Kritagya Raj Upadhyay | Curriculum Vitae

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Last updated: November 2025

EDUCATION

2018 – 2023	**Doctor of Philosophy, Computer Science and Engineering** Department of Computer Science and Engineering University of North Texas, Denton, Texas *Advisor*: Prof. Dr. Ram Dantu *Dissertation*: Paradigm Shift from Vague Legal Contracts to Blockchain-based Smart Contracts
2011 – 2015	**Bachelor of Information Management** Faculty of Management College of Applied Business Tribhuvan University, Nepal

RESEARCH INTERESTS

Blockchain and Smart Contracts, Artificial Intelligence, Federated Learning, Cyber Security, Legal Contracts and Interpretation Analysis, Natural Language Processing, Metaverse, Data Cooperatives, Consensus Mechanisms in Blockchain, Quantum Computing and Communications

RESEARCH AND TEACHING EXPERIENCE

2023 – Present	**Assistant Professor** (Tenure-Track) Department of Computer Science, Middle Tennessee State University, Murfreesboro, Tennessee
2018 – 2023	**Doctoral Researcher** Network Security Lab, University of North Texas • Research on blockchain technologies, smart contracts, AI security, metaverse applications, and contributed to NSF/NSA grant proposals
2018 – 2023	**Graduate Teaching Assistant** Department of Computer Science and Engineering, University of North Texas • Assisted in teaching undergraduate and graduate courses in cybersecurity, programming, and network while mentoring students on research and senior design projects

2011 – 2015   **Undergraduate Researcher**
Faculty of Management
College of Applied Business, Tribhuvan University
- Research on secure online store management system

PEER-REVIEWED PUBLICATIONS

1. S. Poudel, **K. Upadhyay** and J. Upadhya, "RBBD: A Representation-Based Framework for Edge-Case Backdoor Defense in Federated Learning," *2025 IEEE 7th International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications (TPS-ISA)*, Pittsburgh, PA, USA, 2025.

2. Byrd, J.; **Upadhyay, K**.; Poudel, S.; Sharma, H.; Gu, Y. A Blockchain and IoT-Enabled Framework for Ethical and Secure Coffee Supply Chains. *Future Internet* **2025**, *17*, 334. https://doi.org/10.3390/fi17080334.

3. S. Poudel, A. M. Sainju and **K. Upadhyay**, "Privacy Meets Conservation: Federated Learning's Revolution in Deforestation Detection," *2025 IEEE World AI IoT Congress (AIIoT)*, Seattle, WA, USA, 2025, pp. 0249-0258, doi: 10.1109/AIIoT65859.2025.11105254.

4. Z. Taylor, A. Sharma, **K. Upadhyay**, "Examining The Threat Landscape of Generative AI: Attack Vectors and Mitigation Strategies for LLMs", *2025 IEEE 15th Annual Computing and Communication Workshop and Conference (CCWC)*, University of Nevada, Las Vegas, USA.

5. S. Ali, B. Robinson, S. Solomon, S. Poudel, A. Sharma, **K. Upadhyay**, "Chain Your Loot: Implementing Blockchain Into Gaming Loot Box Markets", *2025 IEEE 15th Annual Computing and Communication Workshop and Conference (CCWC)*, University of Nevada, Las Vegas, USA.

6. T. Hartman, S. Poudel, J. Upadhya, M.N. Hasan, K. Poudel, **K. Upadhyay**, "A Big Data Optimization Comparison Using Apache Spark and Apache Airflow", *2025 IEEE 15th Annual Computing and Communication Workshop and Conference (CCWC)*, University of Nevada, Las Vegas, USA.

7. S. Balaji, R. Dantu, **K. Upadhyay** and T. McCullough, "Bridging the Legal Divide: Contractual Enforceability and Acceptability in the AI-Driven Automated Conversion of Smart Legal Contracts," *2024 IEEE 6th International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications (TPS-ISA)*, Washington, DC, USA, 2024, pp. 128-137, doi: 10.1109/TPS-ISA62245.2024.00024.

