

Divya Thekke Kanapram

PhD | AI Research Scientist | ML/DL Expert (Bayesian Methods
& LLMs)

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Machine Learning Research Engineer at Intangia Ltd

Postdoctoral Researcher at Imperial College London and the University
of Cambridge

PROFESSIONAL SUMMARY

AI researcher and Machine Learning Engineer with 7+ years' experience in academia and industry. Expertise in Bayesian methods, interpretable machine learning, and graph-based NLP, with proven ability to deploy scalable solutions on cloud platforms. Skilled in sensor data modeling, anomaly detection, and real-time ML for embedded systems, with a strong track record of impactful research and applied projects. Certified PMP, experienced in leading cross-functional AI initiatives that balance innovation, fairness, and efficiency. Recently focused on fine-tuning large language models (LLMs) for advanced NLP applications. Holds [indefinite leave-to-remain \(ILR\)](#) status in the UK, ensuring full work eligibility.

EDUCATION

Queen Mary University of London and University of Genova London, UK and Genova, Italy
PhD (Joint doctorate) in **Machine Learning** (Interactive and Cognitive Environments) Nov 2017–June 2021

- Thesis: [Ego Things - Networks of Self-Aware Intelligent Objects: Multi-Modal Dynamic Bayesian Models for Self-Awareness and Collective Awareness in Agents' Networks](#) [2-7]

Advisors: *Carlo Regazzoni, Eliane Bodanese, Mario Marchese*

The research aimed to develop a hierarchical dynamic Bayesian Network using data-driven methods, incorporating [self-awareness](#) and [collective awareness](#) in intelligent agent networks for anomaly detection, decision-making, and incremental learning of new models from new experiences. Machine learning, signal processing, and IoT were utilized to implement these functionalities while analyzing the effects of networking protocols and communications. The model was further enhanced with [interpretability](#) by applying *graph-matching techniques*.

University of Genova Genova, Italy
MS in Multimedia Signal Processing and Telecommunication Networks September 2014–December 2016

- Thesis: [Measurement, Representation, and Evaluation of Energy Efficiency Data in Cloud Computing Platforms \(Open stack\)](#)

[8-9]

Advisors: *Franco Davoli, Matteo Rapetto*

Developed flexible software to monitor and manage power consumption across cloud computing environments, compatible with OpenStack and various hardware protocols. This tool significantly aids in improving energy efficiency by enabling comprehensive data analysis and facilitating the creation of energy-saving policies.

WORK EXPERIENCE

Intangible Limited, ML Engineer
Engineering Department

Cambridge, United Kingdom
September 2024 - Present

- Designing and fine-tuning large language models (LLMs) for specific applications, including natural language processing tasks such as text generation, classification, and summarization.
- Implementing and optimizing LLMs for efficient deployment in production environments, ensuring performance scalability, low latency, and cost-effective resource utilization.
- Developing knowledge graphs in Neo4j to enhance Named Entity Recognition (NER) capabilities in LLMs, enabling structured data representation and improved model accuracy in downstream NLP tasks.

University of Cambridge, Research Associate
Electrical Engineering/ Dept. of Engineering

Cambridge, United Kingdom
July 2022 - July 2024

- Developed machine learning and deep learning models for deployment on sensing and computation hardware platforms to estimate states in real-time. These models were also used for further analysis to improve object design, material selection, and sensing platforms.
- Investigated new prototype processor implementations for applications in machine learning and real-time sensor data processing.
- Participated in the design of a new processor micro-architecture aimed at applying machine learning in embedded sensing systems.

Signaloid Limited, Engineering Project Coordinator (Part-time, remote)

Cambridge, United Kingdom
January 2023-January 2024

- Coordinated the development and release activities across multiple engineering teams to ensure the timely delivery of objectives and key results.
- Summarized status updates and dependencies between deliverables.
- Proactively identified and resolved misalignments between team activities and overall company objectives.

Imperial College London, Research Associate
Infectious Disease Epidemiology/ School of Public Health

London, United Kingdom
June 2021-July 2022

- Participated in the development, enhancement, and real-time performance comparison of models of COVID-19 transmission to inform policymakers.
- Engaged in designing novel methodologies to incorporate additional complex spatiotemporal heterogeneity into existing COVID-19 transmission models.
- Presented research findings at scientific conferences.

