

Deeraj Nagothu, Ph.D.

Research Scientist, Intelligent Fusion Technology

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📄 <https://scholar.google.com/citations?user=xBeaGnMAAAAJ&hl>



Research Interests

- ◇ Digital Multimedia Authentication, Information Assurance, DeepFake Detection.
- ◇ Network Infrastructure Virtualization, Network Security and Software Defined Networking.
- ◇ Artificial Intelligence Alignment and Safety Research, Mechanistic Interpretability of LLMs.

Education

- 2017 – 2023 ◇ **Ph.D, Electrical and Computer Engineering**, Binghamton University-SUNY, Binghamton, NY, USA.
Dissertation title: *Lightweight Multimedia Authentication at the Edge using Environmental Fingerprint*
Advisor: Dr. Yu Chen
- 2015 – 2016 ◇ **MS, Electrical and Computer Engineering**, Binghamton University-SUNY, Binghamton, NY, USA.
Thesis title: *iCrawl: A high interaction client honeypot system.*
Advisor: Dr. Andrey Dolgikh
- 2011 – 2015 ◇ **B.Tech, Electronics and Communications Engineering**, SASTRA University, Tamil Nadu, India.

Work Experience

- 2023 – Present ◇ **Research Scientist**. Intelligent Fusion Technology Inc. (IFT), Germantown, MD, USA.
- 2018 – 2023 ◇ **Graduate Research Assistant** SUNY Research Foundation, Binghamton University, Binghamton, NY, USA.

Teaching Experience

- Graduate Instructor ◇ **Network Computer Security (EECE-480F)**, Spring 2016 - Spring 2020.
- Teaching Assistant ◇ **Cyber Physical Systems (EECE-480A)**, Fall 2016 - Spring 2017.
- ◇ **Cryptography and Information Security (EECE-405/560)**, Fall 2020.
- ◇ **Linear Algebra and Engg Programming (EECE-212)**, Spring 2021.

Skills

- Coding ◇ Python, C/C++, C#, Shell, Bash, MATLAB, Powershell, SQL, L^AT_EX, Neo4j and Cypher.
- Network Security ◇ DHCP, SSH, VPN, DNS, Port-Forwarding, DMZ N/W, NMAP scan, Pentesting using Metasploit framework, OpenDaylight for SDN, LibreNMS, Cacti Server, Tenable Nessus Scanner and DISA STIGs.
- Deep Learning ◇ Pytorch, Keras, Tensorflow, FastAI, Transformer-lens (Interpretability of LLMs).
- Virtualization ◇ ESXi, Vmos, Cisco Nexus, HyperV, Xen, OpenStack, OpenMano, Docker, Proxmox.
- Web Dev ◇ HTML, CSS, JavaScript, Flask Web Server, React and Jekyll






Research Publications

Journal Articles




- 1 **Nagothu, D.**, Xu, R., Chen, Y., Blasch, E., & Aved, A. (2022a). Defakepro: Decentralized deepfake attacks detection using enf authentication. *IT Professional*, 24(5), 46–52. [doi:10.1109/MITP.2022.3172653](https://doi.org/10.1109/MITP.2022.3172653)
- 2 **Nagothu, D.**, Xu, R., Chen, Y., Blasch, E., & Aved, A. (2022b). Deterring deepfake attacks with an electrical network frequency fingerprints approach. *Future Internet*, 14(5), 125. [doi:10.3390/fi14050125](https://doi.org/10.3390/fi14050125)
- 3 Xu, R., **Nagothu, D.**, & Chen, Y. (2021a). Decentralized video input authentication as an edge service for smart cities. *IEEE Consumer Electronics Magazine*, 10(6), 76–82. [doi:10.1109/MCE.2021.3062564](https://doi.org/10.1109/MCE.2021.3062564)
- 4 Xu, R., **Nagothu, D.**, & Chen, Y. (2021b). Econledger: A proof-of-enf consensus based lightweight distributed ledger for iomt networks. *Future Internet*, 13(10), 248. [doi:10.3390/fi13100248](https://doi.org/10.3390/fi13100248)
- 5 **Nagothu, D.**, Chen, Y., Aved, A., & Blasch, E. (2021). Authenticating video feeds using electric network frequency estimation at the edge. *EAI Endorsed Transactions on Security and Safety*, "7"(24). [doi:10.4108/eai.4-2-2021.168648](https://doi.org/10.4108/eai.4-2-2021.168648)
- 6 Xu, R., Nikouei, S. Y., **Nagothu, D.**, Fitwi, A., & Chen, Y. (2020). Blendsps: A blockchain-enabled decentralized smart public safety system. *Smart Cities*, 3(3), 928–951. [doi:10.3390/smartcities3030047](https://doi.org/10.3390/smartcities3030047)
- 7 **Nagothu, D.**, Chen, Y., Blasch, E., Aved, A., & Zhu, S. (2019). Detecting malicious false frame injection attacks on surveillance systems at the edge using electrical network frequency signals. *Sensors (Basel)*, 19(11), 1–19. [doi:10.3390/s19112424](https://doi.org/10.3390/s19112424)