8. J. Upadhya, A. Sainju, **K. Upadhyay**, S. Poudel, M.N. Hasan, K. Poudel and J. Ranganathan, "VulnFusion: Exploiting Multimodal Representations for Advanced Smart Contract Vulnerability Detection," *2024 6th International Conference on Blockchain Computing and Applications (BCCA)*, Dubai, United Arab Emirates, 2024, pp. 505-515, doi:

10.1109/BCCA62388.2024.10844483.

9. J. Upadhya, **K. Upadhyay**, A. Sainju, S. Poudel, M.N. Hasan, K. Poudel and J. Ranganathan, "QuadraCode AI: Smart Contract Vulnerability Detection with Multimodal Representation," *2024 33rd International Conference on Computer Communications and Networks (ICCCN)*, Kailua-Kona, HI, USA, 2024, pp. 1-9, doi: 10.1109/ICCCN61486.2024.10637655.

10. Harshit Kumar and **Kritagya Upadhyay**, Decentralized Engagement: Blockchain's Lens on Social Media, *6th International Congress on Blockchain and Applications*, *BLOCKCHAIN'24*, 2024, University of Salamanca (Spain).

11. Badruddoja S., Dantu R., Dockendorf M., Salau A. and **Upadhyay K**. (2024). Revolutionizing Blockchain Consensus: Towards Deliberative and Unanimous Agreement. In Proceedings of the 21st International Conference on Security and Cryptography - Volume 1: SECRYPT; ISBN 978-989-758-709-2, SciTePress, pages 786-791. DOI: 10.5220/0012813400003767.

12. Matthew I. Swindall, **Kritagya Upadhyay**, James H. Brusuelas, Graham West, and John F. Wallin. 2024. Smart Digital Edition Management: A Blockchain Framework for Papyrology. In Proceedings of the 2024 Computers and People Research Conference (SIGMIS-CPR '24). Association for Computing Machinery, New York, NY, USA, Article 11, 1–10. https://doi.org/10.1145/3632634.3655860.

13. Thuan Nhan, **Kritagya Upadhyay**, and Khem Poudel. 2024. Towards Patient-Centric Healthcare: Leveraging Blockchain for Electronic Health Records. In Proceedings of the 2024 Computers and People Research Conference (SIGMIS-CPR '24). Association for Computing Machinery, New York, NY, USA, Article 13, 1–8. https://doi.org/10.1145/3632634.3655883.

14. S. Talapuru, R. Dantu, **K. Upadhyay**, S. Badruddoja, S. Zaman, "The Dark Side of the Metaverse: Why is it Falling Short of Expectations?," *2023 Fifth IEEE International Conference on Trust, Privacy and Security in Intelligent Systems and Applications (TPS-ISA).*

15. S. Zaman, R. Dantu, S. Badruddoja, S. Talapuru, **K. Upadhyay,** "Seamless Asset Exchange in Interconnected Metaverses: Unraveling On-Chain Atomic Swap," *2023 Fifth IEEE International Conference on Trust, Privacy and Security in Intelligent Systems and Applications (TPS-ISA).*

16. S. Zaman, R. Dantu, S. Badruddoja, S. Talapuru and **K. Upadhyay**, "Layerwise Interoperability in Metaverse: Key to Next-Generation Electronic Commerce," *2023 IEEE International Conference on Metaverse Computing, Networking and Applications (MetaCom)*, Kyoto, Japan, 2023, pp. 9-16, doi: 10.1109/MetaCom57706.2023.00018.

17. **K. Upadhyay**, R. Dantu, Y. He, S. Badruddoja and A. Salau, "Auditing Metaverse Requires Multimodal Deep Learning," *2022 IEEE 4th International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications (TPS-ISA),* Atlanta, GA, USA, 2022, pp.