Emirates Telecommunications
Project Management Specialist

Abu Dhabi, United Arab Emirates
August 2010-July 2014

- Project development plans were created and timely, high-quality delivery was ensured through effective management of all relevant internal and external stakeholders.
- New business opportunities were identified and strategic partnerships were formed with the business development team to expand market services.

Waves Computer
IT Administrator

Abu Dhabi, United Arab Emirates
Sept 2009- July 2010

- Ensured the Service Desk and directories were up to date with new site set-ups and closures.
- Supported server, network, and desktop-based software and applications.

Grepsoft Technologies
Technical Support Engineer

Ernakulam, India
Nov 2007- July 2009

- Developed and implemented network enhancements, and made recommendations for improvement. Installed and configured computer hardware, software, networks, and applications. Provided proactive communication and conducted meetings with clients, account managers, and project managers.
- Monitored and maintained systems and networks continuously.
- Provided proactive communication and conducted meetings with clients, account managers, and project managers.

SCHOLARSHIPS AND AWARDS

- Scientific Pandemic Influenza Group on Modelling (SPI-M-O) Award for Modelling and Data Support, Scientific Advisory Group for Emergencies (SAGE), United Kingdom 2022
- Ph.D. scholarship: Joint Doctoral Program in Interactive and Cognitive Environments (JD ICE) 2017–2020, University of Genova, Italy and Queen Mary University London, United Kingdom
- M.Sc. scholarship: M.Sc. Program in Multimedia Signal Processing and Telecommunication Networks (MSPTN) 2014–2016, University of Genova, Italy

TEACHING EXPERIENCE

- Guided students in RISC-V processor design, FPGA tool setup, and Verilog coding.
- Assisted with digital logic design projects, troubleshooting, and practical sessions.
- Ensured clarity on processor architecture, pipelining, and FPGA power measurement.

TECHNICAL SKILLS AND EXPERTISE

- **Machine Learning and AI:** Supervised and unsupervised learning, model evaluation, pipeline design
- **Statistical Machine Learning:** Bayesian inference, HMMs, graphical models, clustering, regression, classification, uncertainty modeling
- **Deep Learning:** Network design and training using CNNs, RNNs, transformers, and autoencoders
- **DL Techniques:** Regularization (Dropout, Batch-Norm), optimization (Adam, SGD), loss functions (CrossEntropy, MSE, Contrastive Loss)
- **LLMs and NLP:** Fine-tuning large language models (LLMs), multimodal learning, transformer-based text generation and NER
- **Graph-based Learning:** Graph neural networks, knowledge graph modeling with Neo4j and Cypher queries
- **Temporal and Sensor Data Modeling:** Spatio-temporal data analysis, multi-sensory fusion, anomaly detection in agent networks
- **Probabilistic Inference:** Dynamic Bayesian networks for decision-making and state estimation in real-time systems
- **Cloud and Deployment:** Google Cloud Platform (Compute Engine, Cloud Functions, BigQuery), scalable ML deployment

PROGRAMMING TOOLS

- **Python:** Proficient in key libraries and frameworks including [TensorFlow](#), [Keras](#), [Scikit-learn](#), [Pandas](#), [NumPy](#), and [Matplotlib](#)
- **MATLAB toolboxes:** Statistics and ML, Signal Processing, Control System, Statistics and Machine Learning, Deep Learning, Sensor Fusion and Tracking.
- **R:** dplyr, tidyr
- **PopSQL::** SQL query development, version control, and collaborative query management

