

Chahat Raj

ARTIFICIAL INTELLIGENCE RESEARCHER

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“Reading maketh a full man, conference a ready man and writing an exact man.”

Research Interests

DEEP LEARNING · SOCIAL NETWORKS · MULTIMODALITY · EXPLAINABLE AI · STATISTICAL INFERENCE · AI FOR SOCIETY & HEALTHCARE

Education

DELHI TECHNOLOGICAL UNIVERSITY, INDIA

CGPA: 9.08/10

MASTER OF TECHNOLOGY IN INFORMATION SYSTEMS

Aug. 2019 - May 2021

Research Track Thesis: Deep Neural Networks towards Multimodal Information Credibility Assessment

INDIRA GANDHI DELHI TECHNICAL UNIVERSITY FOR WOMEN, INDIA

CGPA: 6.42/10

BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING

Aug. 2015 - May 2019

MOUNT OLIVET SCHOOL, DELHI, INDIA

CGPA: 9.2/10, 9.4/10

SENIOR SECONDARY & SECONDARY, CBSE

March 2015

Experience

UNIVERSITY OF TECHNOLOGY SYDNEY

Sydney, Australia

RESEARCH ASSOCIATE, VISITING SCHOLAR

June 2021 - Present

- Researching and developing AI methods for web information pollution (**cyberbullying, hate and offensive speech**) detection.
- Collaborating with **Australian Red Cross** in identifying social media dependencies on **Australian Bushfires'** Donation.
- Researching AI mechanisms in **healthcare** to identify medical ailments: **vertigo, liver cancer, alzheimer's, chest X-ray and plant diseases**.

INDIAN INSTITUTE OF MANAGEMENT RAIPUR

Chhatisgarh, India

REMOTE RESEARCHER

May 2021 - Present

- Using Deep Learning for **Stock Market and Cryptocurrencies'** Price Prediction and performing **financial behaviour analysis**.
- Employing **taylor series approximation** and **copula** for **multivariate time-series predictions** of bitcoin returns.
- Developed a novel **LSTM Autoencoder** with **False Nearest Neighbor Regularizer**, identifying deterministic factors for bitcoin prices.

CENTRE FOR RAILWAY INFORMATION SYSTEMS (CRIS)

Delhi, India

INFORMATION SECURITY INTERN

May 2018 - Aug. 2018

- Performed organizational defense **malicious activity detection, log analysis, vulnerability assessment & patch generation** by Cisco's SIEM.
- Fixed loopholes in North-Indian Railways freight and passenger ticket-booking dashboards. Learned CCNA.

Teaching

GRADUATE TEACHING ASSISTANT Delhi Technological University, ISY5301 **Artificial Intelligence**.

2019 - 2021

PROFESSIONAL TUTOR Raj Tutorials, **tutored** high school students in their curriculum for **6+ years**.

2015 - 2021

Publications

- [1] **Raj, Chahat**, and Priyanka Meel. **"ConvNet frameworks for multi-modal fake news detection."** Applied Intelligence (2021): 1-17. **[Published]**
- [2] **Raj, Chahat** and Mihir P. Mehta. **"MediaEval 2020: An Ensemble-based Multimodal Approach for Coronavirus and 5G Conspiracy Tweet Detection."** MediaEval 2020, CEUR Workshop Proceedings (2020) **[Published]**
- [3] **Raj, Chahat** and Priyanka Meel. **"Fake News on Multiple Online Social Networks."** ICPCCAI (2020): 1-8. **[Published]**
- [4] **Raj, Chahat** and Priyanka Meel. **"Microblogs Deception Detection using BERT and Multiscale CNNs."** IEEE GCAT (2021) **[Accepted]**
- [5] **Raj, Chahat** and Priyanka Meel. **"ARCNN Framework for Multimodal Infodemic Detection."** Neural Networks (2021) **[Revised]**
- [6] Kabade, Varad, Ritika Hooda, **Chahat Raj**, Zainab Awan, Allison Young, Miriam Welgampola and Mukesh Prasad. **"A Review of Machine Learning Techniques for Acute Vertigo/Dizziness."** Sensors (2021) **[Communicated & Revised]**
- [7] **Raj, Chahat** and Priyanka Meel. **"People Lie, Actions Don't! Modeling Infodemic Proliferation Predictors among Social Media Users."** Technology in Society (2021) **[Under Review]**
- [8] **Raj, Chahat** and Priyanka Meel. **"A Review of Web Infodemic Analysis and Detection Trends across Multi-modalities using Deep Neural Networks."** Neurocomputing (2021) **[Under Review]**
- [9] **Raj, Chahat** and Manojit Chattopadhyay. **"Bitcoin Price Prediction using LSTM Autoencoder and False Nearest Neighbor Loss."** Finance Research Letters (2021) **[Under Review]**
- [10] **Raj, Chahat**, Ayush Agarwal and Mukesh Prasad. **"Approaches towards Online Cyberbully Detection: A Comparative Study."** Social Networks (2021) **[Under Review]**

