RAMRAJ CHANDRADEVAN

(470) 360-5244 ramraj.hireme@gmail.com @ramraj-chandradevan @cramraj Minneapolis, MN

OBJECTIVE

Actively looking for full time research opportunities in the areas of Information Retrieval, NLP, Computer Vision, Multimodal (Vision-Language) Learning, or Data Science.

EDUCATION

PhD in Computer Science and Informatics Aug. 2019 - Present
Information Retrieval(IR) Lab, Emory University, Atlanta, GA

BSc.(Hons) in Electronic and Telecommunication Engineering Nov. 2014 - Dec. 2018
Faculty of Engineering, University of Moratuwa, Sri Lanka GPA : **3.80**/4.20 **First class(Honours)**

Private Pilot Licensing (PPL) Jan. 2016 - Jun. 2017
Skyline Aviation, Ratmalana, Sri Lanka

SKILLS

• **Research Expertise:** Fine-tuning LLMs, Instruction-tuning Multimodal-LLMs, Pre-training Multimodal-LLMs, RAG, Generative IR, Neural Ranking, Domain Adaptation, Continual Pre-training, Cross-lingual IR, Multilingual IR, Query Reformulation and Expansion, Content-based Session Recommendation, Graph Neural Networks, Vision-Language Modeling, Visual Question Answering, Object Detection, Image Classification, Image Outlier Detection, Text-Recognition (OCR)
• **Tools:** Python, C++, Java, PyTorch, TensorFlow, HuggingFace, Pyterrier, Pyserini, LangChain, LlamaIndex, Docker, Git, MATLAB, R, ITK, Keras, Theano.

EXPERIENCE

Research Intern — Microsoft Redmond, WA
Visual Document Intelligence Team *May. 2023 - Sep. 2023*
- Developed Instruct-OCR (Instruction Following Transformer OCR): Large-scale pre-trained transformer-based OCR models to augment their functionalities on a wide range of tasks.

Data Scientist Intern — Home Depot Atlanta, GA
Online Recommendations Team *Jun. 2022 - Dec. 2022*
- Implemented a session-based content recommender system for products and articles (guides).

Applied Scientist Intern — Amazon Sunnyvale, CA
Alexa Local Information Science Team *Jun. 2021 - Sep. 2021*
- Designed, implemented, and experimented a semantic retrieval hybrid-system over local search queries to increase recall.

Research and Development Intern — Kitware, Inc Chapel Hill, NC
Medical Computing Team *Feb. 2019 - Jul. 2019*
- (1) Deployed an object detection pipeline and (2) Applied Wavelet transform algorithm to image outlier detection.

Undergraduate Research Intern — CooperLab, Emory University Atlanta, GA
Department of Biomedical Engineering and Bioinformatics *Jun. 2017 - Dec. 2017*
- Applied various Deep Learning architectures to learning-to-rank problem in survival analysis.

Software Developer Intern — Foysonis WMS Carry, NC
Warehouse Management System - Startup *Jul. 2016 - Mar. 2017*
- Designed home web-page, blog web-page, and payment gateway integration.

PROJECTS

Training Search and Ranking Models with Minimal Supervision *PhD Thesis Project*
- Designing (current project) a fine-tuned neural ranker in a RAG system using LLM-supervision.
- Designed a new state-of-the-art domain-adaptation ranking framework substantially outperforming Promptagator.
- Developed a query expansion approach using LLM-based ensemble-prompting.
- Designed a cross-lingual neural ranker to enrich query representation using feedback documents.
- Improved cross-lingual neural ranking performance with continuous contrastive pre-training.
- Investigated the harmfulness of domain fine-tuning a neural ranker on out-of-distribution datasets.

Cross-lingual and Multilingual IR Systems *PhD Funded Research Project* — Sep 2019 - May 2023
- Delivered Cross-lingual and Multilingual IR compact systems as a Docker container (IARPA funded BETTER program).

VQA using Scene Graph Generation *Research Project* — Sep 2020 - Apr 2021
- Improved VQA performance with question guided Conditional Enhanced Graph ATtention network (CE-GAT) using graph enhancement and pruning techniques.

Multiple Instance Learning on Nuclei Detection *Internship at Kitware* — Feb. 2019 - Jun. 2019
- Implemented a generalized end-to-end nuclei detection pipeline in large-scale parallel systems. @Published Blog

Tooth Micro Crack Detection *Internship at Kitware* — Sep. 2019 - Present
- Implemented an image outlier detection algorithm with signal processing techniques (Wavelet transform & Phase analysis).

WBC Cell Detection and Classification *Senior Project Thesis* — Mar. 2018 - Jan. 2019
- Implemented and evaluated an end-to-end pipeline to bounding box detect and classify cancerous white blood cells.

TFSurvivalNet Implementation *Internship at Cooper Lab* — Aug. 2017 - Nov. 2017
- Re-implemented Theano based SurvivalNet to TensorFlow-Slim based lightweight framework and Dockerized the package.

