

Alakananda Mitra, Ph.D.

Research Assistant Professor

Nebraska Water Center, Institute of Agriculture and Natural Resources,
University of Nebraska-Lincoln, Lincoln, NE, 68588-6204, USA.

Visiting Computer Scientist

Adaptive Cropping Systems Laboratory (ACSL)

USDA-Agricultural Research Service, Beltsville, MD, 20705-2350, USA.

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Google Scholar : <https://scholar.google.com/citations?user=Wd3b59YAAAAJ&hl=en>

CURRENT JOB DUTY

Job Duty

- Leading software development at the joint multi-national effort of UNL and Adaptive Cropping Systems Laboratory (ACSL), USDA-ARS to further develop the crop and soil simulation models, graphical user interfaces, databases, and other suitable agro-climatology modeling tools.
- Building AI-based Crop Models.
- Precision Agriculture
- Climate Smart Agriculture

PREVIOUS EMPLOYMENT

May 2022 – June 2022

Research Assistant

SESL, Department of
Computer Science and
Engineering, University of
North Texas.

RESEARCH INTERESTS

- Solving real-world problems with AI and ML techniques and making AI solutions widely available, affordable, and more accessible to people.
- Application of AI/ ML, deep learning, and computer vision in Application-specific and IoT-based Systems and Edge Computing Platforms.
- AI-based Internet of Agricultural Things (IoAT) frameworks for addressing agricultural research issues and aspects.
- AI-based detection systems for Image Forensics (especially Deepfakes).

EDUCATION

University of North Texas, TX, USA.	Computer Science and Engineering GPA: 4.0/4.0 Dissertation: Machine Learning Methods for Data Quality Aspects in Edge Computing Platforms. Major Professor: Prof. Saraju P. Mohanty	Ph.D.	2022
University of Calcutta, India.	Radiophysics & Electronics GPA: 3.93/4.0 Thesis: Modeling of PIN Photodetector using Fuzzy Logic. Major Professor: Prof. N. R. Das	M.Tech.	2006
University of Calcutta, India.	Radiophysics & Electronics GPA: 3.77/4.0 Project: Modeling of IC Inductor using Fuzzy Logic.	B.Tech.	2004
Presidency College, University of Calcutta, India.	Major Professor: Prof. N. R. Das Physics GPA: 3.67/4.0	B.Sc. (Honors)	2001

AWARD AND HONORS

1. Wall Street Journal, July 16, 2024, [Deepfakes Expected to Magnify Bank Fraud - WSJ](#).
2. Deloitte Financial Service, May 29, 2024, [Deepfake banking and AI fraud risk | Deloitte Insights](#).
3. [Remote ID Proofing - Good practices — ENISA \(europa.eu\)](#), March 12, 2024.
4. [Best Paper Award](#) at the Research Demo Session at the 6th IFIP- International Internet of Things 2023 conference.
2. [IFIP- News](#): 2023 IFIP IoT Conference Explores Global Collaboration.
3. [Newsletter](#): University of North Texas, College of Engineering: College hosts international IoT conference exploring global collaboration.
4. [News Coverage](#): Academic deepfake research paper suggests liveness detection vulnerable | Biometric Update.
5. [Newsletter](#): University of North Texas, College of Engineering: Student, faculty receive award for research on deepfake media
6. [Outstanding Early-Stage Doctoral Student 2022](#), Department of Computer Science and Engineering, University of North Texas ([Merit-based](#))
7. IEEE ICC 2022 Student Grant Award, 2022 (Recommendation-based).
8. IEEE INFOCOM 2022 Student Conference Grant Award, 2022 (Recommendation-based).
9. [Best Paper Award](#) at the 19th OITS International Conference on Information Technology (OCIT), 2021.
10. IEEE-iSES-2021 Student fellowship Travel Grant for IEEE International Symposium on Smart Electronic Systems (iSES), 2021 (Recommendation-based).
11. [University of North Texas Student Travel Grant for GRACE HOPPER Celebration 2021](#) ([Merit-based](#)).
12. NSF Student Travel Grant for IEEE Computer Society International Symposium on VLSI (IEEE ISVLSI) 2021 (Recommendation-based).
13. Computer Science and Engineering Departmental Award, University of North Texas, TX, USA, SPRING 2021(Merit-based).
14. Tuition Benefit Scholarship, Toulouse Graduate School, University of North Texas, SPRING 2021 (Merit-based).
15. Computer Science and Engineering Departmental Award, University of North Texas, TX, USA, FALL 2020 (Merit-based).
16. Tuition Benefit Scholarship, Toulouse Graduate School, University of North Texas, FALL 2020 (Merit-based).
17. Computer Science and Engineering Departmental Award, University of North Texas, TX, USA, SPRING 2020 (Merit-based).
18. Tuition Benefit Scholarship, Toulouse Graduate School, University of North Texas, SPRING 2020 (Merit-based).
19. Skills Achievement Award in Cisco Networking Assistant, North Lake College, Dallas

