



Karthik Ragunath Ananda Kumar

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CodeChef - <https://www.codechef.com/users/karthik6995> | Github - <https://github.com/Karthik-Ragunath>

Languages

Python, R, C++, Java, C, Swift, PL/pgSQL, Bash

Technologies And Frameworks

MACHINE LEARNING AND DEEP LEARNING FRAMEWORKS

PyTorch (torch), TensorBoard, torch-vision, torch-audio, Pytorch Geometric, Tensorflow, Keras, Spacy, Scikit-Learn, XGBoost, Numpy, Pandas, Matplotlib, Seaborn, OpenCV2, FAISS, Apache Spark, Natural Language Toolkit (NLTK).

DISTRIBUTED SYSTEM INFRASTRUCTURES

Apache Solr, Apache Zookeeper, Elasticsearch, Apache Hadoop, etcd, uWSGI, Nginx, Redis, PostgreSQL Databases, Kafka, Websockets, Docker, Kubernetes, AWS Cloud Services.

Research - Computer Vision and Natural Language Processing

- Currently (from Spring'22) working on "Autonomous Driving Systems" project particularly on "Semantic Scene Understanding" and "Uncertainty-Aware Object Detection" components under the guidance of Dr Feng Chen in the Pattern Discovery and Machine Learning Lab at UT Dallas.
<https://github.com/Karthik-Ragunath/Semantic-Object-Detection> {{Work-In-Progress}}
<https://github.com/Karthik-Ragunath/DDU/tree/feature/experiments> {{Work-In-Progress}}
 - Researching (from Fall'21) on "Cross Lingual Summarization via Joint Entity and Relationship Extraction Based Approach" at UT Dallas, for which, I am primarily experimenting with multiple Graphical Convolutional Neural Network variants to improve the State Of The Art performance of "Cross Lingual Summarization" models.
https://github.com/Karthik-Ragunath/pytorch_multi_head_selection_re/tree/feature/experiments {{Work-In-Progress}}
 - Currently working on building Computer Vision based Deep Learning models with medical imaging data and conducting single-cell RNA analysis in order to aid in cancer research work as part of Dr Isaac Chan's lab at UTSW Medical Center.
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Experience

SOFTWARE ENGINEER - MACHINE LEARNING AND SEARCH, MAD STREET DEN INC (SEPTEMBER 2018 TO AUGUST 2021)

DEEP LEARNING AND MACHINE LEARNING

- Designed and trained POS, NER and Dependency Parser Neural Network Models and Conditional Random Field (CRF) models, LSTM based Auto-Correction and Auto-Suggestion models to optimize text-search system at production scale.
- Designed BERT masked language models to create search embeddings in order to improve text searching accuracy.
- Experimented with XGBoost's Learning to Rank Algorithms for fine tuning personalisation models.
- Designed NLP Classifier System to classify e-commerce products data into their corresponding e-commerce categories using XGBoost, MLP and BERT based Neural Network Models.
- Worked on building feature affinity models based on e-commerce search and buy history to fine-tune recommendation algorithms with Apache Solr's "boost queries" (bq) and "boost functions" (bf).

ENGINEERING

- Core member of the team which built and tuned Apache Solr and Apache Zookeeper Clusters at Mad Street Den for enabling searching and listing operations on e-commerce websites.
- Scaled Apache Solr's Distributed Computing Infrastructure to handle up to 40,000 requests per minute.
- Worked on building data pipelines for powering real time search requests and Machine Learning models using AWS SQS, AWS SNS, Redis Queues and RabbitMQ Priority Queues.
- Worked on setting up and tuning of Spark clusters in AWS and also implementing (Py)Spark queries to increase the speed of data digestion operations result in 10x performance gain on the update operation.
- Tuned caching layers in Apache Spark and Redis to improve cache hit ratio.
- Performed various database backup, synchronization and migration operations in PostgreSQL databases, AWS Redshift, AWS DynamoDB, AWS S3 and Apache Solr Search Clusters.

