Chahat Raj

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chahatraj.github.io

Research Interests

Social Computing, Antisocial Computing, Deep Learning, Social Media and Networks, Data Multimodality

Education

- **George Mason University** — Fairfax, VA
  Doctor of Philosophy, Computer Science — *Aug. 2022 – May 2027 (Exp.)*

- **Delhi Technological University** — Delhi, India
  Master of Technology, Information Systems (Research Track) — *Aug. 2019 – Aug. 2021*
  Thesis: Deep Neural Networks towards Multimodal Information Credibility Assessment

- **Indira Gandhi Delhi Technical University for Women** — Delhi, India
  Bachelor of Technology, Computer Science and Engineering — *Aug. 2015 – May 2019*

Experience

- **University of Technology Sydney** — Sydney, Australia
  Research Associate | Visiting Scholar — *Jun. 2021 - Present*
  - Examined key hypotheses to identify the relationship between disaster relief fundraising and social media Key Performance Indicators, identified and analyzed Facebook users' perception towards multimedia posts (in collaboration with the Australian Red Cross Society)
  - Performed EDA & sentiment analysis on Red-Cross donation data for the Australian bushfire period, identified people's donation behavior triggered by users' social media activity, identified practical implications to promote healthy fundraising behavior among social media users
  - Reviewed scientific literature to aid the development of a diversity inclusive coursework for Australian aboriginal and indigenous communities to incorporate AI and ML usage in their lifestyle
  - Developed neural network architectures for web information pollution detection (cyberbullying, hate & offensive speech) in multimodal data
  - Reviewed the state-of-the-art literature in vertigo diagnosis and performed 150+ ML experiments determining critical medical tests for clinical inferences and efficient diagnosis of episodic spontaneous vertigo

- **Delhi Technological University** — Delhi, India
  Graduate Researcher — *Aug. 2019 - Present*
  - Developed antisocial content detection frameworks by employing and optimizing deep neural networks, traditional supervised, semi-supervised, and unsupervised machine learning algorithms for fake news, rumor, misinformation, disinformation, infodemic, celebrity death hoax, fake videos and clickbait identification on online and social media
  - Collected real-world misinformation datasets- COronaVirus Infodemic Dataset (CovID I & II), Fake News Video Dataset, a questionnaire-based survey for Infodemic Impact Analysis

- **Indian Institute of Management Raipur** — Chhattisgarh, India
  Remote Researcher — *May 2021 - Aug. 2021*
  - Employed neural networks for stock market & cryptocurrencies' price prediction & analyzed financial behaviour of markets and their causal relationship with societal events
  - Optimized Taylor series approximation and copula for real-time multivariate time-series to predict Bitcoin returns
  - Developed a novel LSTM autoencoder with False Nearest Neighbor regularizer, identifying two social deterministic factors causing fluctuation in bitcoin prices

- **Centre for Railway Information Systems (CRIS)** — New Delhi, India
  Information Security Intern — *May 2018 - Aug. 2018*
  - Performed organizational defense, malicious activity detection, log analysis, vulnerability assessment patch generation using Cisco's Security Information and Event Management for North-Indian railway website

- **Indira Gandhi Delhi Technical University for Women** — Delhi, India
  Research Intern — *Aug. 2017 - Dec. 2017*
  - Identified zero-day vulnerabilities on Facebook, Instagram, & Telegram apps, identified phishing websites and implemented their retraction mechanism from scratch to ensure online security on social networking sites

Publications

- **Chahat Raj** and Priyanka Meel. "People Lie, Actions Don't! Modeling Infodemic Proliferation Predictors among Social Media Users." *Technology in Society 2022, 68, 101930.* (Impact Factor: **4.192**)
- **Chahat Raj** and Priyanka Meel. "ARCNN Framework for Multimodal Infodemic Detection." *Neural Networks 2021, 146, 36-68.* (Impact Factor: **8.050**)
- **Chahat Raj** and Priyanka Meel. "ConvNet Frameworks for Multimodal Fake News Detection." *Applied Intelligence 2021, 1-17.* (Impact Factor: **5.086**)
- **Chahat Raj** and Priyanka Meel. "Microblogs Deception Detection using BERT and Multiscale CNNs." *IEEE GCAT 2021*
- **Chahat Raj** and Priyanka Meel. "Is Dynamic Rumor Detection on Social Media Viable? An Unsupervised Perspective." *2021.* (Under Review)
- **Chahat Raj** and Priyanka Meel. "A Review of Web Infodemic Analysis and Detection Trends across Multi-modalities using Deep Neural Networks." *2021.* (Under Review)
- **Chahat Raj** and Mihir P Mehta. "MediaEval 2020: An Ensemble-based Multimodal Approach for Coronavirus and 5G Conspiracy Tweet Detection." *MediaEval, CEUR Workshop Proceedings 2020*
- **Chahat Raj** and Priyanka Meel. "Fake News on Multiple Online Social Networks." *ICPCCAI 2020, 1-8.*
- **Chahat Raj**, Ayush Agarwal, Gnana Bharathy, Bhuva Narayan and Mukesh Prasad. "Cyberbullying Detection: Hybrid Models Based on Machine Learning and Natural Language Processing Techniques." *Electronics 2021, 10(22), 2810.* (Impact Factor: **2.397**)
- **Chahat Raj** and Manojit Chattopadhyay. "Bitcoin Price Prediction using LSTM Autoencoder Regularized by False Nearest Neighbor Loss." *2021.* (Under Review)
- Vivek Velivela, **Chahat Raj**, Mahendra Samarawickrama and Mukesh Prasad. "The Effectiveness of Social Media Engagement Strategy on Disaster Fundraising." *2021.* (Under Review)
- Varad Kabade, Ritika Hooda, **Chahat Raj**, Zainab Awan, Allison Young, Miriam Welgampola and Mukesh Prasad. "Machine Learning Techniques for Differential Diagnosis of Vertigo and Dizziness: A Review." *Sensors 2021, 21(22), 7565.* (Impact Factor: **3.576**)

