Anup Anand Deshmukh

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EDUCATION

University of Waterloo, Canada (UW) *Fall 2021*

Degree	MMath in Computer Science (Thesis) - "Unsupervised Syntactic Structure Induction in Natural Language Processing" [Link]
CGPA	95.25/100 (4.0/4.0)
Supervisor	Prof. Ming Li and Prof. Jimmy Lin
Key Courses	Machine Learning, Deep Learning for NLP, Information Retrieval, Optimization
Teaching Assistant	CS 686 (Intro to AI) and CS 115 (Basic Racket Programming)

International Institute of Information Technology, Bangalore (IIIT-B) *Summer 2019*

Degree	Integrated Masters in Information Technology
CGPA	3.32/4.0, Theoretical CS Major: 3.63/4.0
Supervisor	Prof. Dinesh Babu
Key Courses	Advanced Machine Perception, Data Structures and Algorithms, Linear Algebra
Teaching Assistant	CS 302 (Theory of Automata and Computations) and SP 825 (Visual Recognition)

PROFESSIONAL EXPERIENCE

Electronic Arts - Montreal, Canada *March 2022 - present*
Machine Learning Engineer

- Learning Muscle Deformations *(Ongoing work)*
  - ➢ Optimized a deep learning model that predicts complex and compute-heavy muscle deformations with an offset as low as 0.25 cm. Utilized Dask to reduce the memory consumption of artist workflows by over 30%. Worked closely with a game team to benchmark the runtime performance of the model inference on PS5. Developed a newer generation of ML deformer that introduces localized influences and is more robust to out-of-distribution poses.
- Generative Motion In-betweening
  - ➢ Proposed a simple yet effective Transformer-based framework for synthesizing realistic human motions for the task of in-betweening. Our model exhibited superior generalization capabilities in longer sequences, with artists preferring the generated motions 70% of the time compared to other baselines. *Work is currently under review in a top computer graphics conference*
  - ➢ Developed a motion in-betweening benchmarking setup for the LaFAN1 dataset, implementing interpolation baselines and replicated results achieved by other competitive methods. Worked with cross-functional teams, multiple managers, and machine learning engineers.
- Code Generation via Retrieval Augmentation and GPT
  - ➢ Developed an end-to-end framework for a conversational agent using Langchain, Retrieval Augmented Generation, and GPT. This *PoseBot* efficiently handles queries related to the internal Animation library, offering additional functionality by generating Python code snippets thus saving time for animators and ML developers.
  - ➢ Conducted a user study to evaluate the effectiveness and deployed with Streamlit in a docker-container setup. Presented the work in two internal conferences
- Volumetric Data Ingestion Pipeline
  - ➢ Implemented a pipeline to process raw, large volumetric captures of real-world football matches and convert them into an animation format. The pipeline processed 50 million frames and brought over hundreds of authentic player styles - passes, shots, tackles into the game for the first time and assisted Hypermotion V, the core technology behind EA Sports FC 24.

University of Alberta - Edmonton, Canada *Fall 2020 & Winter 2021*
Co-op: Research Assistant *Guide: Prof. Lili Mou*

- Proposed a knowledge transfer approach for unsupervised chunking, establishing state-of-the-art results. Achieved an improvement of more than 5% F1 points over the teacher model.
- Led all meetings, documentation and requests of GPU resources, mentored an undergraduate student to develop a simple baseline and set up an evaluation pipeline. Received 'Excellent and Outstanding' evaluations for both co-op terms.

FAST lab, CentraleSupelec - Rennes, France *Summer 2018*
Internship: Research Assistant *Guide: Prof. Renaud Seguier*

- Worked on the problem of detecting emotions, particularly stress, from audio signals in a semi-supervised setting. Proposed Emo-CNN achieved 90.20% categorical accuracy.

Slice, Bangalore - India *Summer 2016*
Internship: Full Stack Developer
- Led the task of bringing flexibility in payment through India's top 10 merchant websites. Built the browser extension using JavaScript, which gave access to Slice payment plans right from the user's merchant website

PUBLICATIONS

Zijun Wu, **Anup Deshmukh**, Yongkang Wu, Jimmy Lin, Lili Mou, "Unsupervised chunking with hierarchical RNN," *arXiv:2309.04919 preprint* [Link]

Anup Deshmukh, Qianqiu Zhang, Ming Li, Jimmy Lin, Lili Mou, "Unsupervised Chunking as Syntactic Structure Induction with a Knowledge-Transfer Approach," *Findings of the Association for Computational Linguistics (EMNLP) 2021* [Link]

Anup Deshmukh, Udhav Sethi, "Semantic Search for Background Linking in News Articles," *NIST Special Publication, Text REtrieval Conference (TREC) 2021* [Link]

Rameshwar Pratap, **Anup Deshmukh**, Pratheeksha Nair, Anirudh Ravi, "Scaling up Simhash," *Asian Conference on Machine Learning (ACML) 2020* [Link]

Anup Deshmukh, Pratheeksha Nair, Shrisha Rao,"A Scalable Clustering Algorithm for Serendipity in Recommender Systems," *International Conference on Data Mining (ICDM), SAREC 2018* [Link]

Rameshwar Pratap, **Anup Deshmukh**, Pratheeksha Nair, Tarun Dutt, "A Faster Sampling Algorithm for Spherical k-means," *Asian Conference on Machine Learning (ACML) 2018* [Link]

SELECTED PROJECTS

Unsupervised Text Style Transfer using BERT and Discriminator Networks *Winter 2020*
Course: Deep Learning for NLP at UW *Guide: Prof. Ming Li*
- The proposed model employed polar-constraint for the cross-alignment between different styles and achieved 3% improvement in the classification score on the Yelp review dataset.

ContentNCF: Content-Based Neural Collaborative Filtering *Fall 2019*
Course: Machine Learning at UW *Guide: Prof. Yaoling Yu*
- ContentNCF tailored for Image recommendation, achieved HR of 94% for the task of top-K recommendation on the Pinterest dataset. Received the highest score in a class of over 100 students.

A Generative Adversarial Network for Diversity in Recommender Systems *Winter 2018*
Multimodal perception lab at IIIT-B *Guide: Prof. Dinesh Babu*
- Proposed a GAN+Reinforce framework to produce diverse yet relevant recommendations. Achieved 77% of intra-list diversity in recommendations on Movielens 100k dataset.

SKILLS

Languages	Python, Matlab, JavaScript, C++, LaTeX
Tools	PyTorch, TensorFlow, Keras, Scikit-learn, Pandas
Software & Services	Motion Builder, Maya, Docker, Azure, AWS, OpenAI

AWARDS & ACTIVITIES

2021 Nominated for Co-op Student of the Year Award, UW
2019 International Masters Award for Excellence and Graduate Scholarship, UW
2017 Speaker at TEDx Pre-event, IIIT-B
2016 Co-Founder of 'Comic Club,' IIIT-B