Divya Thekke Kanapram

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PhD in Artificial Intelligence

Postdoctoral Research Experience at Imperial College London

and University of Cambridge

Professional Summary

Dr. Divya Thekke Kanapram is a researcher in machine learning and AI with a PhD in Artificial Intelligence 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 Artificial Intelligence (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 [5-10]
  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)

[11-12]

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

University of Cambridge, Research Associate — Cambridge, United Kingdom
Electrical Engineering/ Dept. of Engineering — July 2022-Current

- Developing machine learning and deep learning models for deployment on sensing and computation hardware platforms to estimate states in real-time. These models are also used for further analysis to improve object design, material selection, and sensing platforms.
- Investigating new prototype processor implementations for applications in machine learning and real-time sensor data processing.
- Participating 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. [1],[3]-[4]
- 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.

Waves Computer Abu Dhabi, United Arab Emirates
IT Administrator 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 Ernakulam, India
Technical Support Engineer 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

Programming tools

- **Python**: TensorFlow, Scikit-learn, Pandas, Numpy, Matplotlib
- **MATLAB toolboxes**: Statistics and ML, Signal Processing, Control System, Statistics and Machine Learning, Deep Learning, Sensor Fusion and Tracking.
- **R**: dplyr, tidyr

Technical Skills

- **Machine Learning and Artificial Intelligence.**
- **Deep Learning**
- **Dynamic Bayesian Inference.**
- **Agent interaction modelling for anomaly detection.**
- **Spatio-temporal data analysis.**
- **Multi-sensory data processing.**

Publications

1. Perez-Guzman PN, Knock E, Imai N, Rawson T, Elmaci Y, Alcada J, Whittles LK, Thekke Kanapram D, Sonabend R, Gaythorpe KA, Hinsley W, Epidemiological drivers of transmissibility and severity of SARS-CoV-2 in England. Nat Commun 14, 4279 (2023), DOI: 10.1038/s41467-023-39661-5

2. 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*

3. Imai N, Rawson T, Knock ES, Sonabend R, Elmaci Y, Perez-Guzman PN, Whittles LK, Kanapram DT, Gaythorpe KA, Hinsley W, Djaafara BA. Quantifying the effect of delaying the second COVID-19 vaccine dose in England: a mathematical modelling study. ***The Lancet Public Health. 2023 Mar 1;8(3):e174-83**,DOI:10.1016/S2468-2667(22)00337-1*

4. 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*

5. 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*

6. 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

7. 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

8. 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_1$8

9. 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

10. 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

11. 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

12. 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