

Renwei Meng

Mobile: (+86) 182-3513-0053 | Email: 406987331@qq.com | Github: xiaolu-666113 | Homepage: renweimeng.com
Google Scholar | ORCID: 0009-0001-6879-6629 | Undergraduate Student, Anhui University

EDUCATION

Anhui University

Bachelor of Engineering in Digital Media Technology

Hefei, China

Sep. 2023 – Jun. 2027

- **GPA:** 3.69 / 4.0, 92.24/100 (**Ranking:** 1/100)
- **IELTS:** 7.0/9.0
- **Core Courses:** Machine Learning, Data Structures, Computer Organization, Operating Systems, Computer Networks, Linear Algebra, Probability Theory, Digital Image Processing, Computer Graphics, Python.

RESEARCH INTERESTS

- **Large Language Models (LLMs):** Retrieval-Augmented Generation (RAG), Instruction Tuning, Agent Systems, Multimodal LLMs.
- **AI for Healthcare:** Medical Image Analysis (CT/MRI Denoising & Segmentation), EEG Signal Processing.
- **Deep Learning & CV:** Graph Neural Networks (GNN), Vision Transformers, Multi-modal Fusion.
- **Brain-Computer Interface (BCI):** Inter-brain Synchrony, Neural Decoding, Affective Computing.

PUBLICATIONS & PATENTS

Publications

- **Group Resonance Network (GRN) for Cross-Subject EEG Emotion Recognition**

Renwei Meng

Submitted to *International Conference on Artificial Neural Networks (ICANN)*, 2026.

Under Review

- Proposed a group-aware EEG emotion recognition framework integrating learnable prototypes and multi-subject resonance modeling via PLV/coherence synchrony to improve cross-subject generalization on SEED and DEAP benchmarks.
 - **Explainable Innovation Engine: Dual-Tree Agent-RAG with Methods-as-Nodes and Verifiable Write-Back**
- Renwei Meng
- Submitted to *Conference on Uncertainty in Artificial Intelligence (UAI)*, 2026.
- Under Review
- Proposed a dual-tree Agent-RAG framework that enables explainable method-level retrieval and controllable innovation through structured synthesis and verification.
 - **Hyper-FusionNet: Decoding Inter-Brain Synchrony for Deepfake Detection via Multi-View Graph Learning**
- Shiang Hu, Zhiwen Zha, Renwei Meng, et al.
- Submitted to *IEEE International Conference on Multimedia and Expo (ICME)*, 2026.
- Under Review
- Proposed a novel framework fusing multi-dimensional EEG synchrony features (ISC, PLV, COH) with spatial topology using Graph Neural Networks for robust video forgery detection.
 - **VulnAgent-X: A Layered Agentic Framework for Repository-Level Vulnerability Detection**
- Renwei Meng
- Submitted to *International Conference on Artificial Neural Networks (ICANN)*, 2026.
- Under Review
- Designed a multi-stage agentic vulnerability detection pipeline combining risk screening, repository context retrieval, specialised analysis agents, and evidence fusion to improve detection accuracy and localisation on realistic benchmarks.

Patents

- **A generative deepfake video detection method and its system**
- Shiang Hu, Zhiwen Zha, Renwei Meng, Yuhao Fang.
- China Invention Patent, Application No. 202610165744.1.
- Accepted
- **Resting-state EEG quality assessment method and system based on dual-branch contrastive learning**
- Shiang Hu, Dongdong Jia, Wan'er Lv, Renwei Meng, Chao Lv.
- China Invention Patent, Application No. 202512044739.3.
- Accepted

RESEARCH EXPERIENCE

Research on Inter-brain Synchrony for AI-Generated Content Detection (EEG Hyperscanning) Sep. 2025 – Present

Core Researcher / Advisor: Prof. Shiang Hu

- **Problem:** Addressed the growing challenge of distinguishing AI-generated images/videos and detecting hallucinations in LLM outputs, which remain difficult for traditional computer vision and rule-based detection methods.

