

# UDAY KARAN KAPUR

✉ [udaykarankapur@gmail.com](mailto:udaykarankapur@gmail.com) 📞 (438)-993-1436 💻 [uday-kapur](https://github.com/uday-kapur) 🌐 [udaykarankapur](https://udaykarankapur.github.io) 👤 [udaykarankapur.github.io](https://udaykarankapur.github.io)

## Education

---

### Université de Montréal - MILA

Montréal, Quebec, Canada

Master of Science in Computer Science, 4.15/4.30 GPA

Sep 2023 - Present

- **Selected Coursework:** Reinforcement Learning and Optimal Control (Fall 2024), Representation Learning (A+), Fundamentals of Machine Learning (A+), Links between Vision and Language (A), Data Science (A)

### Vellore Institute of Technology

Chennai, Tamil Nadu, India

Bachelors of Technology in Computer Science and Engineering, 8.65/10.0 GPA

Jul 2016 - Sep 2020

- **Selected Coursework:** Natural Language Processing, Machine Learning, Applied Linear Algebra, Statistics, Databases, Parallel and Distributed Computing, High Performance Computing, Data Structures & Algorithms

## Experience

---

### HomePorter

Montréal, Canada

Machine Learning Engineer

May 2024 - Present

- Designing and implementing a BERT-based classifier to analyze transcripts and classify statements related to home repairs, utilizing NLP techniques and libraries such as Pandas, PyTorch, and Hugging Face's Transformers.
- Developing a Retrieval-Augmented Generation (RAG) system to retrieve relevant chunks from a knowledge base and generate effective and efficient reports summarizing conversations about home repairs.

### Peritus.ai

New Delhi, India

Software Engineer

Jun 2021 - Jun 2023

- Built a full-featured analytics dashboard using React, TypeScript, Next.js, HTML, and CSS. The interactive and user-friendly interface allows efficient visualization, interaction, and analysis of community data.
- Assumed responsibility for the authentication service, implementing robust security features with Java Spring Boot and Kotlin. Additionally, played a role in optimizing NGINX to enhance system performance and security.
- Demonstrated effective leadership and management skills while working with a diverse, globally distributed team across various timezones and nationalities, ensuring smooth collaboration and coordination.

### ZS Associates

New Delhi, India

Business Technology Analyst

Jan 2020 - May 2021

- Designed and managed an ETL system on Amazon RDS using Apache Airflow, writing automation scripts in Python and Shell, and handling data with SQL to improve team data operations.
- Maintained data pipelines, ETL processes, and system configurations; engaged with stakeholders to gather requirements, provide updates, and perform root cause analysis, ensuring transparency and reliable documentation throughout project lifecycles.

## Personal Projects

---

### Flickr8k Image Captioning | Blog

- Implementation of Merge Encoder-Decoder architecture using VGG16 as image feature extractor and LSTM as text generator to generate natural language captions for images. Model performance was evaluated using BLEU and the following scores were achieved: BLEU-1: 0.452, BLEU-2: 0.234, BLEU-3: 0.146, BLEU-4: 0.062.

### Text Summarization using BART, T5 and PEGASUS | Blog

- Fine-tuned state-of-the-art models including BART, T5, and PEGASUS on the SAMSum dataset to generate summaries for conversations. Evaluated the quality of the summaries using ROUGE metrics, with PEGASUS leading in ROUGE-L F1 scores (0.43), followed closely by BART (0.40) and T5 (0.38).

### LLM Augmented LLMs

- This project aimed to create a composition of a larger base LLM and augment its existing capabilities with a smaller anchor LLM. The LLMs were connected with each other using trainable cross attention layers while the weights of the LLMs themselves were kept frozen. We used Zephyr 1.6B as a base LLM and fine tuned GPT-2 and CLIP encoder as anchor LLMs.

## Technical Skills

---

**Languages:** Python, C++, Java, Kotlin, Typescript, Shell, SQL, HTML5, CSS

**Technologies/Frameworks:** React.js, Java Spring Boot, Apache Airflow, PyTorch, Tensorflow, Keras, LLMs

**Developer Tools:** Git, Docker