Devang Kulshreshtha

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Education

MSc **McGill University**, Computer Science — Sep 2020 to May 2022

- **GPA**: 4.0/4.0 (Thesis)
- **Supervisor**: Prof. Siva Reddy
- **Coursework**: Representation Learning (IFT6135), Applied Machine Learning (COMP551), Natural Language Processing (COMP550), Mathematics for Computer Science (COMP761).
- **Publications**: [6, 7]
- **Research Scholarships**:
  - MITACS accelerate research scholarship (65,000 CAD for 2 years).
  - Kharusi International Science Fellowship (5,000 CAD).

BTech **Indian Institute of Technology (BHU) Varanasi**, Computer Science — Aug 2014 to May 2018

- **GPA**: 9.11/10.0
- **Coursework**: Probability and Statistics (MA202), Artificial Intelligence (CS202), Computer Vision (CS352).
- **Publications**: [8, 9, 10, 11, 12, 13, 14]
- **Teaching**: TA for Intro to Artificial Intelligence (2018), Programming in C (2016).
- **Achievements**:
  - Microsoft Research Travel Grant for attending COLING 2018 (1,500 USD).
  - Shared task winning team amongst 20+ teams and invited for an oral talk at WASSA EMNLP 2017, Copanhagen, Denmark.

Work Experience

Amazon AWS, Applied Scientist II — NYC, USA; 07/20/22 to Present; 2 years

- **Manager:** *Dr. Spandana Gella*
- **Job responsibilities:** Apply machine learning (ML) research to integrate innovative solutions, implementing new ML approaches for foundational models, addressing customer issues, and publishing research in conferences to advance the field.
- **Projects:**
  - Lifelong Training of Automatic Speech Recognition (ASR) Models [1], [1].
  - Scaling ASR Personlization to multilingual models and Large Catalogs [2], [5, 6].
  - Developing automated metrics, post-processing models and robustness testing of medical Abstractive Summarization [2, 3].
- **Publications:** [1, 2, 3, 4, 5]. **Patents:** [1, 2, 3, 4, 5, 6]
- Promoted from Applied Scientist I to II in 1.25 years (average Amazon promo time: 2 yrs).

Amazon Alexa, Applied Science Intern — Cambridge, UK
07/12/21 to 10/15/21
3 months

- **Supervisor:** *Dr. Jens Forster*
- **Job responsibilities:** Read research papers, implement and evaluate ML systems, publish work in conferences, document internship work.
- **Project:** Improving long-tail performance of ASR by developing robust LM re-scorers.
- Receieved a full-time job offer based on stellar internship performance.

Korbit.AI, Research Intern — Montreal, Canada
09/03/20 to 06/20/22
1 year 9 months

- **Supervisors:** *Prof. Siva Reddy* and *Dr. Iulian Vlad Serban*
- **Job responsibilities:** Read research papers, implement and evaluate new ML ideas, publish work in conferences, document internship work.
- **Projects:**
  - Automatic Question-Answer Generation ML systems from reading materials [6].
  - NLP-based Personalized Feedback Generation in Intelligent Tutoring Systems [7].
- **Publications:** [6, 7]

Amazon, Software Engineer — New Delhi, India
09/03/18 to 09/16/20
2 years

- **Job responsibilities:** Developing technology solutions, SOP writing, documentation, monitoring critical services, standby support, and mentoring junior developers.
- **Project:** Design and implementation of scalable invoice monitoring system to track invoices of carriers at Amazon; report anomalies using rule-based detection mechanisms.

INRIA Labs, Research Intern — Rennes, France
05/22/18 to 08/17/18
3 months

- **Supervisors:** *Prof. Alexandre Termier* and *Prof. Elisa Fromont*
- **Job responsibilities:** Implementing ML techniques based on adopted research methodologies, collaborated with peers, documenting progress comprehensively, manage code with Git, and present findings in meetings.
- **Project:** Discriminative pattern mining to identify subgraphs in DNNs frequently activated on wrong output.

Busigence, Research Associate Intern — Gurugram, India
12/01/17 to 12/31/17
1 month

- **Project:** Constructing deep learning framework for e-commerce recommender systems.

Amazon, Software Engineer Intern — New Delhi, India
05/17/17 to 07/21/17
2 months

- **Job responsibilities:** Developing technology solutions, SOP writing, documentation of internship work.
- **Project:** Mobile Development of Onboarding Flow.
- Receieved a full-time job offer based on stellar internship performance.

CFILT Lab IIT Bombay, Research Intern — Bombay, India
05/15/16 to 07/10/16
2 months

- **Supervisors:** *Prof. Pushpak Bhattacharya* and *Prof. Ganesh Ramakrishnan*
- **Job responsibilities:** Review research methodologies, implement ML techniques, documented progress comprehensively, manage code with Git, present work in meetings.
- **Project:** Development of search engine add-on from scratch that presents Pseudo-Documents and facets for resource scarce languages in case of transactional queries.
- Received a letter of recommendation from *Prof. Ganesh Ramakrishnan* for stellar performance in research and development.