Positions of Responsibility

TALK	Represented University of Technology Sydney, Australia at ML4AU research showcase event	2021
REVIEWER	The Journal of Communication and Media Studies; Common Ground Research Networks, UIUC	2021
REVIEWER	International Journal of Intelligent Computing and Cybernetics; Emerald Publishing	2021
REVIEWER	Advances in Science, Technology and Engineering Systems Journal	2021
RESEARCH MENTOR	to Master's and Bachelor's students at IIT Delhi and DTU in Artificial Intelligence	2020-2021
HEAD COORDINATOR	Cyber Cell, IGDTUW	2017-2019

Projects

UNSUPERVISED RUMOR DETECTION

Delhi, India

SUPERVISOR: **DR. PRIYANKA MEEL**

Ongoing

- Developing a novel machine learning architecture using clustering algorithms (**RBF Kernel, NN, K-Means, Fuzzy C Means** Clustering) to classify tweets in **PHEME** dataset into multiple categories.

MULTIMODAL FAKE NEWS DETECTION USING TEXT-CNN AND ALEXNET

Delhi, India

SUPERVISOR: **DR. PRIYANKA MEEL**

Spring 2020

- Designed and implemented a novel architecture for detecting fake news using textual and visual features with **Text-CNN, AlexNet**, and **Attention-Mechanism**. The model's performance surpasses existing state-of-the-art-methods.

IMAGE FORGERY DETECTION

Delhi, India

SUPERVISOR: **MS. DEEPIKA VARSHNEY**

Fall 2019

- Developed a deep learning model introducing a **novel R-CNN architecture** to detect manipulated regions in images. The approach proposes a faster R-CNN composing **RPN layer, ROI pooling layer, Bilinear pooling layer, RGB Roi and Noise Roi feature layers** and training it end-to-end.

Other Projects **Emotion Analysis by Transfer Learning, Infodemic Sentiment Analysis & Topic Modeling, Fake Video Detection, CryptoResume, RecruitQuery, VehicleTracker**

Technologies

LANGUAGES	Python (Good); R, MATLAB, Simulink, C, C++, HTML (Familiar)
SOFTWARES	Minitab, SPSS, NVivo, Tableau
	Neural Networks and Deep Learning [COURSERA], Deep Learning Fundamentals [IBM], Deep Learning with Tensorflow [IBM],
CERTIFICATIONS	Accelerated Deep Learning with GPUs [IBM], Machine Learning with Python [IBM], Data Visualization with Python [IBM], Data Visualization with R [IBM]

Key Courses

Research Project, Research Problem Formulation, Research Seminar, Artificial Intelligence	10 Grade Point
Machine Learning and Applications	9 Grade Point

Achievements

BATCH TOPPER	Scored 10.00 SGPA in M.Tech. third semester at DTU	2020-2021
SCHOLARSHIP	Received government scholarship from AICTE for qualifying GATE entrance exam	2019-2021
THIRD RANK	MEDIAEVAL 2020 Coarse Classification Subtask	2020
FIFTH RANK	Certified Ethical Hacking, CYBER SECURITY CELL, IGDTUW, scored 75/79	2017
FIRST RANK	DELHI UNIVERSITY, National level entrance exam	2015

Extracurricular Activity

AMATEUR WRITER, POET	Authored over 50 blogs, 200 narratives & poetries in English, Hindi & Urdu.	Website
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Manuscripts under Preparation

- Raj, Chahat** and Priyanka Meel. "**Unsupervised Approach for Early Detection of Twitter Rumors.**"
- Raj, Chahat** and Priyanka Meel. "**Perception Mining and Behavioral Analysis of Social Media Users towards Web Information Pollution.**"
- Raj, Chahat** and Manojit Chattopadhyay. "**Taylor Approximation combined Deep Learning for Predicting Bitcoin Returns.**"
- Raj, Chahat**, Yohei Li, Mahendra Samarawickrama and Mukesh Prasad. "**Establishing Social Media Engagement Factors effecting Disaster Fundraising during Australian Bushfires.**"
- Raj, Chahat**, Chao Wang, Allison Young, Miriam Welgampola and Mukesh Prasad. "**Critical Clinical Tests Determination for Vertigo Detection using Machine Learning Classifiers.**"