MEMBER TECHNICAL STAFF (SOFTWARE ENGINEER) , ZOHO CORPORATION

MAY 2017 TO SEPTEMBER 2018 (FULL TIME); AUGUST 2016 TO APRIL 2017 (INTERNSHIP)

Built frameworks for handling image data and rendering images in iOS applications. Worked extensively in building libraries using Apple's Core Data framework for powering offline iOS applications. Worked on implementing OCR algorithms on receipt images to extract information in the Zoho Expense iOS application.

Education

- Pursuing MS in Computer Science (Machine Learning) at UT Dallas - Current Cumulative GPA - 3.92 / 4.00.

<https://github.com/Karthik-Ragunath/MSCS-Course-Work> {{On-Going}} - [2021 August - 2023 April*]

Interesting projects worked as part of course work:

(i) CS 6375 - Machine-Learning* {{On-Going}} {January 2022 to May 2022}

https://github.com/Karthik-Ragunath/MSCS-Course-Work/tree/master/ML_Spring2022

1. Trained SVM's in Primal and Dual form with/ without Slack Formation applying Polynomial and Gaussian kernels.
2. Built decision trees from scratch with information gain as the parameter to split the trees.
3. Built Sub-Gradient Descent and Stochastic Sub-Gradient Descent models from scratch.

(ii) CS 6313 - Statistical Methods for Data Science {August 2021 to December 2021}

https://github.com/Karthik-Ragunath/MSCS-Course-Work/tree/master/Stats_Fall2021

Linear Regression, Anova Testing, Confidence Interval Testing, Bootstrap and Monte-Carlo Sample Analysis

(iii) CS 5348 - Operating System Concepts {August 2021 to December 2021}

https://github.com/Karthik-Ragunath/MSCS-Course-Work/tree/master/OS_Fall2021

Coded linux-shell, classic concurrency problems (Student-Tutor-Coordinator), XV6/Linux-File-Systems, OS Scheduling.

- Electronics and Communication Engineering - Anna University - GPA 8.75 / 10.
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Projects

<https://github.com/Karthik-Ragunath/DeepLearning-Projects>

https://github.com/Karthik-Ragunath/Deep_Learning_Notebooks

- Built a music recommendation system to recommend songs based on user's music preferences and history. This recommendation system was primarily built on Pytorch-audio backend for model training and Elastic-Search clusters to perform KNN search.
 - Built a complete web-chat application's from scratch.
Backend - <https://github.com/Karthik-Ragunath/OIT-chat-model.git>
Frontend - <https://github.com/Karthik-Ragunath/OIT-Chat-Model-Frontend.git>
 - Built a document classifier system primarily involving BERT models for embedding the documents and Facebook's FAISS library for performing vector similarity search operation as part of DFW Hackathon 2021.
 - Trained CNN model with Efficient-Net architecture to identify possible diseases in plants with an accuracy of about 83%.
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Achievements In Competitive Programming Competitions

Competitive Programming Profile - <https://www.codechef.com/users/karthik6995>

GitHub Repository - https://github.com/Karthik-Ragunath/competitive_programming

- Achieved four star rating in competitive programming contests in CodeChef in May 2018 (Competitive Coding).
 - Achieved a global rank of 279 in CodeChef June CookOff 2018 Division 1 contest (Competitive Programming).
 - Achieved a global rank of 111 in CodeChef May Challenge 2018 Division 2 contest (Competitive Programming).
 - Achieved a global rank of 71 in LoC (Lord's Of Code) contest on the CodeChef platform, June 2018.
 - Achieved a global rank of 243 in CodeChef April Lunchtime 2018 Division 2 contest (Competitive programming).
 - 6th position in Zoho iOS Mobile Application Hackathon in the year 2018.
 - "Top Coder" award winner in College (2016).
 - Global Rank of 327 / 35766 in Project Euler+ Programming Contest in HackerRank during June 2016.
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Certifications

- Mathematics for Machine Learning Specialization - Imperial College London (Coursera) - Grade Achieved - 98%
https://github.com/Karthik-Ragunath/Mathematics_For_Machine_Learning (Mathematics for ML Repository).
 - Deep Learning Specialization - DeepLearning.AI (Coursera) - Grade Achieved - 100%
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