Muhammad **Ahmad** Amin

Postdoctoral Fellow | Cybersecurity and Multimedia Forensics

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RESEARCH INTERESTS

My research addresses real-world cybersecurity and AI-safety challenges at the intersection of trustworthy machine learning, computer vision, and multimedia security. I develop robust, interpretable, and fair AI systems with applications in deepfake detection, forensics, biometric security, and privacy-preserving AI. Core focus areas:

- **AI-Driven Cybersecurity & Forensics:** AI-generated deepfake content detection, finger vein recognition system.
- **Trustworthy & Privacy-Preserving AI:** Fairness, interpretability, adversarial robustness, and secure data pipelines.
- **Learning under Distribution Shift:** Un-/semi-/self-supervised learning for real-world threat environments.

EDUCATION

Postdoctoral Fellow, Trustworthy Machine Learning and Cybersecurity *Sept. 2024 - Present*
School of Cyber Science and Technology, **Sun Yat-sen University (SYSU)**, Shenzhen, China.
- ***Area of Study:*** *Multimedia Forensics, Trustworthy Machine Learning, Vision-Language Models (VLMs), LLMs.*
- ***Projects:*** *Active core member on four national/provincial funded research projects (NSFC, Guangdong Major Project).*

Ph.D./D.Eng., Information and Communication Engineering *Sept. 2018 - Jun. 2024*
School of Electronic and Information Engineering, **South China University of Technology (SCUT)**, Guangzhou, China.
- ***Area of Study:*** *Multimedia Deepfake Forensics, Machine Learning, Privacy Preservation, and Financial Technology.*
- ***GPA:*** 4.0 /4.0 | ***Award:*** Excellent Graduate Student Award.
- ***Recipient:*** Chinese Government Full Fellowship & Guangdong Outstanding International Student Scholarship.

M.Eng., Information and Communication Engineering *Sept. 2016 - Jun. 2018*
School of Electronic and Information Engineering, **SCUT**, Guangzhou, China.
- ***Area of Study:*** *Finger Vein Biometrics, Machine Learning, Information Security, and Financial Technology.*
- ***GPA:*** 4.0 /4.0 | ***Award:*** Excellent Graduate Student Award. | ***Recipient:*** Chinese Government Full Fellowship.

TEACHING AND MENTORSHIP

Teaching and Research Mentor, Key Laboratory of Information Technology at **SYSU** *Sept. 2024 - Present*
- *Co-supervise graduate students on research articles, thesis writing, and project deliverables.*
- *Wrote and contributed to competitive research funding proposals (NSFC, Guangdong Major Project).*
- *Delivered invited webinar: 'A Cybersecurity Awareness Session' at the Consulate General of Pakistan, Guangzhou (2026).*

Teaching and Research Mentor, School of Electronic and Information Engineering at **SCUT** *Sept. 2016 - Jul. 2024*
- *Assisted in teaching graduate-level course 'Information Hiding and Digital Investigation' (course design, labs, grading).*
- *Co-supervised graduate students on research projects, article reviews, and thesis writing over 7 years.*

RESEARCH AND PROFESSIONAL EXPERIENCE

Research Assistant *Sept. 2016 - Jul. 2024*
Research Center of Multimedia Information Security Detection and Intelligent Processing at **SCUT**, Guangzhou, China.
- *Designed novel deep learning algorithms for multimedia forensics, deepfake detection, and finger vein biometric systems.*
- *Published 7+ peer-reviewed papers in international journals/conferences and co-invented a granted patent.*

Research Fellow *Sept. 2022 - Feb. 2024*
Department of Computer Science, **University of Warwick**, Coventry, England.
- *Published research on deepfake frame exposure via spectral frequency-domain analysis of color channels.*
- *Developed representative forgery learning across color spaces achieving improved cross-dataset generalization.*

Research Fellow *Mar. 2023 - Feb. 2024*
School of Information Technology, **Deakin University**, Victoria, Australia.
- *Developed a cross-domain characteristic analysis framework with a multi-domain transformer for deepfake detection.*

Research Fellow *Dec. 2023 - Mar. 2024*
Australian Defense Force Academy, **University of New South Wales,** Canberra, Australia.
- Developed temporal coherence-based deepfake video detection algorithms with improved cross-dataset performance.

Algorithm Engineer *Oct. 2017 - Jul. 2019*
Research and Development Institute, **GRG Banking Ltd.,** Guangzhou, China.
- Researched and deployed real-time finger vein recognition systems, including fake finger vein attack identification.
- Designed overhead security analysis and cross-count systems deployed in production banking and metro train hardware.

PROJECTS AND FUNDING

RESEARCH FUNDING

National Natural Science Foundation of China (NSFC) | *Surface Project* *Jan. 2026 - Dec. 2029*
Sun Yat-sen University | ***Project No.:*** 62572500 | ***Role:*** Core Research Member
Project Title: Research on Intelligent Video Processing Technology in the Encrypted Domain

National Natural Science Foundation of China (NSFC) *Dec. 2024 - Dec. 2026*
Sun Yat-sen University | ***Grant Nos.:*** U23B2022, U22A2030 | ***Role:*** Core Research Member

Guangdong Major Project of Basic and Applied Basic Research *Dec. 2024 - Dec. 2026*
Sun Yat-sen University | ***Grant No.:*** 2023B0303000010 | ***Role:*** Core Research Member

Science and Technology Foundation of Guangzhou Huangpu Development District *Sep. 2018 - Jul. 2024*
South China University of Technology | ***Grant No.:*** 2022GH15 | ***Role:*** Core Research Member

INDUSTRIAL PARTNERSHIPS

Collaborative Product Development Project *Sept. 2018 - Jun. 2019*
GRG Banking Ltd. | South China University of Technology
- Developed overhead security analysis and cross-count systems.