SELECTED PUBLICATIONS

1. Divya Thekke Kanapram , Lucio Marcenaro , David Martin Gomez , Carlo Regazzoni “Graph-Powered Interpretable Machine Learning Models for Abnormality Detection in Ego-Things Network.”, ***Sensors***,2022,DOI:10.3390/s22062260
2. Divya Thekke Kanapram, Mario Marchese, Eliane L. Bodanese, David Martín Gómez, Lucio Marcenaro and Carlo Regazzoni “Dynamic Bayesian Collective Awareness Models for a Network of Ego-Things”, ***IEEE Internet of Things Journal***, DOI:10.1109/JIOT.2020.3043199
3. Divya Thekke Kanapram, Pablo Marin-Plaza, Lucio Marcenaro, David Martin, Arturo de la Escalera and Carlo Regazzoni “Self-awareness in intelligent vehicles: Feature based dynamic Bayesian models for abnormality detection”, ***Robotics and Autonomous Systems Journal***, Volume 134, 2020, 103652, DOI: 10.1016/j.robot.2020.103652
4. Divya Thekke Kanapram, Fabio Patrone,Pablo Marin-Plaza, Mario Marchese, Eliane L. Bodanese, Lucio Marcenaro, David Martín Gómez and Carlo Regazzoni “Collective Awareness for Abnormality Detection in Connected Autonomous Vehicles”, ***IEEE Internet of Things Journal***, VOL. 7, NO. 5, MAY 2020, DOI:10.1109/JIOT.2020.2974680
5. Divya Kanapram, Pablo Marin-Plaza, Lucio Marcenaro, David Martin, Arturo de la Escalera and Carlo Regazzoni “Self-awareness in Intelligent Vehicles: Experience Based Abnormality Detection”, ***ROBOT 2019:Fourth Iberian Robotics Conference pp 216-228*** ,DOI:10.1007/978-3-030-35990-4₁₈
6. Mohamad Baydoun,Damian Campo, Divya Kanapram, Lucio Marcenaro, Carlo S. Regazzoni “Prediction of Multi-target Dynamics Using Discrete Descriptors: an Interactive Approach”, ***ICASSP 2019 - 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*** , DOI: 10.1109/ICASSP.2019.8682272
7. Divya Kanapram, Damian Campo, Mohamad Baydoun, Lucio Marcenaro, Eliane L. Bodanese, Carlo Regazzoni and Mario Marchese, “Dynamic Bayesian Approach for decision-making in Ego-Things,” **2019 IEEE 5th World Forum on Internet of Things (WF-IoT)**, DOI: 10.1109/WF-IoT.2019.8767204
8. D. Kanapram, R. Rapuzzi, G. Lamanna and M. Repetto “A framework to correlate power consumption and resource usage in cloud infrastructures”, **2017 IEEE Conference on Network Softwarization (NetSoft)**, Bologna, 2017, pp. 1-5,DOI: 10.1109/NETSOFT.2017.8004249
9. D. Kanapram,G. Lamanna, M. Repetto “Exploring the trade-off between performance and energy consumption in cloud infrastructures”, **2017 Second International Conference on Fog and Mobile Edge Computing (FMEC)**, Valencia, 2017, pp. 121-126, DOI: 10.1109/FMEC.2017.7946418

Project Name	Approach	Dataset	Diversity of Dataset	Objective	Period
Interactive and Cognitive Environments (University of Genova, Italy, Funded by EU)	Data-driven Generative Dynamic Bayesian Networks	Autonomous vehicle data (odometry, control data: steering, velocity, power)	Multi-sensor time-series data (real-time control and decision-making signals)	Designed generative Bayesian models for anomaly detection and decision-making using multimodal time-series data from autonomous vehicles.	2017-2021
COVID-19 at Imperial College (Imperial College London, Funded by UK Government)	Model-driven Epidemiological models, Bayesian Inference	COVID-19 clinical data	Temporal clinical and demographic data (spanning geographies and interventions)	Modeled COVID-19 transmission dynamics to inform public health policies and contribute to real-time decision-making for government responses.	2021-2022
PROSECCO (Programmable Sensing Composites) (University of Cambridge, Funded by UKRI)	Model-driven Signal processing, sensor fusion models, deep learning (CNN, RNN)	IMU sensory data (accelerometer, magnetometer, gyroscope)	Diverse wearable sensor data (capturing physical activity and movement patterns)	Designed prototypes and developed real-time models for gait analysis in patients, advancing healthcare sensor technology and personalized treatments.	2022-2024
Neo4j Knowledge Graphs for NLP (Intangia Ltd, UK)	Data-driven Knowledge graph modeling and Cypher queries	Structured and unstructured text datasets	Heterogeneous NLP datasets (including labeled entity data and graph embeddings)	Developing knowledge graphs to enhance Named Entity Recognition (NER) and improve the accuracy and interpretability of large language models.	2024-Present
FI Green (University of Genova, Italy, Funded by EU)	Data-driven Power consumption monitoring and management	Power consumption data from OpenStack components (via SNMP, IPMI, and OpenStack APIs)	Energy usage data across cloud environments (diverse protocols and hardware setups)	Developed software to monitor and optimize power consumption in cloud infrastructures, enabling energy-efficient policies and resource utilization.	2014-2016