besnard, Hao-Chun Yang, Li-Wei Kuo, and Chi-Chun Lee, "Behavior Score-Embedded Brain Encoder Network for Improved Classification of Alzheimer Disease Using Resting State fMRI" 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society, EMBC 2020, Montreal, QC, Canada, July 20-24, 2020
- [6] Ya-Lin Huang, Wan-Ting Hsieh, Hao-Chun Yang, and Chi-Chun Lee, "Conditional Domain Adversarial Transfer for Robust Cross-Site ADHD Classification Using Functional MRI" 2020 IEEE International Conference on Acoustics, Speech and Signal Processing, ICASSP 2020, Barcelona, Spain, May 4-8, 2020
- [7] Hao-Chun Yang and Chi-Chun Lee, "A Siamese Content-Attentive Graph Convolutional Network for Personality Recognition Using Physiology"

2020 IEEE International Conference on Acoustics, Speech and Signal Processing, ICASSP 2020, Barcelona, Spain, May 4-8, 2020

- [8] Wan-Ting Hsieh, Hao-Chun Yang, Fu-Sheng Tsai, Chon-Wen Shyi, and Chi-Chun Lee, "An Event-contrastive Connectome Network for Automatic Assessment of Individual Face Processing and Memory Ability" IEEE International Conference on Acoustics, Speech and Signal Processing, ICASSP 2019, Brighton, United Kingdom, May 12-17, 2019
- [9] Hao-Chun Yang and Chi-Chun Lee, "An Attribute-invariant Variational Learning for Emotion Recognition Using Physiology" IEEE International Conference on Acoustics, Speech and Signal Processing, ICASSP 2019, Brighton, United Kingdom, May 12-17, 2019
- [10] Hao-Chun Yang and Chi-Chun Lee, "Annotation Matters: A Comprehensive Study on Recognizing Intended, Self-reported, and Observed Emotion Labels using Physiology"

8th International Conference on Affective Computing and Intelligent Interaction, ACII 2019, Cambridge, United Kingdom, September 3-6, 2019

- [11] Wan-Ting Hsieh, Hao-Chun Yang, Ya-Tse Wu, Fu-Sheng Tsai, Li-Wei Kuo, and Chi-Chun Lee, "Integrating Perceivers Neural-Perceptual Responses Using a Deep Voting Fusion Network for Automatic Vocal Emotion Decoding" 2018 IEEE International Conference on Acoustics, Speech and Signal Processing, ICASSP 2018, Calgary, AB, Canada, April 15-20, 2018
- [12] Hao-Chun Yang, Fu-Sheng Tsai, Yi-Ming Weng, Chip-Jin Ng, and Chi-Chun Lee, "A Triplet-Loss Embedded Deep Regressor Network for Estimating Blood Pressure Changes Using Prosodic Features" 2018 IEEE International Conference on Acoustics, Speech and Signal Processing, ICASSP 2018, Calgary, AB, Canada, April 15-20, 2018

IEEE Signal Processing Society ACLCLP, Taiwan Adbertech Inc., Taiwan National Tsing Hua University Fudan University, China

Computing in Cardiology Society