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Notice for the PhD Viva-Voce Examination

Ms Priya Thomas (Registration Number: 1981317), PhD scholar at the School of Sciences, CHRIST (Deemed to be University), Bangalore will defend her PhD thesis at the public viva-voce examination on Friday, 22 November 2024 at 3.00 pm in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029.

Title of the Thesis	:	**Dynamic Offloading Technique for Latency Sensitive IoT Applications Using Fog Computing**
Discipline	:	**Computer Science**
External Examiner (Outside Karnataka)	:	**Dr Muneeswaran V** Associate Professor Cyber Security and Digital Forensics School of Computing Science and Engineering VIT Bhopal University Kothrikalan Madhya Pradesh - 466114
External Examiner (Within Karnataka)	:	**Dr Veena S** Professor Department of Computer Applications RR Campus, PES University Bengaluru, Karnataka
Supervisor	:	**Dr Deepa V Jose** Associate Professor Department of Computer Science School of Sciences CHRIST (Deemed to be University) Bengaluru – 560029 Karnataka

The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva-voce examination.

Registrar

Place: Bengaluru
Date: 16 November 2024

ABSTRACT

The Internet of Things (IoT) has evolved as one of the most popular technological innovations that offers processing power to different types of entities connected to it. IoT has made traditional applications smarter and easier to use. IoT offers reliable service to different sectors such as healthcare, industrial control, agriculture, autonomous vehicles, traffic management etc. IoT nodes are generally energy-constrained and hence depend on cloud platforms for storage and analytics of generated data. The cloud provides required services for the connected applications based on pay per use policy. But cloud datacenter being at remote location fails to accommodate the time requirements of delay-sensitive IoT applications. Edge/fog computing was designed to address the demands of time-sensitive IoT applications.

The IoT-Fog-Cloud architecture reduces the delay and response time incurred by the IoT-Cloud model. The fog layer in the three-tier architecture is distributed in nature. Hence the latency depends on how well the underlying offloading algorithms distribute the tasks among available fog nodes. Different offloading policies are mentioned in the literature to address this issue. This work initially tries to solve the offloading problem using one of the novel offloading approaches Flamingo Search Algorithm (FSA). Later, the results obtained from FSA are fine-tuned using another metaheuristic algorithm, the Honey Badger Algorithm (HBA). Finally, both FSA and HBA are hybridized to generate the HB-FS algorithm which effectively solves the task offloading problem. The performance evaluation of the proposed approach is done with different existing metaheuristic algorithms and the evaluations show that the proposed work outperforms the existing algorithms in terms of latency, average response time and execution time. The methodology also offers a lesser degree of imbalance and standard deviation than the compared approaches. Hence, HB-FS can be effectively used to reduce the delay in time-sensitive IoT applications.

Keywords: Fog computing, Internet of Things (IoT), Cloud computing, latency, offloading.

Publications:

1. **P. Thomas** and D. V. Jose, "Dynamic Offloading Technique for Latency-Sensitive Internet of Things Applications using Fog Computing", IJRITCC, vol. 11, no. 6, pp. 103–112, Jul. 2023.
2. **P. Thomas** and D. V. Jose "Towards Computation Offloading Approaches in IoT-Fog-Cloud Environment: Survey on Concepts, Architectures, Tools and Methodologies", CIS 2022, Lecture Notes in Networks and Systems, vol 613, pp. 37–52, 2023, Springer, Singapore.
3. **P. Thomas** and D. V. Jose "Metaheuristics based Task Offloading Framework in Fog Computing for Latency-sensitive Internet of Things Applications", ICCIS 2022, Lecture Notes in Networks and Systems, vol 689, pp 221–239, 2023. Springer, Singapore
4. **P. Thomas** and D. V. Jose, "Edge/Fog Computing- An Overview and Insight into Research Directives", in Machine Intelligence: Computer Vision and Natural Language Processing (1st ed.). Auerbach Publications, pp. 47–64, 2023.