Conference Proceedings

- 1 **Nagothu, D.**, Xu, R., & Chen, Y. (2023). DEMA: Decentralized electrical network frequency map for social media authentication. In *Disruptive Technologies in Information Sciences VII* (Vol. 12542, pp. 57–72). [doi:10.1117/12.2663303](https://doi.org/10.1117/12.2663303)
- 2 Poredi, N., Nagothu, D., & Chen, Y. (2023). AUSOME: Authenticating social media images using frequency analysis. In *Disruptive Technologies in Information Sciences VII* (Vol. 12542, pp. 44–56). [doi:10.1117/12.2663296](https://doi.org/10.1117/12.2663296)
- 3 Poredi, N., **Nagothu, D.**, Chen, Y., Li, X., Aved, A., Ardiles-Cruz, E., & Blasch, E. (2022). Robustness of electrical network frequency signals as a fingerprint for digital media authentication. In *2022 IEEE 24th international workshop on multimedia signal processing (MMSP)* (pp. 1–6). [doi:10.1109/MMSP55362.2022.9949315](https://doi.org/10.1109/MMSP55362.2022.9949315)
- 4 **Nagothu, D.**, Dimock, D., Kulesza, A., Yang, H., & Chen, Y. (2022). A distributed crawler for iomt-based public safety surveillance exploring the spatio-temporal correlation. In *Sensors and systems for space applications xv* (Vol. 12121, pp. 18–28). [doi:10.1117/12.2618909](https://doi.org/10.1117/12.2618909)
- 5 **Nagothu, D.**, Xu, R., Chen, Y., Blasch, E., & Aved, A. (2021a). Detecting compromised edge smart cameras using lightweight environmental fingerprint consensus. In *Proceedings of the 19th ACM conference on embedded networked sensor systems* (pp. 505–510). [doi:10.1145/3485730.3493684](https://doi.org/10.1145/3485730.3493684)
- 6 **Nagothu, D.**, Xu, R., Chen, Y., Blasch, E., & Aved, A. (2021b). Defake: Decentralized enf-consensus based deepfake detection in video conferencing. In *IEEE 23rd international workshop on multimedia signal processing*. [doi:10.1109/MMSP53017.2021.9733503](https://doi.org/10.1109/MMSP53017.2021.9733503)
- 7 Quan, W., **Nagothu, D.**, Poredi, N., & Chen, Y. (2021). Cripi: An efficient critical pixels identification algorithm for fast one-pixel attacks. In *Sensors and systems for space applications xiv* (Vol. 11755, pp. 83–99). [doi:10.1117/12.2581377](https://doi.org/10.1117/12.2581377)

- 8 Rosenberg, M., Burns, J. H., **Nagothu, D.**, & Chen, Y. (2020). Enabling continuous operations for uavs with an autonomous service network infrastructure. In *Sensors and systems for space applications xiii* (Vol. 11422, pp. 165–179).  doi:10.1117/12.2565866
- 9 Fitwi, A. H., **Nagothu, D.**, Chen, Y., & Blasch, E. (2019). A distributed agent-based framework for a constellation of drones in a military operation. In *Proc. - winter simul. conf.* (Vol. 2019-Decem).  doi:10.1109/WSC40007.2019.9004907
- 10 **Nagothu, D.**, Schwell, J., Chen, Y., Blasch, E., & Zhu, S. (2019). A study on smart online frame forging attacks against video surveillance system. In *Proc. spie - int. soc. opt. eng.* (Vol. 11017).  doi:10.1117/12.2519005
- 11 **Nagothu, D.**, Xu, R., Nikouei, S. Y., & Chen, Y. (2019). A microservice-enabled architecture for smart surveillance using blockchain technology. In *2018 ieee int. smart cities conf. isc2 2018*.  doi:10.1109/ISC2.2018.8656968
- 12 Nikouei, S. Y., Xu, R., **Nagothu, D.**, Chen, Y., Aved, A., & Blasch, E. (2019). Real-time index authentication for event-oriented surveillance video query using blockchain. In *2018 ieee int. smart cities conf. isc2 2018*.  doi:10.1109/ISC2.2018.8656668