- County, Texas, FALL 2016 (Merit-based).
20. Skills Achievement Award in Cisco Networking INTERN, North Lake College, Dallas County, Texas, FALL 2016 (Merit-based).
 21. [Graduate Aptitude Test in Engineering](#) Scholarship (GATE), All India Council for Technical Education (AICTE), 2004 (Scholarship for the total tenure of Master's).
 22. National Scholarship in Bachelor of Science, University of Calcutta, India, 2001 (Award).
 23. [Merit Certificate under National Scholarships Scheme](#), Education Department of Government of West Bengal, India, 1996 (Award).

PROFESSIONAL EXPERIENCE

PANELIST

1. IoT for Food Security and Healthcare, [6th IFIP International Internet of Things](#) 2023.
2. Women in Engineering, [6th IFIP International Internet of Things](#) 2023.
3. Navigating the Future: AI Applications in Research Libraries, [National Agricultural Library](#) 2024.

SESSION CHAIR

1. Hardware/Software Solutions for IoT and CPS, [6th IFIP International Internet of Things](#) 2023
2. IoT or CPS Applications – 2, [6th IFIP International Internet of Things](#) 2023.
3. Technologies for Smart Agriculture, [6th IFIP International Internet of Things](#) 2023.

PUBLICATION CHAIR

1. [21st OITS International Conference on Information Technology](#) 2023,
2. [22nd OITS International Conference on Information Technology](#) 2024.

REG. CHAIR

[6th IFIP International Internet of Things](#) 2023.

TECH. PROG. COMMITTEE MEMBER

1. [7th IFIP International Internet of Things](#) 2024.
2. 6th International Conference on Computational Intelligence and Data Engineering, 2024.

REVIEWER

IEEE Transactions on Big Data 2024.
Plant Methods 2024.
Journal of Agricultural and Food Chemistry 2024.

Elsevier 2024, 2023, 2022.
MDPI 2024, 2023.
SN Computer Science 2024, 2023, 2022, 2021, 2020.
Journal of Visual Communication and Image Representation, 2023.
PeerJ Computer Science 2024.
Journal of Computer and Communications 2023.
Geocarto International, Taylor & Francis 2022.
ACM Journal on Emerging Technology in Computing Systems 2022.
IEEE Consumer Electronics Magazine 2021.
Social Media and Society 2024, 2023, 2021.
Applied Artificial Intelligence 2022.
6th International Conference on Computer Science and Application Engineering (CSAE), Nanjing, China 2022.

ISTRUCTOR

NSF Funded Interdisciplinary Project “Easy-Med” 2022-2023.

INVITED LECTURES AND PRESENTATION

INVITED LECTURES

1. A Novel Machine Learning-based Method for Cotton Yield Prediction, Sustainable Agricultural Development with Climate Smart Systems Conference, July 2024.
2. Smart Agriculture – Demystified, in the 6th IFIP International Internet of Things (IoT) Conference (IFIP-IoT), November 2023.
3. Smart Agriculture, NSF funded multi-disciplinary project “Easy-Med”, University of North Texas, May 2023.
4. Artificial Intelligence, NSF funded multi-disciplinary project “Easy-Med”, University of North Texas, May 2023.
5. Artificial Intelligence, NSF funded multi-disciplinary project “Easy-Med”, University of North Texas, May 2022.
6. Data Quality Assurance in IoT Enabled Systems, University of North Texas, March 2022.
7. Artificial Intelligence and Machine Learning, University of North Texas, February 2022.

