Nischal Ashok Kumar

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SUMMARY

Researcher experienced in ML, NLP, and IR designing algorithms on educational, scientific and social-media domains.

EDUCATION

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*

EXPERIENCE

Research Assistant, CICS UMass — **Amherst, MA, USA**
Advisor: • Prof. Andrew Lan — *Sept 2022 - Present*

- **Project: ML and NLP for Educational Applications**
- Working on designing a causal RNN model for predicting the relationship between constructs in student data
- Working on controlled topical questions generation for online student learning platforms

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 service for creating long, medium and elevator-pitch slides with posters for over 2M scientific articles
- Proposed novel pipeline consisting of multi-modal information extraction using clustering-based extractive summarizer, sentence-transformer based image ranker and multi-tasking SciBERT based contribution statements retriever

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

- **Undergraduate Thesis: Explainable Multi-Modal Novelty and Emotion based Fake News Detection**
- Proposed a novel pipeline for natural language based explanaiblity for multimodal fake news using evidence from the web
- 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 previous state-of-the-art (SOTA).
- Proposed a novel multi-tasking neural network architecture giving SOTA results on 4 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 unsupervised algorithm with 97.5% recall and 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 Programming By Example (PBE) Systems**
- Discovered five ambiguous properties that hinder the generalization of data transformation programs.
- Proposed a self-explainable multi-task neural network for detecting ambiguity and demonstrated that the architecture improves performance of PBE modules by pointing regions of ambiguity hence generating 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: Analysis of Transfer Learning Approaches for detecting Covid-19 Fake News**
- 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 the CORD-19 corpus 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 from Different Distribution for Adversarial Robustness**
- Constructed new loss functions 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 from Resumes**
- Implemented unsupervised algorithms and hierarchical classifier approaches for information retrieval of fields like Name, Skills, Education, Projects and others from resumes by analyzing its HTML DOM structure.

SELECTED PUBLICATIONS

* denotes equal contribution

- **N Ashok***, R Kumari*, T Ghosal and A Ekbal, **"A Multi-task Learning Approach for Fake News Detection: Novelty, Emotion, and Sentiment Lend a Helping Hand"**, International Joint Conference on Neural Networks, [Paper] [Code]
- **N Ashok***, R Kumari*, T Ghosal and A 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]
- **N Ashok***, JP Wahle*, T Ruas, N Meuschke, T Ghosal and B Gipp, **"Testing the Generalization of Neural Language Models for Covid-19 Misinformation Detection"**, International Conference on Information, iConference 2022, Springer [Paper] [Code]
- V Gupta, R Kumari, **N Ashok**, T Ghosal and A Ekbal , **"M3: An Emotion and Novelty-aware Approach for Multilingual Multimodal Misinformation Detection"**, Findings of the Asia-Pacific Chapter for the Association of Computational Linguistics and International Joint Conference on Natural Language Processing (AACL-IJCNLP 2022) [Accepted, To Appear]
- **N Ashok***, R Kumari*, P Agarwal, T Ghosal and A Ekbal, **"NovEmoFake: Identifying Online Multimodal Misinformation Leveraging Novelty Detection and Emotion Recognition"**, Multimedia Systems Journal [under review]
- **N Ashok**, R Kumari, V Gupta, T Ghosal and A Ekbal, **"FakeXplain: Evidence-Based Multi-Modal Fake News Detection"**, Information Sciences Journal [under review]
- **N Ashok**, N Gupta, S Guttula and H Patel, **"Ambiguity Detection in User Provided Annotations in PBE Systems"** [under review]
- **N Ashok***, A Kumar*, T Ghosal, and C Caragea, **"QPeer: On Generating Deep Scientific Peer Review Questions"**, [under review]

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 2020** - (Indian Academy of Sciences) for pursuing a research internship in AI at IISc Bangalore.
- **Fellowship (KVPY'2016)** - Young Scientist Incentive Plan Govt. of India. 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** - Entrepreneurship-Cell IIT-Patna - 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