CHETRAJ PANDEY

Ph.D. Student,
Dept. of Computer Science,
Georgia State University, Atlanta, GA, USA.

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Education

Jan, 2021 – Present
- **Ph.D. in Computer Science**, Georgia State University, Atlanta, GA, USA.
  Advised by: *Dr. Berkay Aydin*

Jan, 2021 – Aug, 2024
- **M.S Computer Science**, Georgia State University, Atlanta, GA, USA.
  (Requirements completed; Degree not conferred yet.)

Nov, 2013 – Aug, 2017
- **B.E. Computer Engineering**, Tribhuvan University, IOE, ERC, Dharan, Nepal.

Research Interests

Interpretable/Explainable Deep Learning Multimodal Learning Spatiotemporal Modeling

Work Experience

Research Experience

Jan, 2021 – Present
- **Research Assistant,** Data Mining Lab, Georgia State University.
  Leading a project on developing deep learning-based models for solar flare prediction and developing novel techniques in computer science to solve the problems in solar physics and space weather forecasting applications.

May, 2019 – Dec, 2020
- **Research Project Coordinator,** Research and Innovation Unit, HCOE.
  Supervised research-oriented projects of undergraduate students in computer and electronics engineering, Tribhuvan University, Himalaya College of Engineering (HCOE), Lalitpur, Nepal.

Teaching Experience

Jan, 2024 – Apr, 2024
- **Teaching Fellow,** Georgia State University, Atlanta, GA, USA.
  ★ Spring 2024, CSC 4780/6780 & DSCI 4780, undergraduate & graduate students, Fundamentals of Data Science.

Apr, 2020 – Dec, 2020
- **Lecturer,** Tribhuvan University, Himalaya College of Engineering, Nepal.
  ★ Spring 2020, BCT Juniors, Artificial Intelligence.
  ★ Spring 2020, BEX Sophomores, Discrete Mathematics.

Apr, 2018 – Mar, 2020
- **Assistant Lecturer,** Tribhuvan University, Himalaya College of Engineering.
  ★ Fall 2019, B.Sc. CSIT Juniors, Artificial Intelligence.
  ★ Fall 2019, BCE Freshmen, Computer Programming.
  ★ Spring 2019, BCT Juniors, Artificial Intelligence.
  ★ Spring 2019, BEX Sophomores, Discrete Mathematics.
  ★ Fall 2018, BCE Freshmen, Computer Programming.
  ★ Spring 2018, BEX Sophomores, Discrete Mathematics.
  ★ Spring 2018, BCT Sophomores, Numerical Methods.

Work Experience (continued)

Sept, 2018 – Dec, 2020
- **Instructor / Co-founder,** Line Academy, Kupondole, Lalitpur, Nepal.
  - ★ Computer Programming in C and Fortran

Dec, 2017 – Apr, 2018
- **Part-time Instructor,** Tribhuvan University, KEC, Kalimati, Lalitpur, Nepal.
  - ★ Fall 2017, BCT Freshmen, Computer Programming.

Publications

Journal Articles

1. K. Whitman, R. Egeland, I. G. Richardson, ..., **C. Pandey**, and et al., "Review of solar energetic particle models," *Advances in Space Research*, Aug. 2023. DOI: 10.1016/j.asr.2022.08.006.
2. **C. Pandey**, A. Ji, R. A. Angryk, M. K. Georgoulis, and B. Aydin, "Towards coupling full-disk and active region-based flare prediction for operational space weather forecasting," *Frontiers in Astronomy and Space Sciences*, vol. 9, Aug. 2022. DOI: 10.3389/fspas.2022.897301.

Conference Proceedings

1. **C. Pandey**, R. A. Angryk, and B. Aydin, "Unveiling the potential of deep learning models for solar flare prediction in near-limb regions," in *2023 International Conference on Machine Learning and Applications (ICMLA)*, IEEE, Dec. 2023. DOI: 10.1109/icmla58977.2023.00103.
2. J. Hong, **C. Pandey**, A. Ji, and B. Aydin, "An innovative solar flare metadata collection for space weather analytics," in *2023 International Conference on Machine Learning and Applications (ICMLA)*, Dec. 2023, pp. 408–413. DOI: 10.1109/ICMLA58977.2023.00063.
3. J. Hong, A. Ji, **C. Pandey**, and B. Aydin, "Enhancing solar flare prediction with innovative data-driven labels," in *2023 IEEE 5th International Conference on Cognitive Machine Intelligence (CogMI)*, IEEE, Nov. 2023. DOI: 10.1109/cogmi58952.2023.00035.
4. **C. Pandey**, R. A. Angryk, M. K. Georgoulis, and B. Aydin, "Explainable deep learning-based solar flare prediction with post hoc attention for operational forecasting," in *Discovery Science*, Cham: Springer Nature Switzerland, Oct. 2023, pp. 567–581. DOI: 10.1007/978-3-031-45275-8_38.
5. **C. Pandey**, A. Ji, T. Nandakumar, R. A. Angryk, and B. Aydin, "Exploring deep learning for full-disk solar flare prediction with empirical insights from guided grad-cam explanations," in *2023 IEEE 10th International Conference on Data Science and Advanced Analytics (DSAA)*, IEEE, Oct. 2023. DOI: 10.1109/dsaa60987.2023.10302639.
6. **C. Pandey**, R. A. Angryk, and B. Aydin, "Explaining full-disk deep learning model for solar flare prediction using attribution methods," in *European Conference on Machine Learning and Knowledge Discovery in Databases: ADS Track, ECML PKDD*, Cham: Springer Nature Switzerland, Sep. 2023, pp. 72–89. DOI: 10.1007/978-3-031-43430-3_5.
7. **C. Pandey**, A. Ji, R. A. Angryk, and B. Aydin, "Towards interpretable solar flare prediction with attention-based deep neural networks," in *2023 IEEE Sixth International Conference on Artificial Intelligence and Knowledge Engineering (AIKE)*, IEEE, Sep. 2023. DOI: 10.1109/aike59827.2023.00021.
8. J. Hong, A. Ji, **C. Pandey**, and B. Aydin, "Beyond traditional flare forecasting: A data-driven labeling approach for high-fidelity predictions," in *Big Data Analytics and Knowledge Discovery*, Springer Nature Switzerland, Aug. 2023, pp. 380–385. DOI: 10.1007/978-3-031-39831-5_34.
9. **C. Pandey**, R. Angryk, and B. Aydin, "Deep neural networks based solar flare prediction using compressed full-disk line-of-sight magnetograms," in *Information Management and Big Data*, Springer International Publishing, 2022, pp. 380–396. DOI: 10.1007/978-3-031-04447-2_26.

