Muhammad **Ahmad** Amin

Postdoctoral Fellow @ School of Cyber Science and Technology, Sun Yat-sen University, Shenzhen, China

PERSONAL INFORMATION

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Google Scholar: https://scholar.google.com/citations?hl=en&user=57ouxVcAAAAJ

RESEARCH INTERESTS

My research focuses on the dynamic intersection of trustworthy machine learning, computer vision, pattern recognition, and natural language processing, specifically within multi-disciplinary application domains, like multimedia forensics, image processing, information security, privacy, and biometrics. My current focus areas are:

- **Biometrics and Forensics:** Learning for domain generalization, AI-generated multimedia content detection.
- **Image/Audio/Video Processing:** Representation learning, Multimodal learning, Fairness, Interpretability.
- **Learning with Real-world Data:** Un-/Semi-/Supervised learning

EDUCATION

Postdoctoral Fellow, Trustworthy Machine Learning *Sept. 2024 - Present*
School of Cyber Science and Technology, **Sun Yat-sen University (SYSU)** *Shenzhen, China*
- ***Area of Study:*** *Multimedia Forensics, Trustworthy Machine Learning, VLMs, LLMs*

Ph.D., 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 Forensics, Machine Learning, Privacy Preservation, Financial Technology*
- ***GPA:*** *4 /4.*

EXPERIENCE

Researcher Assistant *Sept. 2016 - Jul. 2024*
@Research Centre of Multimedia Information Security Detection and Intelligent Processing at **SCUT** *Guangzhou, China*
- *Research on the preprocessing of finger vein recognition systems, fake finger vein identification, and Deepfake detection.*
- *Developed new algorithms for multimedia forensics and published multiple research articles and a patent.*
- *Co-supervised graduate students on their research, projects, and article reviews.*
- *Assisted in teaching the subject of "Information Hiding and Digital Investigation".*

Algorithm Engineer *Oct. 2017 - Jul. 2019*
@Research and Development Institute, **GRG Banking Ltd.** *Guangzhou, China*
- *Researched and developed algorithms for finger vein recognition systems and fake finger vein attack identification.*
- *Optimized preprocessing of vein data for better recognition and resolved on-device finger rotation errors.*
- *Designed and developed the overhead security analysis and cross-count systems.*

Remote Research Fellow *Sept. 2022 - Feb. 2024*
@Department of Computer Science, **University of Warwick** *Coventry, England*
- *Published research on "exposing Deepfake frames through spectral analysis of color channels in the frequency domain."*
- *Researched exploring varying color spaces through representative forgery learning to improve Deepfake detection.*

Remote Research Fellow *Mar. 2023 - Feb. 2024*
@School of Information Technology, **Deakin University** *Victoria, Australia*
- *Researched Deepfake detection based on cross-domain local characteristic analysis with a multi-domain transformer.*

Remote Research Fellow *Dec. 2023 - Mar. 2024*
@Australian Defence Force Academy, **University of New South Wales** *Canberra, Australia*
- *Researched and developed novel algorithms for Deepfake video detection based on temporal coherence analysis.*

PROJECTS

Collaborative Project *Sept. 2018 - Jun. 2019*
@GRG Banking LTD./South China University of Technology *Guangzhou, China*
- Worked on Overhead Security Analysis and Cross-count System.

Research and Development Project *Oct. 2017 - Aug. 2018*
@GRG Banking LTD./South China University of Technology *Guangzhou, China*
- Worked on Finger Veins Recognition System.
- Developed new algorithms to improve the recognition of low-quality finger vein images.

PUBLICATIONS

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.

JOURNALS AND CONFERENCES

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, Feb. 2024.

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, Feb. 2024.

Analyzing Temporal Coherence for Deepfake Video Detection
Muhammad Ahmad Amin, Yongjian Hu, and Jiankun Hu
Electronic Research Archive, Mar. 2024.

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.

SKILLS

Frameworks/Libraries: PyTorch, TensorFlow, Keras, Scikit-Learn, Matplotlib, Numpy, Pandas, OpenCV, Transformers.
Programming Languages: Python, C++.

SERVICES

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

AWARDS AND HONORS

Guangdong Government Outstanding International Student Scholarship *Sept. 2022 - Jul. 2024*
- Ph.D.

Chinese Government Fellowship *Sept. 2016 - Jul. 2022*
- Fully Funded Ph.D. degree
- Fully Funded M.Eng. degree

Excellent Graduate Student's Award *Sept. 2016 - Jul. 2024*
- Ph.D.
- M.Eng.