Research and Development Project *Oct. 2017 - Aug. 2018*
GRG Banking Ltd. | South China University of Technology
- Developed novel algorithms for detecting fake finger veins and enhancing low-quality finger vein image recognition.

PUBLICATIONS

JOURNALS AND CONFERENCES

Trustworthy Deepfake Defense for Consumer Applications via Frequency-Preserving Resizing and Dual-Branch Forensics
Muhammad Ahmad Amin, Jiangqun Ni, Ping Xu, Zeqin Yu, Dahao Fu
IEEE Transactions on Consumer Electronics, 2026.

Quality of Experience (qoe) in Cloud Gaming: A comparative analysis of Deep Learning techniques via Facial Emotions in a Virtual Reality Environment
Awais Khan Jumani, Jinglun Shi, Asif Ali Laghari, Muhammad Ahmad Amin, Aftab ul Nabi, Kamlesh Narwani, Yi Zhang
Virtual Reality Environment. Sensors 2025, 25, 1594.

Exploring Varying Color Spaces through Representative Forgery Learning to Improve Deepfake Detection
Muhammad Ahmad Amin, Yongjian Hu, Yu Guan, and Muhammad Zain Amin
Digital Signal Processing, Volume 147, 2024, 104426, ISSN 1051-2004.

Deepfake Detection based on Cross-Domain Local Characteristic Analysis with Multi-domain Transformer
Muhammad Ahmad Amin, Yongjian Hu, Chang-Tsun Li, and Beibei Liu
Alexandria Engineering Journal, Volume 91, 2024, Pages 592-609, ISSN 1110-0168.

Analyzing Temporal Coherence for Deepfake Video Detection
Muhammad Ahmad Amin, Yongjian Hu, and Jiankun Hu
Electronic Research Archive, 2024, 32(4), 2621-2641.

Exposing Deepfake Frames through Spectral Analysis of Color Channels in Frequency Domain
Muhammad Ahmad Amin, Yongjian Hu, Huimin She, Jicheng Li, Yu Guan, and Muhammad Zain Amin
In proceedings of the 11th IEEE International Workshop on Biometrics and Forensics (IWBF), Barcelona, Spain, 2023.

Notifyminer: Rule based User Behavioral Machine Learning Approach for Context wise Personalized Notification Services
Muhammad Faizan Khan, Lu Lu, Muhammad Toseef, Ahmed Musyafa, and Muhammad Ahmad Amin
Journal of Ambient Intelligence and Humanized Computing, vol. 14, no. 10, pp. 13 301–13 317, 2023.

Detecting Video Inter-frame Forgeries based on Convolutional Neural Network Model
Xuan Hau Nguyen, Yongjian Hu, Muhammad Ahmad Amin, Gohar Hayat Khan, and Van Thinh Le
International Journal of Image, Graphics and Signal Processing, vol. 14, no. 3, p. 1, Jun. 2020.

Three-dimensional Region Forgery Detection and Localization in Videos
Xuan Hau Nguyen, Yongjian Hu, Muhammad Ahmad Amin, Gohar Hayat Khan, Van Thinh Le, and Dinh Tu Truong
International Journal of Image, Graphics and Signal Processing, vol. 11, pp. 1–13, Dec. 2019.

PATENTS

An Adaptive Detection Method for the Upper and Lower Edges of the Low-quality Finger Vein Images
Innovator: Yongjian Hu, Muhammad Ahmad Amin, Wan Dongxia, Wang Yufei, and Beibei Liu
China National Intellectual Property Administration, China, 2022, vol. CN 109409181 B.

TECHNICAL SKILLS

AI Security & Forensics: Deepfake detection, biometric anti-spoofing, adversarial ML, privacy-preserving AI.
Deep Learning Frameworks: PyTorch, TensorFlow, Keras, Hugging Face Transformers.
ML & Data Science: Scikit-Learn, NumPy, Pandas, Matplotlib, OpenCV.
Programming Languages: Python (primary), C++.

ACADEMIC SERVICE AND AWARDS

SERVICE

Peer Reviewer: CVPR, AAAI, IEEE TCE, Digital Signal Processing, Entertainment Computing.
Volunteer: Member of Scout Association (Since 2007).
Organizer: China Information Hiding and Multimedia Security Workshop (CIHW 2018).

HONORS AND AWARDS

- Guangdong Government Outstanding International Student Scholarship (Ph.D.) at **SCUT** *Sep. 2022 - Jul. 2024*
- Chinese Government Full Scholarship (M.Eng. and Ph.D.) at **SCUT** *Sep. 2016 - Jul. 2022*
- Excellent Graduate Student Award (M.Eng. and Ph.D.) at **SCUT** *Sep. 2016 - Jul. 2024*