8. Artificial Intelligence Machine Learning- Basics and Applications, Invited Lecture, at Summer Training of NSF Funded Interdisciplinary Project “Easy-Med”, University of North Texas, May 2021.
 9. Integrated Circuit Synthesis and EDA Tools Tutorial, University of North Texas, November 2021.
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PRESENTATIONS

10. Geospatial Corn Yield Forecasting: A Location-Adaptive Approach, AGU Fall Meeting, December 2024.
11. Harnessing Deep Learning for Plant Growth Prediction, ASA, CSSA, SSSA International Annual Meeting, November 2024.
12. Field to Fiber: AI-Driven Cotton Yield Predictions, USDA ARS AI Forum, November 2024.
13. ToEFL: A Novel Approach for Training on Edge for Smart Agriculture, Great Lakes Symposium on VLSI 2024 (GLSVLSI '24), Clearwater, FL, USA, June 14, 2024.
14. A Novel Machine Learning Approach for Cotton Yield Prediction, AGU Fall Meeting, December 2023.
15. iLog 2.0: A Novel Method for Food Nutritional Value Automatic Quantification in Smart Healthcare, IEEE International Symposium on Smart Electronic Systems, December 2022.
16. EasyDeep: An IoT-friendly robust detection method for GAN generated deepfake images in social media, the 4th IFIP International Internet of Things (IoT) Conference (IFIP-IoT), Amsterdam, Netherlands, November 2021.
12. Detection of deep-morphed deepfake images to make robust automatic facial recognition systems, the 19th OITS International Conference on Information Technology (OCIT), December 2021.
13. iFace: A Deepfake Resilient Digital Identification Framework for Smart Cities, IEEE International Symposium on Smart Electronic Systems (iSES), December 2021.
14. A Novel Machine Learning based Method for Deepfake Video Detection in Social Media, IEEE International Symposium on Smart Electronic Systems (iSES), December 2020.
15. A simplified approach to model an IC Inductor on Si substrate, General Assembly of International Union of Radio Science (URSI) India, October 2005.
17. Modeling of pin Photodetector using Fuzzy Logic, 3rd International Conference on Computers and Devices for Communication (CODEC-06) India, December 2006.

MENTORING

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1. Undergraduate Student, Computer Science, University of Nebraska-Lincoln, Spring 2024- Present.
 2. Ph.D. Student, Computer Science & Engineering, University of North Texas, Fall 2024- Present.
 3. Ph.D. Student, Computer Science & Engineering, University of North Texas, Fall 2024- Present.
 4. Ph.D. Student, Computer Science & Engineering, University of North Texas, Fall 2023- Fall 2024.
 5. M.S Student., Computer Science & Engineering, University of North Texas, Fall 2022 – Spring 2024.
 6. M.S. Student, Computer Science & Engineering, University of North Texas, Fall 2022 – Fall 2023, Spring 2024-Present.
 7. Ph.D. Student, Computer Science & Engineering, University of North Texas, Fall 2022 – Spring 2023, Summer 2024-Present.
 8. B. S. Student, Computer Science & Engineering, University of North Texas, Spring 2022.
 9. Texas Academy of Math. and Science (TAMS) Student, University of North Texas, Fall 2022 – Spring 2023.
 10. Texas Academy of Math. and Science (TAMS) Student, University of North Texas, Fall 2022.
 11. Texas Academy of Math. and Science (TAMS) Student, University of North Texas, Spring 2022 – Summer 2022.
 12. Texas Academy of Math. and Science (TAMS) Student, University of North Texas, Fall 2021 –Spring 2022.

