

Divya Thekke Kanapram

PhD in Artificial Intelligence

Machine Learning Research Engineer at Intangia Ltd

Postdoctoral Research Experience at Imperial College London

and University of Cambridge

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PROFESSIONAL SUMMARY

Dr. Divya Thekke Kanapram is a researcher in machine learning and Artificial Intelligence(AI) with a PhD in AI and postdoctoral experience at Imperial College London and the University of Cambridge. She focuses on developing advanced AI models, including dynamic Bayesian networks and real-time data processing. Her research has notably advanced IoT systems and intelligent agent networks, enhancing anomaly detection and decision-making. As a certified Project Management Professional (PMP: 1695117), she effectively leads teams to drive innovation and develop state-of-the-art solutions.

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](#) [3-8]

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 \(Open stack\)](#)

[9-10]

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

Cambridge, United Kingdom

Electrical Engineering/ Dept. of Engineering

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

London, United Kingdom

Infectious Disease Epidemiology/ School of Public Health

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

Abu Dhabi, United Arab Emirates

Project Management Specialist

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.

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

TECHNICAL SKILLS AND EXPERTISE

- **Machine Learning and Artificial Intelligence**
- **Deep Learning** (including Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN) and Graph-based Models)
- **Dynamic Bayesian Inference**
- **Agent Interaction and Anomaly Detection**
- **Data Analysis and Processing** (including Spatio-temporal Data Analysis, Multi-sensory Data Processing, and Real-World Data Processing)
- **Fine-tuning Large Language Models (LLMs) and Multimodal Models**
- **Neo4j (Graph Database)**: Data modeling, Cypher query language, data import/export, relationship and node management, graph analysis

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

KEY PROJECTS

Project Name	Approach	Dataset	Purpose/Objective
Interactive and Cognitive Environments (University of Genova, Italy, Funded by EU)	Data-driven Dynamic Bayesian Networks	Autonomous vehicle data (odometry, control data: steering, velocity, power)	Developed anomaly detection systems for autonomous vehicles using sensor data combinations to improve decision-making.
COVID-19 at Imperial College (Imperial College London, Funded by UK Government)	Model-driven Epidemiological models, Bayesian Inference	COVID-19 clinical data	Modeled COVID-19 transmission dynamics to inform public health policies and contributed to real-time decision-making for government responses.
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)	Designed prototypes and developed real-time models for gait analysis in patients, advancing healthcare sensor technology.

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. Raphael Sonabend, Lilith K. Whittles, Natsuko Imai, Pablo N Perez-Guzman, Edward S Knock, Thomas Rawson, Katy AM Gaythorpe, Bimandra A Djaafara, Wes Hinsley, Richard G FitzJohn, John A Lees, [Divya Thekke Kanapram](#), et al. “Non-pharmaceutical interventions, vaccination and the Delta variant: epidemiological insights from modelling England’s COVID-19 roadmap out of lockdown.”, ***The Lancet*** (2021), DOI: 10.1016/S0140-6736(21)02276-5
3. [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

4. 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
5. 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
6. 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:10.1007/978-3-030-35990-4_18
7. 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
8. 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
9. 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
10. 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