

# Muhammad **Ahmad** Amin

Research Assistant @ South China University of Technology (SCUT), Guangzhou, China

## PERSONAL INFORMATION

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**LinkedIn:** <https://www.linkedin.com/in/7ahmadamin/>

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

## RESEARCH INTERESTS

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My research focuses on the dynamic intersection of 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. I currently focus on the following research topics:

- **Biometrics and Forensics:** Continual 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

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### Ph.D., Information and Communication Engineering

South China University of Technology

Sept. 2018 - Jun. 2024

Guangzhou, China

- **Thesis:** "Exploiting Bio-signals and Handcrafted Features for Deepfake Detection."

- Excellent Graduate Student's Award from School of Electronic and Information Engineering

- **Adviser:** Prof. Yongjian Hu

- **Area of Study:** Multimedia Forensics, Machine Learning, Pattern Recognition, Privacy Preservation, Image Processing

- **GPA:** 4 / 4.

### M.Eng., Information and Communication Engineering

South China University of Technology

Sept. 2016 - June 2018

Guangzhou, China

- **Thesis:** "A Study on the Preprocessing of Finger Vein Recognition System."

- Excellent Graduate Student's Award from School of Electronic and Information Engineering

- **Adviser:** Prof. Yongjian Hu

- **Area of Study:** Biometrics, Machine Learning, Financial Technology, Information Security, Image Processing

- **GPA:** 4 / 4.

## EXPERIENCE

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### Researcher Assistant

Sept. 2016 - Present

@Research Centre of Multimedia Information Security Detection and Intelligent Processing at SCUT Guangzhou, China

- Supervised by Prof. Yongjian Hu.

- 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.

### Visiting Research Fellow

Sept. 2022 - Feb. 2024

@Department of Computer Science, University of Warwick

Coventry, England

- Supervised by Prof. Yu Guan and Prof. Yongjian Hu.

- 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.

### Visiting Research Fellow

@School of Information Technology, Deakin University

- Supervised by Prof. Chang-Tsun Li and Prof. Yongjian Hu.

- Researched Deepfake detection based on cross-domain local characteristic analysis with a multi-domain transformer.

Mar. 2023 - Feb. 2024

Victoria, Australia

### Visiting Research Fellow

@University of New South Wales, Australian Defence Force Academy

- Supervised by Prof. Jiankun Hu and Prof. Yongjian Hu.

- Researched and developed novel algorithms for Deepfake video detection based on temporal coherence analysis.

Dec. 2023 - Mar. 2024

Canberra, Australia

## PROJECTS

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### Collaborative Project

@GRG Banking LTD./South China University of Technology

- Worked on Overhead Security Analysis and Cross-count System.

Sept. 2018 - Jun. 2019

Guangzhou, China

### Research and Development Project

@GRG Banking LTD./South China University of Technology

- Worked on Finger Veins Recognition System.

- Developed new algorithms to improve the recognition of low-quality finger vein images.

Oct. 2017 - Aug. 2018

Guangzhou, China

## PUBLICATIONS

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## 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.

## AWARDS AND HONORS

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**Guangdong Government Outstanding International Student Scholarship**  
- Ph.D.

Sept. 2022 - Jul. 2024

**Chinese Government Fellowship**  
- Fully Funded Ph.D. degree  
- Fully Funded M.Eng. degree

Sept. 2016 - Jul. 2022

**Excellent Graduate Student's Award**  
- Ph.D.  
- M.Eng.

Sept. 2016 - Jul. 2024

## SKILLS

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**Frameworks/Libraries:** PyTorch, TensorFlow, Keras, Scikit-Learn, Matplotlib, Numpy, Pandas, OpenCV, Transformers.

**Programming Languages:** Python, C++, Javascript.

**Online Courses:** Machine Learning ([Stanford University](#)), Neural Networks and Deep Learning ([Andrew Ng](#)).

## SERVICES

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**Reviewer:** IEEE, Digital Signal Processing.

**Volunteer:** Member of Scout Association (Since 2007).

**Organizer:** China Information Hiding and Multimedia Security Workshop (CIHW 2018).

## REFEREES

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**Professor Yongjian Hu**

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School of Electronic and Information Engineering,  
South China University of Technology, Guangzhou,  
510641, Guangdong, China

**Professor Chang-Tsun Li**

**Email:** changtsun.li@deakin.edu.au

School of Info. Technology,  
Deakin University, Geelong,  
VIC, 3216, Australia

**Professor Yu Guan**

**Email:** yu.guan@warwick.ac.uk

Department of Computer Science,  
University of Warwick, Coventry,  
CV4 7AL, England