Yindong Hua

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Education Background

- Ph.D. in Computer Engineering — Stony Brook University — 01/2020-12/2025
- Master of Electrical Engineering — Peking University — 09/2013-07/2016
- Bachelor of Electrical Engineering — Henan University — 09/2009-07/2013

Technical Skills

Language: Python, Java, C, Matlab, JavaScript
Framework: Keras, Pytorch, Node.js, Tensorflow.
Developer Tools: Docker, Git, AWS, Linux/Unix, Docker.
Database: InfluxDB, MySQL.
Libraries: Pandas, Numpy, Matplotlib, OpenCV, Scikit-learn, Hugging Face, Redis.

Research Experience

Research Assistant at Stony Brook University

Project: Motion-Based Computer Vision for Consciousness Recovery. 10/2024-present

- Developed a convolutional VAE model using Pytorch to encode high-dimensional facial motion trajectories into robust, low-dimensional (128-dim) latent embeddings, achieving an average reconstruction MSE of 0.012.
- Built and optimized a Transformer encoder to predict future latent vectors from historical embeddings, effectively capturing temporal dependencies in patient motion and attaining a shorter ahead forecasting (<= 10-step) for less coma patients.
- Validated the hypothesis linking motion predictability to consciousness recovery by stratifying results using Glasgow Coma Scale (GCS) and movement labels, generated detailed visualizations of prediction-error trajectories.

Project: Contrastive Learning with LLM for Consciousness Level Classification. 09/2023-09/2024

- Created a custom EEG Dataset object with strategic daily segment selection per subject to maintain balanced class distribution, improving model generalizability.
- Built a dual-encoder architecture (CNN-based patch embedding + GPT-2 LLM backbone) for robust EEG feature extraction.
- Implemented advanced contrastive learning to learn shared (common across subjects), private (subject-specific), and orthogonal (disentangled) EEG representations using NT-Xent loss and orthogonality constraints.
- Fine-tuned embeddings on Glasgow Coma Scale (GCS) prediction, achieving strong classification performance (Accuracy: 76%, AUROC: 0.85, F1-score: 0.74).

Project: Scalable Home-Based Health Monitoring Infrastructure. 10/2022-08/2023

- Engineered a scalable, manageable, and fault-tolerant IoT-based distributed health monitoring system using Python and Node.js, utilizing microservices architecture and Docker containerization for modular deployment and CI/CD practices via AWS Greengrass.
- Created a data-agnostic pipeline using publish-subscribe mechanisms, reducing configuration efforts by 25x.
- Implemented automated monitoring and recovery with logging, dashboards, caching strategies, and reboot protocols.
- Leveraged InfluxDB and MySQL for high-availability time-series and relational data storage, ensuring data integrity.
- Validated system performance in a simulated smart home environment with 26 sensor nodes, achieving robust 24/7 operation with less than 1% data loss.

Research Scholar at Texas A&M University

Project: Deep Learning for Monocular Depth Estimation. 08/2018-06/2019

- Presented a dilated fully convolutional neural network (CNN) using Python and PyTorch for monocular depth estimation in computer vision applications.
- Implemented dilated convolutions to expand the receptive field without losing spatial resolution, enhancing context capture and achieving a 7x reduction in parameters compared to VGG-16, leading to faster inference and reduced computational load.

Publications

- Hua, Yindong, et al. " Proteus: Towards a Manageability-focused Home-based Health Monitoring Infrastructure*." Proceedings of the 14th ACM international conference on bioinformatics, computational biology and health informatics.* 2023.
- Hua, Yindong, Zongxing Xie, and Fan Ye. "A Study of Practical Radar-based Nighttime Respiration Monitoring at Home." *2023 IEEE Radar Conference (RadarConf23)*. IEEE, 2023.
- Hua, Yindong, et al. "Dilated fully convolutional neural network for depth estimation from a single image." *2019 International Conference on Computational Science and Computational Intelligence (CSCI)*. IEEE, 2019.