39-46, doi: 10.1109/TPS-ISA56441.2022.00015.

18. A. Salau, R. Dantu, **K. Upadhyay**, S. Badruddoja, "Data Cooperatives for Trusted News Sharing in Social Media," *EAI BlockTEA 2022 - 2nd EAI International Conference on Blockchain Technology and Emerging Applications.*

19. S. Badruddoja, R. Dantu, Y. He, A. Salau, **K. Upadhyay**, "Scalable Smart Contracts for Linear Regression Algorithm," *EAI BlockTEA 2022 - 2nd EAI International Conference on Blockchain Technology and Emerging Applications.*

20. A. Salau, R. Dantu, K. Morozov, S. Badruddoja and **K. Upadhyay**, "Making Blockchain Validators Honest," *2022 Fourth International Conference on Blockchain Computing and Applications (BCCA)*, 2022, pp. 267-273, doi: 10.1109/BCCA55292.2022.9921952.

21. S. Badruddoja, R. Dantu, Y. He, M. Thompson, A. Salau and **K. Upadhyay**, "Trusted AI with Blockchain to Empower Metaverse," *2022 Fourth International Conference on Blockchain Computing and Applications (BCCA)*, 2022, pp. 237-244, doi: 10.1109/BCCA55292.2022.9922027.

22. S. Badruddoja, R. Dantu, Y. He, M. Thompson, A. Salau and **K. Upadhyay**, "Smarter Contracts to Predict using Deep-Learning Algorithms," *2022 Fourth International Conference on Blockchain Computing and Applications (BCCA),* 2022, pp. 280-288, doi: 10.1109/BCCA55292.2022.9922240.

23. S. Badruddoja, R. Dantu, Y. He, M. Thompson, A. Salau and **K. Upadhyay**, "Making Smart Contracts Predict and Scale," *2022 Fourth International Conference on Blockchain Computing and Applications (BCCA)*, 2022, pp. 127-134, doi: 10.1109/BCCA55292.2022.9922480.

24. Salau, A., Dantu, R., Morozov, K., **Upadhyay, K.**, & Badruddoja, S. (2022). Multi-Tier Reputation for Data Cooperatives. In *The 3rd International Conference on Mathematical Research for Blockchain Economy*.

25. Salau, A.; Dantu, R.; Morozov, K.; **Upadhyay, K.** and Badruddoja, S. (2022). Towards a Threat Model and Security Analysis for Data Cooperatives. In *Proceedings of the 19th International Conference on Security and Cryptography - SECRYPT,* ISBN 978-989-758-590-6; ISSN 2184-7711, pages 707-713. DOI: 10.5220/0011328700003283.

26. **K. Upadhyay**, R. Dantu, Y. He, A. Salau and S. Badruddoja, "Paradigm Shift from Paper Contracts to Smart Contracts," *2021 Third IEEE International Conference on Trust, Privacy and Security in Intelligent Systems and Applications (TPS-ISA),* 2021, pp. 261-268, doi: 10.1109/TPSISA52974.2021.00029.

27. **K. Upadhyay**, R. Dantu, Y. He, S. Badruddoja and A. Salau, "Can't Understand SLAs? Use the Smart Contract," *2021 Third IEEE International Conference on Trust, Privacy and Security in Intelligent Systems and Applications (TPS-ISA)*, 2021, pp. 129-136, doi: 10.1109/TPSISA52974.2021.00015.

28. **K. Upadhyay**, R. Dantu, Y. He, A. Salau and S. Badruddoja, "Make Consumers Happy by

Defuzzifying the Service Level Agreements," *2021 Third IEEE International Conference on Trust, Privacy and Security in Intelligent Systems and Applications (TPS-ISA)*, 2021, pp. 98-105, doi: 10.1109/TPSISA52974.2021.00011.

