Karthik Raja Kalaiselvi Bhaskar

📞 (+1) 647-804-6600 | ✉ karthikrajabk@gmail.com | 🌐 kbhaskar.com | 🐙 karthikraja95 | 🔗 kbhaskar

EDUCATION

University of Toronto   Toronto, Canada
M.A.Sc, Electrical & Computer Engineering (Machine Learning), GPA: 3.94/4.0

Anna University   Chennai, India
B.Eng, Electronics and Communication Engineering, GPA: 3.74/4.0

WORK EXPERIENCE

CIBC   Toronto, Canada
Senior AI Scientist | Technical Lead   Nov 2020 – Present

- **Technical Lead** driving AI/ML strategy with **full autonomy**: presented architectural decisions to **4 Senior Directors**, led **3 POCs end-to-end to production**, mentored **4 Data Scientists/Engineers**, managed **5 co-ops (2 converted to FT)**. Designed ML interview frameworks and led hiring panels.
- **Owned end-to-end** design, build, and deployment of **enterprise-scale GenAI Chatbot** using **RAG**, vector indexing, and prompt engineering, implementing **LLM-as-a-Judge evaluation framework**, now serving **50,000+ employees** enterprise-wide.
- **Led and architected** a **Multi-Agent AI System** for **Anti-Money Laundering (AML) investigations**, orchestrating **7 specialized agents** powered by **Google Gemini 2.5 Pro/Flash**, integrating external knowledge bases and real-time web grounding (Google Search API) to generate **Suspicious Transaction Report (STR) recommendations**, reducing analyst research time by **70%**, with end-to-end observability via **Langfuse**.
- **Spearheaded** cloud migration of ML infrastructure to **GCP** with **NVIDIA GPU clusters**, **owning architecture decisions** for training, inference, and ETL pipelines, achieving **92% reduction in model training time** (3 days to 6 hours).
- **Independently designed and shipped** production **AI Agents** using **OpenAI SDK**: **Talent Acquisition Agent**, **HR Document Generation Agent** (saving **900+ hours annually**), **Meeting Minutes Agent** (saving **12 hours/week per team member**).
- **Owned end-to-end HR chatbot** powered by **GPT-4o**, from architecture to deployment, reducing **response time by 99%** (15-20 minutes to seconds).
- **Led Conversational AI** initiative, building system with **ASR** and **Neural Agent Assistance**, reducing call-center volume by **25%**. **Published research at EMNLP 2022 Industry Track**.
- **Architected** Strategic Workforce Management tool using **Gaussian Deep Learning** and **Graph Neural Networks**, enabling **3-5 year workforce forecasting** with **uncertainty quantification**, reducing HR decision time by **40%**.
- **Owned RAG systems** architecture using **vector databases**, improving **information retrieval accuracy by 35%**.
- Established **LLMOps** practices using **MLFlow** and **Databricks ML**, reducing **model deployment time by 25%**.
- **Led** development of **NLP-based Search tools** for AML investigations, reducing **investigation time by 35%**.
- **Owned end-to-end** self-served **BERT** pipeline for client feedback analysis, reducing **80% manual labor**.
- **Led LLM fine-tuning** initiatives (**GPT-3.5, Llama, Falcon**) with **prompt engineering**, achieving **30% improvement** in query accuracy.
- **Architected and deployed** high-performance **Semantic Search Engine** using **Transformer models** with **data and model parallelism**. Deployed using **Docker and Kubernetes**.
- Built **DistilGPT-2** generative model for **synthetic financial data generation**, augmenting training datasets.
- Built **Semantic Feedback Analysis Pipeline** using **NLP and embeddings** for **CIBC and ME Chatbot**, enabling data-driven model improvements.

Diversio   Toronto, Canada
Machine Learning Engineer   May 2020 – Aug 2020

- Built a text classifier using **Word Embedding, LSTM, and Transformers**.
- Created a **Diversity and Inclusion score** that reflects employee experience within organizations.
- Designed a **Deep Learning based Recommendation System** using the diversity and inclusion score.

TD Canada Trust   Toronto, Canada
Data Scientist   May 2018 – Aug 2019

- Developed a **Deep Learning model** that detects and prevents the cyberattack before it happens **(ProjectX)**.
- Built **Unsupervised Auto Tagging algorithm** and Automatic Rule Synthesis for **Octavius**.
- Formalized an **Automatic Rule synthesis algorithm** for Octavius using **Deep Reinforcement Learning** to improve overall defense mechanism.

Infosys Ltd   Chennai, India
Software Engineer   May 2016 – Aug 2017

- Project deals with retail side application supported by **Apple** open to outside as well as Internal to Apple.
- Performed **root cause analysis** and carried out recommended changes.
- Conducted **impact analysis** on new changes before moving the code to production systems.
- Integrated changes in production environment with **minimal impact to existing functionalities**.
- Extensively monitored the system to make sure **business users are not impacted**.