PATENTS & PUBLICATIONS

PATENTS

1. S. P. Mohanty, E. Kougiannos, and **A. Mitra**, [Method for Synthetic Video/Image Detection](#), US 2024/0153306 A1, Publication Date: May 9, 2024.
2. S. P. Mohanty, E. Kougiannos, and **A. Mitra**, [System to Assist Farmers](#), USA Patent Application Number: 18/755,561, Filed: June 28, 2024.

ARTICLES

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1. **A. Mitra**, S. Beegum, D. Fleisher, V. R. Reddy, W. Sun, C. Ray, D. Timlin, and A. Malakar, "Cotton Yield Prediction: A Machine Learning Approach with Field and Synthetic Data", IEEE Access, DOI: [10.1109/ACCESS.2024.3418139](https://doi.org/10.1109/ACCESS.2024.3418139)
 2. D.H. Fleisher, D.J. Timlin, Z. Wang, S. Beegum, W. Sun, S. Li, J. Barnaby, **A. Mitra**, S. Yesilkoy, E. Han, and V.R. Reddy, "Current crop models: State-of-the-art and future developments" **Book Chapter 02**- USDA-ARS Adaptive Cropping Systems Laboratory Crop and Soil Models, Burleigh Dodds Science Publishing [**In Print**].
 3. **Alakananda Mitra**, Saraju P. Mohanty, and Elias Kougianos, "The World of Generative AI: Deepfakes and Large Language Models." *arXiv preprint arXiv:2402.04373* (2024).
 4. **A. Mitra**, S. P. Mohanty, and E. Kougianos, "aGROdet 2.0: An Automated Real Time Approach for Multiclass Plant Disease Detection", *Springer Nature Computer Science (SN-CS)*, Vol. 4, No. 5, Sep 2023, Article: 657, 20-pages, DOI: <https://doi.org/10.1007/s42979-023-02076-6>.
 5. Chinna Gopi Simhadri, Hari Kishan Kondaveeti, Valli Kumari Vatsavayi, **Alakananda Mitra**, Preethi Ananthachari, "Deep learning for rice leaf disease detection: A systematic literature review on emerging trends, methodologies and techniques", *Information Processing in Agriculture*, 2024, ISSN 2214-3173, DOI: [10.1016/j.inpa.2024.04.006](https://doi.org/10.1016/j.inpa.2024.04.006).
 6. **A. Mitra**, Alakananda, Sahila Beegum, David Fleisher, Vangimalla R. Reddy, Wenguang Sun, Chittaranjan Ray, Dennis Timlin, and Arindam Malakar. "Cotton Yield Prediction Using Random Forest." *arXiv preprint arXiv:2312.02299* December 2023.
 7. **A. Mitra**, D. Bigioi, S. P. Mohanty, P. Corcoran, and E. Kougianos, "iFace 1.1: A Proof-of-Concept of a Facial Authentication Based Digital ID for Smart Cities", *IEEE Access Journal*, Vol. 10, 2022, pp. 71791–71804, DOI: <https://doi.org/10.1109/ACCESS.2022.3187686>.
 8. **A. Mitra**, A. Singhal, S. P. Mohanty, E. Kougianos, and C. Ray, "eCrop: A Novel Framework for Automatic Crop Damage Estimation in Smart Agriculture", *Springer Nature Computer Science (SN-CS)*, Vol. 3, No. 319, 2022, Article: NN, 16-pages, DOI: <https://doi.org/10.1007/s42979-022-01216-8>.
 9. **A. Mitra**, S. L. T. Vangipuram, A. K. Bapatla, V. K. V. V. Bathalapalli, S. P. Mohanty, E. Kougianos, and C. Ray, "Everything You wanted to Know about Smart Agriculture", *arXiv Computer Science*, [arXiv:2201.04754](https://arxiv.org/abs/2201.04754), Jan 2022, 45-pages.
 10. **A. Mitra**, S. P. Mohanty, P. Corcoran, and E. Kougianos, "A Machine Learning based Approach for Social Media Deepfake Video Detection through Key Video Frame Extraction", *Springer Nature Computer Science Journal*, 2021, Vol. 2, No. 2, Article: 99, 18-pages, DOI: <https://doi.org/10.1007/s42979-021-00495-x>.
 11. N. R. Das, **A. Mitra**, "A New Approach to the Modelling of Si-RFIC Inductor", *Microwave and Optical Technology Letters*, Vol.48. No.6, June 2006, pp.1095- 1101, DOI: <https://doi.org/10.1002/mop.21610>.