29. S. Badruddoja, R. Dantu, Y. He, **K. Upadhayay** and M. Thompson, "Making Smart Contracts Smarter," *2021 IEEE International Conference on Blockchain and Cryptocurrency (ICBC)*, 2021, pp. 1-3, doi: 10.1109/ICBC51069.2021.9461148.

30. A. Salau, R. Dantu and **K. Upadhyay**, "Data Cooperatives for Neighborhood Watch," *2021 IEEE International Conference on Blockchain and Cryptocurrency (ICBC)*, 2021, pp. 1-9, doi: 10.1109/ICBC51069.2021.9461056.

31. **K. Upadhyay**, R. Dantu, Z. Zaccagni and S. Badruddoja, "Is Your Legal Contract Ambiguous? Convert to a Smart Legal Contract," *2020 IEEE International Conference on Blockchain (Blockchain)*, 2020, pp. 273-280, doi: 10.1109/Blockchain50366.2020.00041.

32. S. Badruddoja, R. Dantu, L. Widick, Z. Zaccagni and **K. Upadhyay**, "Integrating DOTS With Blockchain Can Secure Massive IoT Sensors," *2020 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*, 2020, pp. 937-946, doi: 10.1109/IPDPSW50202.2020.00156.

MENTORSHIP AND ADVISING

Ph.D. Students
❖ Samir Poudel, Ph.D. Candidate, Computational and Data Science
   Middle Tennessee State University, Major Advisor, 2023 – Present
❖ Thuan Nhan, Ph.D. Candidate, Computational and Data Science
   Middle Tennessee State University, Committee Member, 2023 – Present

Master Students
❖ Nathan Lathrop, M.S. in Computer Science, Research Assistant
   Middle Tennessee State University, Advisor, Summer 2025 – Present

Undergraduate Student
❖ Eliza Danila, B.S. in Computer Science, Undergraduate Honors Thesis
   Middle Tennessee State University, Thesis Director and Major Advisor, 2024 – Present

OTHER PROFESSIONAL EXPERIENCE

Summer 2022	**Internship, CertiK**
2015 – 2016	**Subisu Cablenet Limited**
Summer 2015	**Internship, Thamel.Com**

HONORS / AWARDS

2023	**Best Research Paper Award**
	Awarded at 5th IEEE Int'l Conference on Trust, Privacy and Security (TPS-ISA)

2023	**Best Poster Award, Hot Topics in the Science of Security (HotSoS) 2023**
	Awarded by National Security Agency (NSA)

2023	**Outstanding Ph.D. Student Award**
	Awarded by Dept. of Computer Science and Eng., University of North Texas

2022	**Best Research Paper Award**
	Awarded at 4th Int'l Conference on Blockchain Computing & Applications

2022	**Outstanding Teaching Assistant Award Nomination**
	Nominated by Dept. of Computer Science and Eng., University of North Texas

2021	**NSA Innovation Award**
	Awarded by the Center for Academic Excellence and Research (CAE-R)

2018 – 2023	**Tuition Benefit Program Award**
	Awarded by University of North Texas

2018 – 2023	**College of Engineering Department Award**
	Awarded by College of Engineering, University of North Texas

GRANTS AND FUNDING

Funded Grants:

2025 – 2030	**NRT-QISE-AI: Middle Tennessee Interdisciplinary Graduate Research and Training in Quantum Information and AI - $2,000,000.00**
	NSF Award #2510274
	*PI: Wandi Ding; Co-PI: Abdul-Qayyum Khaliq, Jing Kong, Joshua Phillips, Hanna Terletska; **Senior Personnel: Kritagya Upadhyay** and Donglin Wang*
	Awarded by National Science Foundation – NSF Research Traineeship (NRT)

2024 – 2025	**Data Science Institute Seed Grant - $5,000.00**
	PI: Kritagya Upadhyay; *Co-PI: Arpan Sainju and Khem Poudel*
	Awarded by MTSU Data Science Institute, Middle Tennessee State University

Pending Grant Proposals:

2025	**SaTC 2.0: RES: Real-Time Multimodal AI for Trustworthy Smart Contract Security in the Metaverse - $542,318.00**
	PI: Kritagya Upadhyay; *Co-PI: Arpan Sainju, Yi Gu and Syed Badruddoja*
	Submitted to National Science Foundation – Secure & Trustworthy Cyberspace

TALKS AND PRESENTATIONS

Nov 2025   Blockchain & Secure Voting. *NepaleseInTech*, Discord.

