

# 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, Legal Contracts, Fuzzy Logic, Natural Language Processing, Metaverse, Data Cooperatives, Cyber Security, Consensus Mechanisms in Blockchain, Quantum Computing and Communications

## RESEARCH AND TEACHING EXPERIENCE

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2023 – Present

### **Assistant Professor**

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

- Support for many undergraduate and graduate-level courses such as Intro to Computer Security, Intro to Computer Science and Programming in C++, Intro to Computer Networks, Foundations of Data Structures, Computer Forensic, Advance Network Security - Blockchain Development Course, Cryptography, Secure Software Systems, Secure E-Commerce
- Guidance to TAMS, Undergraduate and Graduate students on their research and senior design projects

2018 – 2023

**Doctoral Researcher**

Network Security Lab, University of North Texas

- Research on Ethereum-based Blockchain technologies, especially on Smart Contracts and Vague Legal Contracts
- Research on Metaverse and Application Development, Blockchain Interoperability, Blockchain for AI Fairness, Data Security with Data Cooperatives and Blockchain, ChatGPT and Natural Language Processing,
- Proposal writing for grants for NSA and NSF

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

**PUBLICATIONS**

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1. 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.
2. 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.
3. T. Hartman, S. Poudel, J. Upadhyay, 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.
4. 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.
5. J. Upadhyay, 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.
6. J. Upadhyay, **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.
  7. 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).
  8. 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: SECRIPT*; ISBN 978-989-758-709-2, SciTePress, pages 786-791. DOI: 10.5220/0012813400003767.
  9. 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>.
  10. 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>.
  11. 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)*.
  12. 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)*.
  13. 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.
  14. **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.
15. 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*.
  16. 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*.
  17. 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.
  18. 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.
  19. 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.
  20. 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.
  21. 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*.
  22. 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.
  23. **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.
  24. **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.

25. **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.
26. 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.
27. 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.
28. **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.
29. 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.

## 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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2024 – 2025	<b>Data Science Institute Seed Grant - \$5,000</b> Awarded by MTSU Data Science Institute, Middle Tennessee State University
2023	<b>Best Research Paper Award</b> Awarded at 5 <sup>th</sup> IEEE Int'l Conference on Trust, Privacy and Security (TPS-ISA)
2023	<b>Best Poster Award, Hot Topics in the Science of Security (HotSoS) 2023</b> Awarded by National Security Agency (NSA)
2023	<b>Outstanding Ph.D. Student Award</b> Awarded by Dept. of Computer Science and Eng., University of North Texas

2022	<b>Best Research Paper Award</b> Awarded at 4 <sup>th</sup> Int'l Conference on Blockchain Computing & Applications
2022	<b>Outstanding Teaching Assistant Award Nomination</b> Nominated by Dept. of Computer Science and Eng., University of North Texas
2021	<b>NSA Innovation Award</b> Awarded by the Center for Academic Excellence and Research (CAE-R)
2018 – 2023	<b>Tuition Benefit Program Award</b> Awarded by University of North Texas
2018 – 2023	<b>College of Engineering Department Award</b> Awarded by College of Engineering, University of North Texas

## PRESENTATIONS

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Jun 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 \_\_\_\_\_

### **Session Chair**

- ❖ 2024 33rd International Conference on Computer Communications and Networks (ICCCN), Session Track 1

### **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**

- ❖ IEEE
- ❖ ACM