SKILLS

Languages & Tools: Python, SQL, Git, Linux, Bash, Spark, Distributed Systems
ML/AI Frameworks: PyTorch, TensorFlow, Keras, Scikit-Learn, MLflow, HuggingFace Transformers, Ray
LLM & GenAI: LangChain, LlamaIndex, OpenAI SDK, Spacy, RAG, Vector Databases (Pinecone, ChromaDB), Prompt Engineering
Cloud & MLOps: AWS, GCP, Azure, Docker, Kubernetes, Databricks, Model Monitoring, CI/CD
Data Engineering: PySpark, Hadoop, Pandas, NumPy, SciPy, ETL Pipelines
Research Areas: Deep Learning, NLP, LLMs, GenAI, Multi-Agent Systems, Reinforcement Learning, Graph Neural Networks

RESEARCH

Vector Institute & University Health Network Toronto, Canada
Student Researcher Aug 2020 – Jan 2021
- Worked on a project at the intersection of **Electronic Health Records, Deep Learning** and **Natural Language Processing**.
- Applied **Self Supervised Learning, Weak Supervision** and **Data Programming** on **MIMIC III** database.
- Built **Transformer** based model to improve the accuracy of massively **multi-task classification problem**.
- Our Team **BeatCovid** designed and built a DL model to predict the COVID-19 cases across worldwide in **XPrize's Pandemic Response Challenge** and secured **16th place out of 250 teams** participated in this challenge worldwide.

University of Toronto Toronto, Canada
Machine Learning Researcher Sep 2018 – Jan 2020
- Designed a **Deep Learning based Recommendation System** for Wolseley's e-commerce website from scratch to production.
- Used NLP, Matrix Factorization, Collaborative Filtering, Bayesian Optimization and Deep Learning techniques such as MLP, Autoencoder, LSTM, etc.
- Achieved a personalized **NDCG score of 72.4%** and improved the **One-Product Hit Ratio to 100%**.

PROJECTS

Fika - End to End Data Science Tool Toronto, Canada
Data Science - Python - Docker - FastAPI - MLFlow - Deployment Sept 2021
- Built a collection of tools for Data Scientists and ML Engineers to **automate their workflow** of performing analysis to deploying models and pipelines.
- Fika provides automated **data cleaning, preprocessing, feature engineering, visualizations, model interpretability and modelling techniques** through one line of code.
- Experiment tracking with **MLFlow**. Fika exports trained models as a service (Generates the necessary code, files and folder structure).

End to End Deforestation Detection Toronto, Canada
Deep Learning - FastAI - Streamlit - GCP - BigQuery - Deployment May 2021
- Built a **ResNet** model to detect deforestation, achieved **95.6%** accuracy and **92.7%** F2 score.
- Designed a Dashboard using **Streamlit** to deploy, manage and share the application.
- Created a **Data Flywheel** using Google's BigQuery and Cloud Storage Buckets.

Multi Agent Tennis - Collaboration and Competition Toronto, Canada
Reinforcement Learning - Multi Agents - DDPG - Experience Replay - PyTorch Apr 2020
- Set-up: Two-player game where agents control rackets to bounce ball over a net without dropping. Positive reward +0.1, Negative reward -0.01.
- Built **Multi Agent DDPG** algorithm, achieved an average reward of **+0.5** over 100 episodes.

Defense GAN & Physical Adversarial Examples Toronto, Canada
Deep Learning - GAN - DeepFool - Cleverhans - TensorFlow Apr 2019
- Generated adversarial examples using **FGSM, DeepFool** and **Carlini & Wagner (CW)** attacks.
- Built **Defense GAN**, a stable and robust model for adversarial attacks.

Hyper Face Toronto, Canada
Deep Learning - Computer Vision - FRCNN - PyTorch, OpenCV Apr 2019
- Built a **Multi-Task CNN** to recognize face and to predict the facial landmark points, visibility, pose and gender with **90.68%** accuracy.

Other Projects Toronto, Canada
Reinforcement Learning - Deep Learning - Machine Learning - Cyber Security Jan 2018 – Apr 2020
- Human like Chess Engine, Microsoft Malware Detection, Stackoverflow Tag Predictor, Quora Question Similarity, Navigation, etc.
- Please visit **https://www.kbhaskar.com/**

AWARDS

2018	**Master's Research Fellowship**, University of Toronto, ECE	Toronto
2018	**Master's Student Fellowship**, University of Toronto, ECE	Toronto
2016	**Best Outgoing Student**, Anna University, ECE	Chennai

POSITIONS OF RESPONSIBILITY

Jan 2021 – Mar 2022	**Stream Owner: ML in HealthCare - AISC**, A.I. Socratic Circles - technical review and discussion of advances in ML	Toronto
May 2020 – Oct 2020	**Machine Learning Researcher - CheckingIn**, Mental Health startup, built models using app and Apple Watch data	Vancouver
Sep 2018 – Aug 2020	**Teaching Assistant - UofT**, Fundamentals of AI, Intro to Machine Intelligence, Programming Languages	Toronto
Sep 2018 – Apr 2019	**Project Lead & ML Engineer - UofT Data Science Team**, Mentored undergrads on CV, NLP projects	Toronto
Sep 2018 – Apr 2019	**ML Engineer - WearTech**, Built Face Recognition for people with Prosopagnosia	Toronto