# 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), 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

- Currently (from Spring'22 semester) 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.
- Researching (from Fall'21) on "Cross Lingual Summarization via Joint Entity and Relationship Extraction Based Approach" under the guidance of professor Jessica Ouyang at UT Dallas. As part of this project, I am primarily working with Graphical Neural Network models to improve the state of the art performances of "Cross Lingual Summarization" models.
- 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.

## 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.
- Trained CNN models on for tagging e-commerce fashion products to identify features such as Base Color, Pattern, Background Color and Categories.
- 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 in10x 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.

**STUDENT MACHINE LEARNING DEVELOPER (UT DALLAS PART TIME ON-CAMPUS EMPLOYMENT) [JAN 2022 TO PRESENT]**

As part of this on-campus job at UT Dallas, I am working at an off-campus location, namely, Dr Isaac Chan's lab at UT Southwestern Medical Center where I am aiding in breast cancer research work by building Deep Learning models.

## Education

- Pursuing MS in Computer Science (Machine Learning) at UT Dallas - Current Cumulative GPA - 3.92 / 4.00.
- Electronics and Communication Engineering - Anna University - GPA 8.75 / 10.

## Projects

- 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%.
- Built a simple unix shell in C as part of coursework in Operating Systems CS 5348.
  https://github.com/Karthik-Ragunath/Simple-Unix-Shell.git

## Achievements

- 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.
- National Rank of 191 and Global Rank of 202 in CodeVita 2016 (Competitive Programming Contest).
- "Top Coder" award winner in College (2016).
- Global Rank of 327 / 35766 in Project Euler+ Programming Contest in HackerRank during June 2016.

## Certifications

- Mathematics for Machine Learning Specialization - Imperial College London (Coursera) - Grade Achieved - 98%
- Deep Learning Specialization - DeepLearning.AI (Coursera) - Grade Achieved - 100%

## Github Repository , Verified Certificates And Profile Links

- https://github.com/Karthik-Ragunath/competitive_programming (Personal Competitive Programming Repository)
- https://github.com/Karthik-Ragunath/Mathematics_For_Machine_Learning (Mathematics for ML Repository)
- https://github.com/Karthik-Ragunath/Deep_Learning_Notebooks (Deep Learning Specialization Repository)
- https://www.codechef.com/users/karthik6995 (Competitive Programming Profile)
- https://github.com/Karthik-Ragunath/MSCS-Course-Work
- https://github.com/Karthik-Ragunath/DeepLearning-Projects (Personal Deep Learning Projects + Research Repository)