CONFERENCE PROCEEDINGS

12. **Alakananda Mitra**, Saraju P. Mohanty, and Elias Kougiianos, “ToEFL: A Novel Approach for Training on Edge for a Smart Agriculture,” Great Lakes Symposium on VLSI 2024 (GLSVLSI '24), June 12–14, 2024, Clearwater, FL, USA. ACM, New York, NY, USA, 6 pages. DOI: [10.1145/3649476.3660381](https://doi.org/10.1145/3649476.3660381).
13. H. K. Kondaveeti, S. A. Athar, G. B. Sai, V. K. Vatsavayi, **A. Mitra**, and P. Ananthachari, “Federated Learning for Smart Agriculture: Challenges and Opportunities,” *Third International Conference on Distributed Computing and Electrical Circuits and Electronics (ICDCECE)*, Ballari, India, 2024, pp. 1-7, DOI: [10.1109/ICDCECE60827.2024.10548604](https://doi.org/10.1109/ICDCECE60827.2024.10548604).
14. **A. Mitra**, S. Beegum, D. Fleisher, V. R. Reddy, W. Sun, C. Ray, D. Timlin, and A. Malakar, “A Novel Machine Learning Approach for Cotton Yield Prediction”, AGU Fall Meeting, 2023, DOI: [10.22541/essoar.170365314.45002421/v1](https://doi.org/10.22541/essoar.170365314.45002421/v1).
15. **A. Mitra**, S. P. Mohanty, and E. Kougiianos, “Smart Agriculture – Demystified”, in *Internet of Things. Advances in Information and Communication Technology. IFIP- IoT*, 2023, vol. 684, pp. 405-411, DOI: [10.1007/978-3-031-45878-1_28](https://doi.org/10.1007/978-3-031-45878-1_28).
16. K. Kethineni, **A. Mitra**, S. P. Mohanty, and E. Kougiianos, “WeedOut: An Autonomous Weed Sprayer in Smart Agriculture Framework using Semi-Supervised Non-CNN Annotation”, *Internet of Things. Advances in Information and Communication Technology. IFIP-IoT* 2023, vol 684, pp. 415-423. DOI: [10.1007/978-3-031-45878-1_29](https://doi.org/10.1007/978-3-031-45878-1_29).
17. C. Dockendorf, **A. Mitra**, S. P. Mohanty, and E. Kougiianos, “Lite-Agro: Exploring Light- Duty Computing Platforms for IoAT-Edge AI in Plant Disease Identification”, in *Internet of Things. Advances in Information and Communication Technology. IFIP- IoT* 2023, vol 684, pp. 371-380. DOI: [10.1007/978-3-031-45882-8_25](https://doi.org/10.1007/978-3-031-45882-8_25). **(Best Paper @ Research Demo Session)**
18. A. Alkinani, **A. Mitra**, S. P. Mohanty, and E. Kougiianos, “FruitPAL: A Smart Healthcare Framework for Automatic Detection of Fruit Allergens”, in Proceedings of the IEEE International Symposium on Smart Electronic Systems (iSES), 2023, DOI: [10.1109/iSES58672.2023.00081](https://doi.org/10.1109/iSES58672.2023.00081).
19. A. Alkinani, **A. Mitra**, S. P. Mohanty, and E. Kougiianos, “FruitPAL 2.0: A Smart Healthcare Framework for Automatic Monitoring of Fruit Consumption”, in Proceedings of the OITS International Conference on Information Technology (OCIT), 2023, Raipur, India, 2023, pp. 422-425, DOI: [10.1109/OCIT59427.2023.10430648](https://doi.org/10.1109/OCIT59427.2023.10430648).
20. C. Dockendorf, **A. Mitra**, S. P. Mohanty, and E. Kougiianos, “Lite-Agro 2.0: Integrating Federated and TinyML in Pear Disease Classification IoAT-Edge AI”, in Proceedings of the IEEE International Symposium on Smart Electronic Systems (iSES), 2023, pp. 429-432, DOI: [10.1109/iSES58672.2023.00096](https://doi.org/10.1109/iSES58672.2023.00096).
21. **A. Mitra**, S. P. Mohanty, and E. Kougiianos, “A Smart Agriculture Framework to Automatically Track the Spread of Plant Diseases using Mask Region-based Convolutional Neural Network”, in Proceedings of the IFIP International Internet of Things Conference (IFIP-IoT), 2022, pp. 68–85, DOI: https://doi.org/10.1007/978-3-031-18872-5_5.
22. **A. Mitra**, S. Goel, S. P. Mohanty, E. Kougiianos, and L. Rachakonda, “iLog 2.0: A Novel

