Kritagya Raj Upadhyay | Curriculum Vitae

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

RESEARCH AND TEACHING EXPERIENCE

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

1. 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)*

2. 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)*

3. 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.

4. **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.

5. 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.

6. 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.*

7. 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.

8. 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.

9. 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.

10. 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.

11. 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*.

12. 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.

13. **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.

14. **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.

15. **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.

16. 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.

17. 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.

18. **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.

19. 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 _____

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

HONORS /AWARDS _____

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

PRESENTATIONS

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 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

Technical Program Committee Member
❖ 5th International Conference on Blockchain Computing and Applications (BCCA 2023)

Ad-hoc Reviewer
❖ 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
❖ IEEE Student