Nischal Ashok Kumar

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Github • Google Scholar • Linkedin • Twitter

RESEARCH INTERESTS

Machine Learning, Natural Language Processing, Multi-Modality, Explainability and Robustness

EDUCATION BACKGROUND

University of Massachusetts (UMass), Amherst   **Sept 2022 - Present**
Doctor of Philosophy (MS-PhD), Computer Science

Indian Institute of Technology (IIT), Patna   **July 2018 - May 2022**
Bachelor of Technology (B.Tech), Computer Science and Engineering   *CGPA: 9.38/10, Institute Rank: 3/265*

PUBLICATIONS

* denotes equal contribution

- **Nischal Ashok***, Rina Kumari*, Tirthankar Ghoshal and Asif Ekbal, **"A Multi-task Learning Approach for Fake News Detection: Novelty, Emotion, and Sentiment Lend a Helping Hand"**, International Joint Conference on Neural Networks, **IEEE: IJCNN-2021**, [Paper] [Code]

- **Nischal Ashok***, Rina Kumari*, Tirthankar Ghoshal and Asif Ekbal, **"Misinformation detection using multitask learning with mutual learning for novelty detection and emotion recognition"**, Journal of Information Processing and Management, Elsevier, **IPM-2021**, (Impact Factor: 6.222) [Paper] [Code] [WHO Website]

- **Nischal Ashok***, Rina Kumari*, Tirthankar Ghoshal and Asif Ekbal, **"What the fake? Probing Misinformation Detection Standing on the Shoulder of Novelty and Emotion"**, Journal of Information Processing and Management, **IPM-2021**, Elsevier (Impact Factor: 6.222) [Paper] [Code]

- **Nischal Ashok***, Jan Philip Wahle*, Terry Ruas, Norman Meuschke, Tirthankar Ghosal and Bela Gipp, **"Testing the Generalization of Neural Language Models for Covid-19 Misinformation Detection"**, International Conference on Information, iConference 2022, Springer [Paper] [Code]

- **Nischal Ashok***, Rina Kumari*, Pawan Agarwal, Tirthankar Ghoshal and Asif Ekbal, **"NovEmoFake: Identifying Online Multimodal Misinformation Leveraging Novelty Detection and Emotion Recognition"**, [under review]

- **Nischal Ashok**, Rina Kumari, Vipin Gupta, Tirthankar Ghoshal and Asif Ekbal, **"FakeXplain: Evidence-Based Multi-Modal Fake News Detection"**, [under review]

- **Nischal Ashok**, Nitin Gupta, Shanmukha Guttula and Hima Patel, **"Ambiguity Detection in User Provided Annotations in PBE Systems"** [under review]

- Asheesh Kumar*, **Nischal Ashok***, Tirthankar Ghosal, and Cornelia Caragea, **"QPeer: On Generating Deep Scientific Peer Review Questions"**, [under review]

- Rina Kumari, Vipin Gupta, **Nischal Ashok**, Tirthankar Ghoshal and Asif Ekbal, **"Emotion Aided Multi-task Framework for Video Embedded Misinformation Detection"**, [under review]

- Rina Kumari, Vipin Gupta, **Nischal Ashok**, Tirthankar Ghoshal and Asif Ekbal, **"M3: An Emotion and Novelty-aware Approach for Multilingual Multimodal Misinformation Detection"**, [under review]

EXPERIENCE

ML-NLP Research Scientist Intern, SciSpace   **Bangalore, India**
Advisor: • Dr. Tirthankar Ghosal   *May 2022 - August 2022*

- **Project: Multimedia (Slides and Poster) Generation from Scientific Articles**
- Built an end-to-end module for generating long, medium and elevator-pitch slides with posters
- Proposed novel pipeline consisting of multi-modal information extraction using clustering-based extractive summarizer, sentence-transformer based image retrieval and multi-tasking Scibert based contribution statements retriever for slides and poster generation

Undergraduate Researcher, AI-NLP-ML Lab   **IIT-Patna, India**
Advisor: • Prof. Asif Ekbal   *July 2019 - May 2022*

- **Undergraduate Thesis: Explainable Multi-Modal Misinformation Detection**
- Proposed a novel pipeline for natural language based explanaiblity for multimodal fake news
- Proposed a novel contrastive learning approach using novelty and emotion for multimodal fake news with self-procured background knowledge which gives 7% improvement over the best models.
- Proposed a novel multi-tasking deep neural network architecture giving State-of-the-Art results on 4 well known datasets (ByteDance, FNC, Covid-Stance and FNID with 7.73%, 3.69%, 7.95% and 13.38% improvement) which has been integrated with Wipro Research

Undergraduate Researcher, University of Illinois   **Chicago, IL, USA**
Advisor: • Prof. Cornelia Caragea   *Nov 2021- Feb 2022*

- **Project: Critical Question Generation from Peer Reviews**

- Procured a novel dataset of peer-review based critical questions using an effective unsupervised algorithm with 97.5% recall from peer reviews
- Built a BART-based multi-task framework for question generation and aspect tagging.