- Method for Food Nutritional Value Automatic Quantification in Smart Healthcare”, in *Proceedings of the IEEE International Symposium on Smart Electronic Systems (iSES)*, 2022, pp. 683–688, DOI: [10.1109/iSES54909.2022.00152](https://doi.org/10.1109/iSES54909.2022.00152).
23. **A. Mitra**, S. P. Mohanty, and E. Kougianos, “aGROdet: A Novel Framework for Plant Disease Detection and Leaf Damage Estimation”, in Proceedings of the IFIP International Internet of Things Conference (IFIP-IoT), 2022, pp. 3–22, DOI: https://doi.org/10.1007/978-3-031-18872-5_1.
 24. **Alakananda Mitra**, Saraju P. Mohanty, Peter Corcoran, and Elias Kougianos, “Detection of Deep-morphed Deepfake Images to Make Robust Automatic Facial Recognition Systems”, In Proceedings of the 19th OITS International Conference on Information Technology (OCIT), 2021, DOI: <https://doi.org/10.1109/OCIT53463.2021.00039>. (**Best Paper**)
 25. **Alakananda Mitra**, Saraju P. Mohanty, Peter Corcoran, and Elias Kougianos, “iFace: A Deepfake Resilient Digital Identification Framework for Smart Cities”, In Proceedings of IEEE International Symposium on Smart Electronic Systems (iSES), 2021, DOI: <https://doi.org/10.1109/iSES52644.2021.00090>. (Nominated for Best Paper)
 26. **Alakananda Mitra**, Saraju P. Mohanty, Peter Corcoran, and Elias Kougianos, “EasyDeep: An IoT Friendly Robust Detection Method for GAN Generated Deepfake Images in Social Media”, In Proceedings of the 4th IFIP International Internet of Things (IoT) Conference (IFIP-IoT), 2021, DOI: https://doi.org/10.1007/978-3-030-96466-5_14.
 27. **A. Mitra**, S.P. Mohanty, P. Corcoran, E. Kougianos: “A Novel Machine Learning based Method for Deepfake Video Detection in Social Media”, In Proceeding of IEEE International Symposium on Smart Electronic Systems (iSES), 2020, pp. 91-96, DOI: <https://doi.org/10.1109/iSES50453.2020.00031>.
 28. N. R. Das & **Alakananda Mitra** “Modeling of pin Photo-detector using Fuzzy Logic”, In Proceedings of the 3rd International Conference on Computers and Devices for Communication (CODEC-06), India, 2006, pp. 461-464.
 29. N. R. Das, **Alakananda Mitra**, and Amit Maji, “A Simplified Approach to Model an IC Inductor on Si Substrate”, In Proceeding of General Assembly of International Union of Radio Science (URSI), India, 2005.

CERTIFICATIONS

Graduate Student Teaching Excellence Program (GSTEP)	MAY 2022
Cisco Certified Network Associate (CCNA)	MAY 2017

PROFESSIONAL SOCIETY MEMBERSHIPS

Institute of Electrical and Electronics Engineers (IEEE)
 IEEE Women in Engineering
 American Geophysical Union (AGU)

