Nischal Ashok

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RESEARCH INTERESTS

Machine and Deep Learning, Natural Language Processing, Multi-modal Analysis, Explainability and Robustness

EDUCATION BACKGROUND

Indian Institute of Technology (IIT), Patna — **July 2018-May 2022**
Bachelor of Technology (B.Tech), Computer Science and Engineering — ***CGPA: 9.30/10***

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 multi-task 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***, Rina Kumari*, Tirthankar Ghoshal and Asif Ekbal, **"FakeVid: A Benchmark Fake News Dataset with Video Content"**, [under review]
- **Nischal Ashok**, Nitin Gupta, Shanmukha Guttula and Hima Patel, **"Ambiguity Detection in User Provided Annotations in PBE Systems"**, [under review]
- **Nischal Ashok***, Rina Kumari*, Tirthankar Ghoshal and Asif Ekbal, **"Novelty and Emotion Grounded Contrastive Learning Approach for Multimodal Fake News with Background Knowledge"**, [under review]
- **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 [Arxiv Preprint] [Code]
- **Nischal Ashok**, Venkatesh Babu R, **"Exploring Adversarial Robustness in Deep Neural Networks"**, (Technical Report) Indian Academy of Sciences Research Portal **[Accepted]** [Yet to be published] [Report]

EXPERIENCE

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 Programming by Example (PBE) Task**
- Discovered five novel ambiguous properties that hinder the generalization of data transformation programs.
- Proposed a novel self-explainable multi-task multi-head attention deep 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

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 health-related fake-news datasets.
- Probed the efficacy of various neural language models with varying training schemes on domain-specific data.
- Showed Empirically that tokenizers and models tailored to health-related datasets do not provide a significant advantage over general-purpose ones

Undergraduate Researcher, AI-NLP-ML Lab — **IIT-Patna, India**
Advisors: • Prof. Asif Ekbal — *July 2019-Present*

- **Current Project (Undergraduate Thesis): Multi-modal Misinformation Detection**
- Probed misinformation detection through novelty detection, emotion recognition and showed that using novelty and emotion-aware representations with a simple statistical ML model outperforms various DL baselines.
- 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)

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 utilize unlabeled data from different distributions for improving adversarial robustness

- Proposed a novel loss function combining cross-entropy with KL-divergence.
- Performed domain-adaptation using DE (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 a 2% error margin) against iterative FGSM and PGD-20 attacks.

AI Startup Winter 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.

SELECTED PROJECTS

IIT-Patna Academic Alexa **AI-NLP-ML Lab, IIT Patna**
Guide: Prof. Pushpak Bhattacharya *Jan 2020-May 2020*

- A sentiment-aware intelligent information retrieval based Chatbot for the Academic Portal of IIT-Patna.
- Devised a novel and effective way of converting natural language data into SQL queries using Dependency Tree Parsers, POS tagging, and NER techniques for information retrieval from the database
- Designed a custom chatbot pipeline which includes Multi-Channel CNN based intent classifier, sentiment analyzer, sentence similarity and feedback modules wrapped in wx-python GUI interface [Code] [Blog]

Reddit-Drug Abuse Detection **Data Analytics Lab, IIT Patna**
Guide: Dr. Joydeep Chandra *Jan 2020-May 2020*

- Investigated Drug Abuse on Social Media through Reddit Website by collecting and annotating data from r-opiates sub-reddit.
- Built a multi-head attention deep neural network for classifying comments as motivational or not. Further classification done on altruism, hope, good advice, bad advice, and universality. [Data+Code]

AWARDS and HONORS

- **Conference Grant Scholarships** - ICWSM 2021-AAAI, NAACL-2021, ICML-2021
- **ML Summer Schools Scholarships** - MLSS 2021 Taipei, CVIT IIIT-Hyderabad
- **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.
- **IIT-Patna Merit List** - Among top 10 CGPA holders in the IIT-Patna Computer Science class of 2022.
- **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 150,000 students in 10th Standard public exam (ICSE'2016).

SERVICE and LEADERSHIP

- **Volunteer** - NAACL-2021, ICML-2021, ACL-IJCNLP-2021
- **Secondary Reviewer** - Expert Systems with Applications Journal, CIKM-2021 Conference
- **Head of ML and AI** - NJACK - Computer Science 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-Present)
- **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** - E-Cell (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:** • C/C++ • Python • Java • Bash • Verilog • Assembly
- **Deep Learning Tools:** • Tensorflow • Keras • PyTorch • HuggingFace • AllenNLP
- **Other tools:** • SQL • Docker • LaTeX • Git/GitHub