

# Saravanan Rajamanickam

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## CAREER PROFILE

Dynamic and innovative Research Scientist with over 12 years of experience in Data Science, Analytics, and AI/ML solutions. Expert in leading cross-functional teams to design, build, and deploy scalable AI applications and infrastructure, driving strategic growth and operational efficiency.

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## EDUCATION

### Master of Technology (MTech)

Jan 2017 – Oct 2018

National University of Singapore (NUS), Singapore  
Enterprise Business Analytics

### Non-degree Graduate

Aug 2015 – 2016

Illinois Institute of Technology, Chicago, US  
Information Technology and Management

### Bachelor of Engineering (B.Eng.)

Jul 2005 – May 2009

PSG College of Technology, Coimbatore, India  
Electronics and Communication

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## TECHNICAL SKILLSET

### Programming Languages & Tools:

Python, R, Java

### Databases & Tools:

Oracle, MySQL, NoSQL

### Cloud Framework:

Amazon Web Services, Azure and Google Cloud

### ML frameworks & Deployment:

Pytorch, Tensorflow, Keras, Git, Kubernetes, Docker,  
Langchain, LlamaIndex

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## PROFESSIONAL EXPERIENCE

From Sep 2024 -

### Research Scientist 3/Machine Learning Engineer – Blue Raven AI

- Leading a team of ML Engineers, and developed novel machine learning models to solve complex math problems in automated theorem proving using math reasoning models
- Built training & inference pipelines for LLMs and conducted extensive experiments using state-of-the-art models and evaluated against our model for math reasoning benchmarks.
- Working with the engineering team and design team to build prototypes into production

### Lead Research Engineer II – A\*Star, Institute for Infocomm Research (I2R)

May '19 - May'24

- LLM-Based RAG Model for Synthesizing Military Intelligence from Geopolitical Reports - ISW, Janes
  - Langchain, Llama2, Mistral, and Mixtral models for generating response.
- Led AI for education and math reasoning models, and won 1st Prize at AAAI2024 Workshop.
  - LLMs Used - Codellama, Llama2, Mistral [2023-24]
- Developed neuro-symbolic AI models for Evidence-based Logic Reasoning for Explainable AI
  - Building Neuro-symbolic AI models for Natural Language Generation (Published 2 papers in ACL 2023) [2022-23] LLMs Used – Llama2, Falcon, Vicuna
- Developed multimodal models (NLP and CV models) for sensitive content detection and threat detection.
  - Won 2nd Prize in EMNLP 2023 for Multimodal Argument Mining for sensitive/threat topics [2023]

- Lead the development of machine learning models to extract entities and relationships from unstructured information and deployed AWS AI solution for custom entity extraction [2021]
- Keyword extraction and classification of text description for improving tax process. Built and deployed an end-to-end AI model for the MNC client [2019]
- Implemented privacy-preserving data analysis solutions using homomorphic encryption. Deployed solution for government healthcare company [2021]

#### **AI Data Scientist – Amaris.AI, Singapore**

**Oct 2018 – May '19**

- Identifying a use case based on the problem statement and breaking the use case into discrete MVPs (minimal viable products) based on the user requirement
- Communicated effectively with line-of-business end-users to discover pain points and use cases, lead project definitions, and convey the business value of the project.

#### **Data Scientist Intern – AI Chat Pte Ltd, Singapore**

**Dec 2017 – May '18**

**Project:** Building a neural machine translation language model for natural language generation

- Built an automated data pipeline for crawling the textual data and feature extraction using unsupervised learning
- Built customized unsupervised learning algorithms for annotating training documents automatically using proxy labels
- Built Entity Extraction pipeline for each domain from the noisy documents. Built text classification models and Information Retrieval models for various domains to train chatbots

#### **Data Scientist Intern – Lazada, Singapore**

**Sep 2017 – Nov '17**

**Project:** Automated Machine Learning model - Outlier detection for A/B testing

- Built a Machine Learning Outlier Detection model for customer orders
- Suggested metrics to optimize A/B testing performance
- Using unsupervised algorithms, machine-learning model was designed to detect the outliers