Nov 2025   Scam and Cybersecurity Awareness. *MTSU Dames Club*, Middle Tennessee State University, TN, USA.

Apr 2025   QuadraCode AI and VulnFusion: Deep Learning Multimodal Representations for Advanced Smart Contract Vulnerability Detection. *2025 Tech Vision Conference, Jones College of Business*, Middle Tennessee State University, Murfreesboro, TN, USA.

July 2024   Blockchain, Smart Contracts and Applications. *2024 First ACM Chapter Meeting*, Department of Computer Science, Middle Tennessee State University, Murfreesboro, TN, USA.

June 2023   Paradigm Shift from Vague Legal Contracts to Blockchain-based Smart Contracts. *2023 CAE in Cybersecurity Symposium*, Seattle, WA, USA.

Dec 2022   Auditing Metaverse Requires Multimodal Deep Learning. *The 4th IEEE International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications*, Atlanta, GA, USA.

Nov 2022   Data Cooperatives for Trusted News Sharing in Social Media. *EAI BlockTEA 2022 - 2nd EAI International Conference on Blockchain Technology and Emerging Applications*, Copenhagen, Denmark.

Dec 2021   Paradigm Shift from Paper Contracts to Smart Contracts. *The 3rd IEEE International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications*, Atlanta, GA, USA.

Dec 2021   Can't Understand SLAs? Use the Smart Contract. *The 3rd IEEE International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications*, Atlanta, GA, USA.

Dec 2021   Make Consumers Happy by Defuzzifying the Service Level Agreements. *The 3rd IEEE International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications*, Atlanta, GA, USA.

Nov 2020   Is Your Legal Contract Ambiguous? Convert to a Smart Legal Contract. *The 3rd IEEE International Conference on Blockchain (Blockchain 2020)*, Rhodes Island, Greece.

PROFESSIONAL AFFILIATIONS AND SERVICES

Editorial Roles
❖ Guest Editor, Special Issue: Blockchain and Big Data Analytics, *Future Internet* Journal,

MDPI (2025)
❖ Guest Editor, Special Issue: AI for Cybersecurity and Emerging Technologies for Secure Systems, *Electronics* Journal, MDPI (2025)

Session Chair
❖ 2024 33rd International Conference on Computer Communications and Networks (ICCCN), Session Track 1 (Security, Privacy and Trust)

Technical Program Committee Member
❖ 7th International Congress on Blockchain and Applications (BLOCKCHAIN'25)
❖ 15th Annual Computing and Communication Workshop and Conference (CCWC 2025)
❖ 5th International Conference on Blockchain Computing and Applications (BCCA 2023)

Ad-hoc Reviewer
❖ 15th Annual Computing and Communication Workshop and Conference (CCWC 2025)
❖ Symmetry Journal, MDPI
❖ ACM SIGMIS-CPR '24: Proceedings of the 2024 Computers and People Research
❖ 5th International Conference on Blockchain Computing and Applications (BCCA 2023)
❖ 5th International Congress on Blockchain and Applications (BLOCKCHAIN'23)
❖ 2021 IEEE Information Theory Workshop (ITW), Kanazawa
❖ 26th Australasian Conference on Information Security and Privacy
❖ Information Processing & Management Journal, Elsevier

Professional Organization Member
❖ Professional Member, Institute of Electrical and Electronics Engineers (IEEE)
❖ Member, IEEE Young Professionals Affinity Group
❖ Member, Association for Computing Machinery (ACM)