- **Method:** Conducted dual-brain EEG hyperscanning experiments and developed a neural-cognition-inspired framework integrating multi-band EEG features with advanced deep models, including Transformer-based multimodal encoders, Graph Neural Networks (GNN), and attention-based cross-brain feature fusion.
- **Result:** The proposed model achieved **93.7% accuracy** and **92.9% F1-score**, outperforming strong baselines such as CNN, SVM, and standard multimodal detectors.

Coronary CTA Image Artifact Removal and Clarity Reconstruction Jan. 2025 – Jun. 2025

Research Assistant

- Focused on removing motion artifacts and noise in Coronary CT Angiography (CTA) to enhance clinical diagnostic quality.
- Designed a deep learning denoising framework combining **U-Net** with **Generative Adversarial Networks (GAN)**.
- Implemented the pipeline in PyTorch. The proposed method significantly improved the Signal-to-Noise Ratio (SNR) and Structural Similarity Index (SSIM) compared to traditional filtering methods (e.g., BM3D).

Software Vulnerability Detection based on Transformer Architecture Mar. 2025 – Present

Project Leader | National College Student Innovation Program

- Developing a semantic-aware vulnerability detection model using **Transformer** architecture to address the limitations of RNNs in capturing long-range dependencies in code.
- Utilizing **Self-Attention mechanisms** to extract deep semantic features from Abstract Syntax Trees (AST) and Control Flow Graphs (CFG) of source code.
- Curating a large-scale dataset of C/C++ vulnerabilities and evaluating the model's precision and recall against static analysis tools.

Industrial Metaverse Intelligent Interaction System (Multi-modal) Sep. 2025 – Present

Algorithm Engineer | Research Group

- Developing a real-time interaction system integrating **Eye-tracking**, **Gesture Recognition**, and **Pose Estimation**.
- Designed a multi-modal fusion algorithm to interpret user intent in industrial scenarios with low latency.
- Optimized 3D rendering modules and data transmission protocols to ensure smooth interaction in the metaverse environment.

Regional Carbon Emission Price Prediction (CNN-GRU-LSTM-Attention) Jun. 2024 – Jun. 2025

Project Leader | National College Student Innovation Program

- Proposed a hybrid time-series prediction model combining **CNN** (local feature extraction), **GRU/LSTM** (temporal dependency), and **Attention mechanisms**.
- Validated on data from 7 major carbon trading markets in China, achieving higher prediction accuracy and robustness compared to single-structure models.

INTERNSHIP EXPERIENCE

Taiyuan Longwei Electronic Technology Co., Ltd. Taiyuan, China

Java Backend Developer Intern

Jul. 2025 – Sep. 2025

- Developed robust backend interfaces and managed database operations using **Spring Boot** and **MyBatis** frameworks.
- Collaborated with the frontend team to design and implement RESTful APIs, optimizing data transmission efficiency and system stability.

State Grid Shanxi Electric Power Co., Ltd. Taiyuan, China

System Operations and Maintenance Intern

Jul. 2024 – Sep. 2024

- Maintained the stability and security of the power operation system platform, ensuring high availability for critical grid management tasks.
- Performed data analysis on operational metrics and generated comprehensive monthly reports to support data-driven decision-making for system optimization.

HONORS & AWARDS

- **National Scholarship** (Top 0.1%, Highest Honor for Undergraduates in China) 2025
- **First Prize**, National College Student Mathematical Modeling Competition (Provincial) 2025
- **Honorable Mention**, Mathematical Contest in Modeling (MCM/ICM) 2025
- **Second Prize**, Lanqiao Cup National Software Talent Competition (Java, Provincial) 2025
- **Honorable Mention**, Global Mathematical Modeling Challenge (GMMC) 2025
- **University First-Class Academic Scholarship** 2024, 2025

TECHNICAL SKILLS

- **Programming:** Python, MATLAB, C/C++, Java, R, SQL.
- **Frameworks & Tools:** PyTorch, TensorFlow, Git, Docker, Linux, E-Prime 3.
- **Typesetting & Design:** L^AT_EX, Visio, Adobe Photoshop, Adobe Illustrator.
- **AI tools:** n8n, LangChain, ComfyUI.