PUBLICATIONS

- **Ramraj Chandradevan**, Kaustubh D Dhole, and Eugene Agichtein. 2024. "***DUQGen**: Effective Unsupervised Domain Adaptation of Neural Rankers by Diversifying Synthetic Query Generation.*" In Proceedings of the 2024 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Mexico City, Mexico. Association for Computational Linguistics. **NAACL 2024 (main)**. https://arxiv.org/pdf/2404.02489.pdf
- Kaustubh D Dhole, Shivam Bajaj, **Ramraj Chandradevan**, and Eugene Agichtein. 2024. "*QueryExplorer: An Interactive Query Generation Assistant for Search and Exploration.*" In Proceedings of the 2024 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Mexico City, Mexico. Association for Computational Linguistics. **NAACL 2024 (demo)**. https://arxiv.org/pdf/2403.15667.pdf
- **Ramraj Chandradevan**, Kaustubh D Dhole, and Eugene Agichtein. 2024. "*Fine-tuning a Pretrained Neural Ranker Found Harmful: Investigating the Effectiveness of Domain Adaptation for Ranking.*" **Work-in-progress**.
- Kaustubh D Dhole, **Ramraj Chandradevan**, and Eugene Agichtein. 2024. "*Generative Query Reformulation Using Ensemble Prompting, Document Fusion, and Relevance Feedback.*" **Coming to Arxiv soon**.
- Kaustubh D Dhole, **Ramraj Chandradevan**, and Eugene Agichtein. 2023. "*An Interactive Query Generation Assistant using LLM-based Prompt Modification and User Feedback.*" **Arxiv**. https://arxiv.org/pdf/2311.11226.pdf
- **Ramraj Chandradevan**, Eugene Yang, Mahsa Yarmohammadi, and Eugene Agichtein. 2022. "*Learning to Enrich Query Representation with Pseudo-Relevance Feedback for Cross-lingual Retrieval.*" In **SIGIR 2022**: The 45th International ACM SIGIR Conference on Research and Development in Information Retrieval, July 11–15, 2022, Madrid, Spain. ACM, New York, NY, USA, 5 pages. https://dl.acm.org/doi/10.1145/3477495.3532013
- Eugene Yang, Suraj Nair, **Ramraj Chandradevan**, Rebecca Iglesias-Flores and Douglas Oard. 2022. "*C3: Continued Pretraining with Contrastive Weak Supervision for Cross Language Ad-Hoc Retrieval.*" In **SIGIR 2022**: The 45th International ACM SIGIR Conference on Research and Development in Information Retrieval, July 11–15, 2022, Madrid, Spain. ACM, New York, NY, USA, 5 pages. https://arxiv.org/pdf/2204.11989.pdf
- **Ramraj Chandradevan**, Sai Vidyaranya Nuthalapati, Eleonora Giunchiglia, Bowen Li, Maxime Kayser, Thomas Lukasiewicz, Carl Yang. 2021. "*Lightweight Visual Question Answering using Scene Graphs.*" In Proceedings of the 30th ACM International Conference on Information and Knowledge Management (**CIKM 2021**), November 1–5, 2021, Virtual Event, QLD, Australia. ACM, New York, NY, USA, 5 pages. https://dl.acm.org/doi/abs/10.1145/3459637.3482218
- **Ramraj Chandradevan**, Ahmed A. Aljudi, Bradley R. Drumheller, Nilakshan Kunananthaseelan, Mohamed Amgad, David A. Gutman, Lee A. D. Cooper, David L. Jaye. "*Machine-Based Detection and Classification for Bone Marrow Aspirate Differential Counts: Initial Development Focusing on Nonneoplastic Cells.*" **Laboratory Investigation** (Sep 30 **2019**).https://www.nature.com/articles/s41374-019-0325-7
- Jared Vicory, **Ramraj Chandradevan**, Pablo Hernandez-Cerdan, Wei Angel Huang, Dani Fox, Laith Abu Qdais, Matthew McCormick, Andre Mol, Rick Walter, J. S. Marron, Hassem Geha, Asma Khan, Beatriz Paniagua. "*Dental microfracture detection using wavelet features and machine learning.*" In: Isgum I, Landman BA, editors. **Medical Imaging 2021**: Image Processing. Washington, DC: International Society for Optics and Photonics; 2021, 115961R. Link @URL.
- Yousefi Safoora, Amirreza Shaban, Mohamed Amgad, **Ramraj Chandradevan**, Lee AD Cooper. "*Learning Clinical Outcomes from Heterogeneous Genomic Data Sources.*". **Arxiv 2019**. https://arxiv.org/pdf/1904.01637.pdf
- *Early Experience in Developing a Machine-Learning and Digital Pathology Approach to Automate Bone Marrow Differential Counts.* Oral presentation at **ACLPS 2018**.