Book Chapters

- 1 Xu, R., **Nagothu, D.**, & Chen, Y. (2023). Ecom: Epoch randomness-based consensus committee configuration for iot blockchains. In K. Daimi, I. Dionysiou, & N. El Madhoun (Eds.), *Principles and practice of blockchains* (pp. 135–154).  doi:10.1007/978-3-031-10507-4_7
- 2 **Nagothu, D.**, Poredi, N., & Chen, Y. (2022). Evolution of attacks on intelligent surveillance systems and effective detection techniques.  doi:10.5772/intechopen.105958
- 3 **Nagothu, D.**, Xu, R., Nikouei, S. Y., Zhao, X., & Chen, Y. (2020). Smart surveillance for public safety enabled by edge computing. (pp. 409–433).  doi:10.1049/PBPC033E_ch19

Books

- 1 **Nagothu, D.**, & Chen, Y. (2023). *Authentication of video feeds in smart edge surveillance networks* (C. Olson, Ed.). Bellingham, Washington 98227-0010: SPIE Press.

Dissertation and Thesis

- 1 **Nagothu, D.** (2023). *Lightweight Multimedia Authentication at the Edge Using Environmental Fingerprint* (Ph.D. State University of New York at Binghamton, United States – New York). ISBN: 9798380566988. Retrieved October 28, 2023, from  <https://www.proquest.com/docview/2872097834/abstract/A49AAD7CD800446BPQ/1>
- 2 **Nagothu, D.** (2016). *Icrawl: A high interaction client honeypot system* (M.S. State University of New York at Binghamton, United States – New York).

Professional Activities

Reviewer for Journals

- ◇ IEEE Transactions on Pattern Analysis and Machine Intelligence
- ◇ IEEE Transactions on Dependable and Services Computing
- ◇ IEEE Transactions on Services Computing
- ◇ SPIE Journal of Electronic Imaging (JEI).
- ◇ Elsevier Computers and Security

Professional Activities (continued)

- ◇ Expert Systems with Applications
- ◇ IEEE Access
- ◇ IEEE Transactions on Aerospace and Electronic Systems

Reviewer for Conferences

- ◇ IEEE International Conference on Computer Communications (INFOCOM).
- ◇ IEEE Global Communications Conference (GLOBECOM) IoT and Sensor Networks (IoTSN).
- ◇ IEEE Global Communications Conference (GLOBECOM) Communication and Information Systems Security (CISS).
- ◇ IEEE Global Communications Conference (GLOBECOM) Communications Software, Services and Multimedia Apps (CSSMA).
- ◇ IEEE International Conference on Wireless and Mobile Computing, Networking And Communications (WiMob).
- ◇ ACM International Workshop on Blockchain-enabled Networked Sensor Systems (BlockSys)
- ◇ IEEE International Smart Cities Conference (ISC2).
- ◇ IEEE International Conference on Cloud Networking (CloudNet)
- ◇ IEEE International Conference on Communications (ICC)

Miscellaneous Experience

Awards and Achievements

- 2020 ◇ **GSEA**, Graduate Student Award for Excellence in Teaching (**Courses** - Network Computer Security and Cyber Physical Systems).

Academic Mentor

- 2023-2024 ◇ **Master's Thesis** "A Lightweight Deep Learning Model for Rapid Detection of Fabricated ENF Signals from Audio Sources"
- 2022-2023 ◇ **ECE Capstone Design Project (ECD 323)**. "Real-Time Visual-Layer Attacks Detection using Electrical Network Frequency Signals".
- 2019-2020 ◇ **Master's Thesis** "Critical Pixels Attack on DNN"
- ◇ **Master's Thesis** "Human Identification Using Skeleton Joints Based on 2D Image"
- 2019-2021 ◇ **ECE Capstone Design Project (ECD 122 - WCP 29)**. "Exploring the Spatio-Temporal Correlation in IoVT Network for Smart Public Safety".
- 2018-2019 ◇ **ECE Capstone Design Project (WCP40)**. "Service Network for Drones".

Memberships

- ◇ IEEE, ACM and SPIE.