#### **Senior Data Analyst –Tata Consultancy Services, Chennai, India & London, UK**

**Dec 2009 -Aug '15**

##### **Client: Marks & Spencer [2012–2015]: Omni-channel Order Management**

- Led a team of 20 engineers to enhance the e-commerce Order Management System, focusing on customer order fulfillment, inventory sourcing & scheduling, and gift card management.
- Managed critical KPIs, tracked out-of-stock inventory, and generated peak sales reports to optimize performance.
- Conducted data validation across multiple applications and coordinated efforts among various teams at the client site in London.
- Spearheaded complex data analysis for promotional campaign execution for a US-based retailer, developing robust data analytical databases and pipelines from diverse customer sources.
- Successfully secured multiple projects, driving a 50% increase in revenue for the client. Presented innovative ideas and proposals to senior management, including the Head of IT Director.
- Published and maintained customer analytics and real-time monitoring dashboards in Splunk, which continue to provide significant value at the Head office in London.

##### **Client: JCPenney [2009–2012]: Order Management**

- Oversaw the entire portfolio of Order Management, developing and implementing analytic solutions for various operational challenges.
- Managed supply chain operations, including TMS, WMS, EDI integration, and inventory reporting reconciliation.
- Conducted data analysis across multiple sources, tracked sales, and engaged directly with client business SMEs for ad-hoc development and maintenance as per their requirements.
- Played a key role in order processing, inventory sourcing & scheduling, and managing the gift card registry

## RECENT HIGHLIGHTS

- Architected and deployed NLP/LLM/AI solutions, focusing on explainable AI and semantic text analysis
  - Deep knowledge of Generative AI models, frameworks, packages, and related tools
  - Good knowledge in prompt engineering and prompt tuning techniques like chain-of-thoughts, RAG
  - Finetuned LLM/Generative AI models and built AI pipelines for LLM Inference
  - Design an automatic machine learning system for Information Retrieval models, Q&A models which is used for various clients (Created Internal software IP for this project)
  - Lead design reviews with other technical staff and stakeholders to define product requirements and formulated system designs for the integration of AI into existing software systems in production
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## INTELLECTUAL PROPERTY

### Project IPs:

- Keyword Extractions and classification of Text Descriptions for improving Tax preparations (April '20)

### Software IPs:

- Secure Merging using HXOR (April'21)
  - Machine learning framework for text mining models (Jun'20)
  - Explainable Logic Reasoner for Natural Language Text (Nov'22)
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## PUBLICATIONS

- Rajaraman, K., Rajamanickam, S., Veeramani, H., Westerski, A. M., & Kim, J. J. (2023, December). Semantists at ImageArg-2023: Exploring Cross-modal Contrastive and Ensemble Models for Multimodal Stance and Persuasiveness Classification. In Proceedings of the 10th Workshop on Argument Mining (pp. 181-186).
  - Rajamanickam, S., & Rajaraman, K. (2023, July). I2R at SemEval-2023 Task 7: Explanations-driven Ensemble Approach for Natural Language Inference over Clinical Trial Data. In Proceedings of the 17th International Workshop on Semantic Evaluation (SemEval-2023) (pp. 1630-1635).
  - Rajaraman, K., Rajamanickam, S., & Shi, W. (2023, July). Investigating TransformerGuided Chaining for Interpretable Natural Logic Reasoning. In Findings of the Association for Computational Linguistics: ACL 2023 (pp. 9240-9253).
  - Paul, J., Rajamanickam, S., Veeravalli, B., & Aung, K. M. M. PENDA: Privacy ENhanced Data Aggregator.
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## HONORS & AWARDS

- **Feb 2024 - Global Competition on Math Problem Solving and Reasoning - Association for the Advancement of Artificial Intelligence**

Won 1st Prize on Global Competition on Math Problem Solving and Reasoning (Track 2 - Solution without API).

- **Oct 2014 - "Top Talent Denmark -Denmark - India Business Challenge" - Innovation Center Denmark**

Awarded the " Top Talent Denmark " in the category of Denmark - India Business Challenge and for the winner a study trip to Denmark was provided.

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