

# Kritagya Raj Upadhyay | Curriculum Vitae

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## EDUCATION

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- 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

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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

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- 2023 – Present      **Assistant Professor (Tenure-Track)**  
Department of Computer Science,  
Middle Tennessee State University, Murfreesboro, Tennessee
- 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
- 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

Summer 2021

**Graduate Student Assistant**

Department of Computer Science and Engineering,  
University of North Texas

- Conducted administrative and technical tasks in the lab requested by the advisor

2011 – 2015

**Undergraduate Researcher**

Faculty of Management  
College of Applied Business, Tribhuvan University

- Research on secure online store management system

**PEER-REVIEWED PUBLICATIONS**

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1. S. Poudel, **K. Upadhyay** and J. Upadhya, “RBBD: A Representation-Based Framework for Edge-Case Backdoor Defense in Federated Learning”, *2025 IEEE 7<sup>th</sup> 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 15<sup>th</sup> 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 15<sup>th</sup> 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 15<sup>th</sup> 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 6<sup>th</sup> 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, *6<sup>th</sup> 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 - SECRIPT*, 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. Upadhyay** 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

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### 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

### Undergraduate Student

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

## OTHER PROFESSIONAL EXPERIENCE

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Summer 2022	<b>Internship, CertiK</b>
2015 – 2016	<b>Subisu Cablenet Limited</b>
Summer 2015	<b>Internship, Thamel.Com</b>

## HONORS / AWARDS

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- 2023      **Best Research Paper Award**  
Awarded at 5<sup>th</sup> 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 4<sup>th</sup> 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

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### 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

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- 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 4<sup>th</sup> 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 3<sup>rd</sup> 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 3<sup>rd</sup> 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 3<sup>rd</sup> 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 3<sup>rd</sup> IEEE International Conference on Blockchain (Blockchain 2020)*, Rhodes Island, Greece.

## PROFESSIONAL AFFILIATIONS AND SERVICES

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### Editorial Roles

- ❖ Guest Editor, Special Issue: Blockchain and Big Data Analytics, *Future Internet Journal*, MDPI (2025)

### Session Chair

- ❖ 2024 33<sup>rd</sup> International Conference on Computer Communications and Networks (ICCCN), Session Track 1 (Security, Privacy and Trust)

**Technical Program Committee Member**

- ❖ 7<sup>th</sup> International Congress on Blockchain and Applications (BLOCKCHAIN'25)
- ❖ 15<sup>th</sup> Annual Computing and Communication Workshop and Conference (CCWC 2025)
- ❖ 5<sup>th</sup> International Conference on Blockchain Computing and Applications (BCCA 2023)

**Ad-hoc Reviewer**

- ❖ 15<sup>th</sup> Annual Computing and Communication Workshop and Conference (CCWC 2025)
- ❖ Symmetry Journal, MDPI
- ❖ ACM SIGMIS-CPR '24: Proceedings of the 2024 Computers and People Research
- ❖ 5<sup>th</sup> International Conference on Blockchain Computing and Applications (BCCA 2023)
- ❖ 5<sup>th</sup> International Congress on Blockchain and Applications (BLOCKCHAIN'23)
- ❖ 2021 IEEE Information Theory Workshop (ITW), Kanazawa
- ❖ 26<sup>th</sup> 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)