

RAMRAJ CHANDRADEVAN

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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 Re-formulation 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://aclanthology.org/2024.naacl-long.413/>
- 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://aclanthology.org/2024.naacl-demo.11/>
- **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.*” **Arxiv**. <https://arxiv.org/pdf/2405.17658>
- 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 Pre-training 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 Kumananthaseelan, 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**.