Publications

1. **Sequential Editing for Lifelong Training of Speech Recognition Models** [Paper]
   D. Kulshreshtha, S. Dingliwal, B. Houston, N. Pappas, S. Ronanki. *INTERSPEECH 2024*
2. **Retrieve and Copy: Scaling ASR Personalization to Large Catalogs** [Paper]
   SM. Jayanthi, **D. Kulshreshtha**, S. Dingliwal, S. Ronanki, S. Bodapati. *EMNLP 2023*
3. **Generalized zero-shot audio-to-intent classification** [Paper]
   VR. Elluru, **D. Kulshreshtha**, R. Paturi, S. Bodapati, S. Ronanki. *ASRU 2023*
4. **Multilingual contextual adapters to improve custom word recognition in low-resource languages** [Paper]
   D. Kulshreshtha, S. Dingliwal, B. Houston, S. Bodapati. *INTERSPEECH 2023*
5. **Mask the Bias: Improving Domain-Adaptive Generalization of CTC-Based ASR with Internal Language Model Estimation** [Paper]
   N. Das, M. Sunkara, S. Bodapati, J. Cai, **D. Kulshreshtha**, J. Farris, K. Kirchhoff. *ICASSP 2023*
6. **Few-shot question generation for personalized feedback in intelligent tutoring systems** [Paper]
   D. Kulshreshtha, M. Shayan, R. Belfer, S. Reddy, IV. Serban, E. Kochmar. *IJCAI-PAIS 2022*
7. **Back-Training excels Self-Training at Unsupervised Domain Adaptation of Question Generation and Passage Retrieval** [Paper] [Presentation] [Code] [Poster]
   D. Kulshreshtha*, R. Belfer, I.V. Serban, S. Reddy. *EMNLP 2021*
8. **How emotional are you? Neural Architectures for Emotion Intensity Prediction in Microblogs** [Paper] [Presentation] [Code]
   D. Kulshreshtha*, P. Goel*, A.K. Singh. *COLING 2018*
9. **NLPRL-IITBHU at SemEval-2018 Task 3: Combining Linguistic Features and Emoji pre-trained CNN for Irony Detection in Tweets** [Paper]
   H. Rangwani, **D. Kulshreshtha**, and A.K. Singh. *SemEval Workshop, NAACL-HLT 2018*
10. **Feature Augmented Deep Neural Networks for Collaborative Filtering** [Paper][Code]
    D. Kulshreshtha. *IJCAI 2017 Workshop on AI Applications in E-commerce*
11. **Prayas at emoint 2017: An ensemble of deep neural architectures for emotion intensity prediction in tweets.** [Paper][Presentation]
    P. Goel*, **D. Kulshreshtha***, P. Jain and K.K. Shukla. *8th WASSA Workshop at EMNLP 2017*
12. **Automated digital mammogram segmentation using dispersed region growing and sliding window algorithm** [Paper]
    A. Shrivastava, A. Chaudhary, **D. Kulshreshtha**, V.P. Singh, R. Srivastava. *ICIVC 2017*
13. **Content-based mammogram retrieval using k-means clustering and local binary pattern** [Paper]
    D. Kulshreshtha, V.P. Singh, A. Shrivastava, A. Chaudhary, R. Srivastava. *ICIVC 2017*
14. **Mammogram classification using selected GLCM features and random forest classifier** [Paper]
    V.P. Singh, A. Srivastava, **D. Kulshreshtha**, A. Chaudhary, R. Srivastava. *IJCSIS 2016*

Academic Services

Reviewing: ARR 2024, INTERSPEECH 2024, ARR 2022
Talks: INTERSPEECH (Dublin, 2023), IJCAI-PAIS (Virtual, 2022), EMNLP (Virtual, 2021), COLING (Virtual, 2018), IJCAI Workshop (Melbourne, 2017)

US Patents

1. **[P86759-US01] Sequential Editing for Lifelong Training of Speech Recognition Models - AWS Lex, Transcribe, and Aura**
   D. Kulshreshtha, N. Pappas, S. Dingliwal, B. Houston, S. Ronanki, V.R. Elluru. *To be filed*

2. **[P82127-US01] Question-Answering and Entailment based metrics for Evidence Mapping Evaluation - AWS Aura**
   D. Kulshreshtha, S. Dingliwal, S.B. Bodapati, K. Kirchhoff, S. Handa. *Filed 29 Jun 2023 (Patent ID: 85779885)*

3. **[P82121-US01] Personalised styles for medical summaries**
   A. Elangovan, **D. Kulshreshtha**, K. Kirchhoff, L. Xu, S. Handa, S.B. Bodapati. *Filed 22 Jun 2023 (Patent ID: 85779897)*

4. **[P81977-US01] Multilingual Contextual Adapters for ASR Personalization of low-resource languages - AWS Lex, Aura, and Transcribe**
   D. Kulshreshtha, S. Dingliwal, B. Houston, S.B. Bodapati, S. Ronanki, J. Farris, V. Govindan, K. Kirchhoff. *Filed 30 Jun 2023 (Patent ID: 85798351)*

5. **[P81637-US01] A Non-Autoregressive Approach To Mitigate Lexical Bias in E2E Speech Architectures for Cost-Efficient Customization of AWS Transcribe, Lex, Connect and Aura Services**
   N. Das, M.N. Sunkara, S.B. Bodapati, J. Cai, **D. Kulshreshtha**, J. Farris, N. Aldridge. *Filed 03 May 2023 (Patent ID: 85753349)*

6. **[P80896-US01] FFL - Scaling up "All-neural" ASR models to support large catalogs up to 500k entries - Lex, Aura and Transcribe**
   D. Kulshreshtha, S. Dingliwal, S.B. Bodapati, V.R. Elluru, A. Mishra, K. Kirchhoff. *Filed 28 Mar 2023 (Patent ID: 85731815)*