Teaching Experience

- **Student Advisor** — DTU, Delhi
  Student guide to eight graduate and undergraduate students for their research projects — *Aug. 2020 – May 2021*
- **Graduate Teaching Assistant** — DTU, Delhi
  ISY5301 Artificial Intelligence (graduate and undergraduate level) — *Aug. 2019 – May 2021*
- **Professional Tutor** — RT, Delhi
  Tutored 300+ high school students in their curriculum for 7 years — *Apr. 2015 – Mar. 2022*

Awards and Achievements

- **Research Excellence Award 2022**: Received *Commendable Research Award* and a cash prize of INR 50,000 by DTU, Delhi, for the research done as a part of graduate thesis and its publication in Applied Intelligence (APIN)
- **Graduate Scholarship**: Received government scholarship from AICTE of INR 2,97,600 during the academic years 2019-2021 for qualifying GATE exam, and carrying out graduate studies

Professional Service

- **Reviewer**
  Common Grounds Research Networks (UIUC), IJICC, JCMS, ASTES, Arts in Society

Talks and Presentations

- **Cyberbully Monitoring**: ML4AU Research Showcase Event 2021, Sydney, Australia
- **Cyber Security and Online Safety**: Motilal Nehru College, Delhi University, Delhi, India
- **Microblogs Deception Detection using BERT and Multiscale CNNs**: GCAT 2021, Bangalore, India
- **Fake News: Coronavirus and 5G Conspiracy Task**: MediaEval 2020
- **Fake News on Multiple Online Social Networks**: ICPCCAI 2020, Jaipur, India

Relevant Coursework

Graduate Coursework

- *Research Problem Formulation, Research Project (24-Credits), Artificial Intelligence, Machine Learning and Applications, Image Analysis, Linear Algebra and Probability, High Performance Computing*

Undergraduate Coursework

- *Natural Language Processing, Artificial Intelligence, Data Warehousing & Data Mining, Cloud Computing, Big Data Analytics, Theory of Computation*

Skills and Technologies [codes]

- **Languages**: Python, R, MATLAB, C, C++, LATEX
- **Libraries**: TensorFlow, PyTorch, Keras, scikit-learn, nltk, spaCy, numpy
- **Softwares**: Minitab, SPSS, NVivo, Tableau, PowerBi, Office
- **Certifications**: Neural Networks and Deep Learning [Coursera], Deep Learning Fundamentals [IBM], Deep Learning with Tensorflow [IBM], Accelerated Deep Learning with GPUs [IBM], Machine Learning with Python [IBM], Data Visualization with Python [IBM], Data Visualization with R [IBM]

Selected Projects [codes]

- **TruePixel**: Novel R-CNN to detect image forgery using RPN, ROI pooling, Bilinear pooling, RGB Noise Roi layers
- **SimonSays**: A Novel LSTM-CNN with 98% accuracy for speaker identification on self-curated dataset of 1300 audios
- **ToonGAN**: Cartoon Face to Human Face Translation using Generative Adversarial Network with Semantic Loss
- **AI-Spy**: Collected an infodemic dataset of 200 videos to perform rule frame-based visual fake news detection
- **EMO-280**: A deep CNN to perform fine-grained emotion classification on AarogyaSetu data by transfer learning
- **FakeTalk**: Sentiment Analysis on Twitter Infodemic with TextBlob, Affin; Misinformation Topic Modeling with LDA
- **WhoAmI**: A residual network for image-based human reidentification for biometric devices on self curated data
- **Touristics**: Mined TripAdvisor data and analyzed customer preferences in tourism and hospitality during COVID-19
- **Vehicle Tracker**: Device to detect road-violation using Raspberry Pi, GPS, Accelerometer, Ultrasonic sensor, camera
- **CryptoResume**: Decentralized Blockchain to resist frauds, data leakage support accreditation for resume validation
- **RecruitQuery**: A low-cost solution to GitHub recruiters built using front-end layer over GitHub API, Re, Pygments

Manuscripts Under Preparation

- Perception Mining and Behavior Analysis of Social Media Users towards Fake News
- Extending Temporal Ensembling-based Semi-supervised ConvNets to Multimodalities for Fake News Detection
- Understanding Social Media Engagement in response to Disaster Fundraising Attempts during Australian Bushfires
- Artificial Intelligence for First Nation Australians: A Survey
- Using Machine Learning for Differential Diagnosis in Episodic Spontaneous Vertigo
- Clinical Factors determining Vestibular Migraine and Meniere's Disease in Patients: Insights from Statistical Analysis

Non-academic Interests

Poetry, Blog Writing, Travel, Photography, Football, Arts

References

Dr. Priyanka Meel, *Assistant Professor, Delhi Technological University*
Dr. Mukesh Prasad, *Senior Lecturer, University of Technology Sydney*
Dr. Dinesh Kumar Vishwakarma, *Professor, Delhi Technological University*