Summer Research Intern, IBM Research AI   **IBM Research, Bangalore, India**
Research Managers: ● *Nitin Gupta*   ● *Hima Patel*   *May 2021-Aug-2021*

- **Project: Detecting Ambiguity in Input-Output Annotations for PBE Systems**
- Discovered five ambiguous properties that hinder the generalization of data transformation programs.
- Proposed a self-explainable multi-task attention based neural network for detecting ambiguity.
- Demonstrated that the architecture improves performance of PBE modules by pointing out regions of ambiguity through saliency maps on the input and by generating better programs as per user's intent.

Undergraduate Researcher, DKE Group   **University of Wuppertal, Germany**
Advisors: ● *Dr. Terry Ruas*   ● *Prof. Dr. Bela Gipp*   *Dec 2020-May 2021*

- **Project: Language Technologies for detecting Health Fake News**
- Performed and Analyzed Transfer Learning based NLP approaches on Covid-19 fake-news datasets.
- Performed masked-language-modeling (MLM) based pre-training of general neural language models (BERT, RoBERTa, DeBERTa etc.) on Covid-19 corpus, CORD-19.
- Showed Empirically that tokenizers and models tailored to health-related datasets do not provide a significant advantage over general-purpose ones

AI Research Intern, Video Analytics Laboratory   **Indian Institute of Science, Bangalore, India**
Advisor: ● *Prof. Venkatesh Babu*   *May 2020-Aug 2020*

- **Project: Unlabeled Data for Adversarial Robustness**
- Experimented with semi-supervised learning algorithms to use unlabeled data from other distributions for adversarial robustness with novel loss function combining cross-entropy and KL-divergence
- Performed domain-adaptation using Data-Enriching GANs between Cifar-100 and Cifar-10 datasets.
- Showed that unlabeled data from a different distribution is as competitive as the fully-supervised setting (within 2% error margin) against iterative FGSM and PGD-20 attacks.

Data Science Intern, TildeHat   **Bangalore, India**
Manager: ● *Dr. Om Deshmukh*   *Dec 2019-Jan 2020*

- **Project: Unsupervised Data Retrieval**
- Designed an end-to-end module for data-retrieval from resumes by converting pdf and doc files to HTML format and analyzing its DOM structure.
- Implemented unsupervised algorithms and hierarchical classifier approaches for information retrieval of fields like Name, Skills, Education, Projects and others.

AWARDS and HONORS

- **UMass CICS Doctoral Scholarship** - Received scholarship of 4000$ among the Fall-2022 admits
- **IIT-Patna Merit List** - 3rd Rank for the institute in the IIT-Patna B.Tech Class of 2022.
- **Summer Research Fellow** (FASTSF'2020) - Indian Academy of Sciences [India's foremost Science Academy] for pursuing a research internship in Artificial Intelligence at IISc Bangalore.
- **Fellowship (KVPY'2016)** - Young Scientist Incentive Plan - Government of India, for pursuing a career in research in pure sciences. Stood among top 0.2% among 200,000 students.
- **Academic Excellence Award** - Ranked 2nd among 100,000 students in 10th Standard public exam (ICSE'2016).

SERVICE and LEADERSHIP

- **Conference Volunteer** - NAACL-2021, ICML-2021, ACL-IJCNLP-2021
- **Reviewer** - Expert Systems with Applications Journal, CIKM-2021 Conference, IEEE Transactions on Computational Social Systems, IEEE Internet of Things Journal, Information Processing and Management Journal
- **Head of ML and AI** - NJACK - CS Club (IIT-Patna) - Introduced NJACK ML Workshop Series.
- **Departmental Lead** - DSC IIT-P - Associate Facilitator of Explore-ML Workshop IIT-P powered by Google-AI
- **Mentor** - Institute Student Mentorship Program (IIT-Patna) (2020-2022)
- **Project Mentor** - NJACK Winter of Code Open Source Programme'2019 - [ML Project Link]
- **Facilitator** - Delivered four (one-hour) talks in the Reinforcement Learning Seminar Series - IBM Research AI
- **Teaching** [Link] and **writing blogs** [Link] on ML and AI
- **Lead** (**Industrial Relations**) - Entrepreneurship-Cell IIT-Patna (2019-2021) - Introduced Entrepreneur-101 series and organized 4 sessions on entrepreneurship.
- **Social Worker** - National Service Scheme IIT-Patna - Led the rural entrepreneurship division.

SKILLS

- **Programming Languages:**   ● Python   ● C/C++   ● Java   ● Bash   ● Verilog   ● Assembly
- **Deep Learning Tools:**   ● PyTorch   ● HuggingFace   ● AllenNLP   ● Tensorflow   ● Keras
- **Other tools:**   ● SQL   ● Docker   ● LaTeX   ● Git/GitHub