Cover Letter

Abhinit is an AI Engineer (currently studying the Masters of AI Engineering program at CMU) with an applied AI background spanning across 5 countries. I know Abhinit to be a sound engineer who can develop production ready applied ML solutions. What makes him stand apart is his applied ML background across diverse domains: data systems, urban infrastructure, manufacturing operations, healthcare, and quality control operations.

Recently, Abhinit as an AI Engineer for Covestro shipped a production grade evaluation service that monitors and enhances the performance of their in-house agentic retrieval system. His evaluation service boosted the performance of the agentic retrieval system by 13%. Additionally, something truly commendable and interesting about Abhinit is that he was part of the team that deployed the world's first vision framework that utilizes machine learning and satellite imagery for the monitoring of Zurich's sewage system. His research at Eawag and ETH Zurich in Switzerland is published in Nature, Scientific Data.

He also has prior experience working in optimizing query search at the prestigious Max Planck Institute for Software Systems in collaboration with a team at MIT. Particularly, he focussed on the cardinality estimation problem with Laurent Bindschaedler. I have developed a multi-modal machine learning framework that processes two modalities: a graph-based query and a tokenized query. This framework integrates a residual Graph Neural Network (GNN) and a BERT-based transformer. By effectively synthesizing the learnings from both modalities using a fusion layer, the framework predicts cardinalities using the original queries from the JoinGym Dataset.

As part of his graduate journey at CMU, he designed a custom GPT-2 (by integrating Rotary Positional Embeddings (RoPE) and Grouped Query Attention. Additionally, he enhanced the reasoning ability of a vision language model via CoT-supervised fine-tuning, DPO with human preference signals (RLHF), and a ReAlign PPO framework. He achieved a ~1.8% improvement over baseline results.

Abhinit is currently looking for roles where he can serve as an AI/ML Engineer. He is set to graduate in December'25. Abhinit has a lot of references that one can contact to learn more:

1. Andre Assis, Covestro, andre.assis@covestro.com
2. Dr. Laurent Bindschaedler, Max Planck Institute for Software Systems: bindsch@mpi-sws.org
3. Prof. Albert Presto, Carnegie Mellon University: apresto@andrew.cmu.edu
4. Prof. Wouter Saeys, Ku Leuven: wouter.saeys@kuleuven.be
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