10 **C. Pandey**, R. A. Angryk, and B. Aydin, "Solar flare forecasting with deep neural networks using compressed full-disk HMI magnetograms," in *2021 IEEE International Conference on Big Data (Big Data)*, IEEE, Dec. 2021, pp. 1725–1730. DOI: 10.1109/bigdata52589.2021.9671322.

Posters

1 **C. Pandey**, T. Adeyeha, T. Nandakumar, A. Rafal, and B. Aydin, *Insights into deep learning-based full-disk solar flare prediction with post hoc explanation and evaluation*, 2023, EarthCube 2023 - A Geoscience and Cyberinfrastructure Workshop. DOI: 10.13140/RG.2.2.34673.97124.

2 **C. Pandey**, M. K. Georgoulis, B. Aydin, R. A. Angryk, and A. Ji, *Exploring heuristics in full-disk aggregation from individual active region prediction of solar flares*, Jul. 2022, p. 3457. DOI: 10.13140/RG.2.2.34673.97124.

3 **C. Pandey**, A. Ji, R. Angryk, and B. Aydin, *Training and Deployment of Predictive Models for Space Weather Forecasting: An Application on Full-disk and Active Region-based Flare Prediction*, Dec. 2021, AGU Fall Meeting Abstracts, SH55A–1825. URL: https://agu2021fallmeeting-agu.ipostersessions.com/Default.aspx?s=5F-7A-C4-11-FE-CA-94-F0-F0-DF-63-FE-6F-17-3E-99.

Skills and Graduate Coursework

Technical Skills

Programming Language	• Python, C, C++, and MATLAB.
Databases	• MySQL and PostgreSQL.
Web Development	• HTML, CSS, JavaScript, and Django.
Libraries and Framework	• Numpy, Pandas, Matplotlib, Scikit-Learn, Pytorch, Tensorflow, and Keras.
Tools and Environment	• Git, Github, LaTeX, Docker, Google Cloud Platform (GCP), and HPCE.

Graduate Courseworks

Spring, 2021	• Advanced Machine Learning, Database Systems, Computer Science Teaching Pedagogy, and Seminar in Computer Science.
Fall, 2021	• Advanced Deep Learning, Digital Image Processing, and Fundamentals of Data Science.
Spring, 2022	• Advanced Computer Networks and Computer Vision.
Fall, 2022	• Advanced Topics in Deep Learning and Advanced Data Mining.

Awards and Certifications

Awards and Achievements

Jun 27–28, 2023	• **Early-career Travel Award** , EarthCube 2023, Building Upon the EarthCube Community: A Geoscience and Cyberinfrastructure Workshop.
May, 2021– Aug, 2022	• Second Century Initiative (2CI), **University Doctoral Fellowship**, Georgia State University.
Jul, 2016 – Jun, 2017	• 4th Committee **President,** Association of Computer Engineering Students (ACES), Purwanchal Campus, Dharan, Nepal.
Nov, 2013 – Aug, 2017	• **Full Governmental Scholarship on Merit**, Bachelors in Computer Engineering at Tribhuvan University, Institute of Engineering, Dharan, Nepal.

Certifications

Jul 14, 2020	• Neural Networks and Deep Learning, Coursera. [certificate].

Awards and Certifications (continued)

- Oct 2, 2020 — Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization. [certificate].
- Oct 19, 2020 — Structuring Machine Learning Projects, Coursera. [certificate].
- Mar 18, 2021 — Research Administrators Conduct of Research Course 1, CITI Program. [certificate].

Service to Profession

- 2024 — **External Reviewer**, 27th International Conference on Pattern Recognition (ICPR), 2024.
- 2023 — **Reviewer**, International Conference on Machine Learning and Applications (ICMLA), 2023.
- **Session Chair**, Session 21B, International Conference on Machine Learning and Applications (ICMLA), 2023.

References

Dr. Berkay Aydin
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Dr. Rafal A. Angryk
Distinguished University Professor,
Dept. of Computer Science,
Georgia State University, Atlanta, GA, USA
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