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NOTICE

Guidelines for submission of Abstract for "OUTR Research Conclave – 2026"

Last Date of Submission: **15th February, 2026**
E-mail to which abstract to be submitted: **editor_rc2026@outr.ac.in**

The detail guidelines for submission of the abstract are as follows:

(i) **Title** (maximum 3 lines, font 12, bold, Times New Roman single spacing)

(ii) **Authors** (1st author to present the paper will be underlined and main author to be with asterisk mark) (Dr. / Prof. / Mr. / Mrs. should not be pre-fixed in the name). Full name of the authors should be written.

(iii) **Affiliation of the Institute with Address**

(iv) **e-mails** (of 1st and corresponding authors)

(v) **Passport size colour Photograph of 1st author** (in .jpg file, 1MB size)

(vi) **Abstract** (Times New Roman, font size 11, single spacing, maximum 500 words) shall be in MS-Word file xx.doc or xxx.docx.

(vii) Reference should not be given.

NB: Abstract with graphical figures, if any, must be publishable in **ONE Page** only.

A sample abstract is enclosed for kind reference and it is requested to follow similar format, i.e., different sequence-wise section and descriptions thereof. The sequence of sections is: **Introduction, Materials and Methods, Results and Discussion, Conclusion / Recommendations, and Key** words.

All concerned are requested to submit their abstracts as per above guidelines and within the schedule date failing which it will not be considered for publication.

Sd/-
PIC – Research Conclave

Adaptive Reinforcement Learning for Dynamic Voltage and Frequency Scaling in Energy-Efficient Computing

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Introduction: The increasing demand for energy-efficient computing has driven the development of advanced techniques to optimize power consumption in modern systems. While Dynamic Voltage and Frequency Scaling (DVFS) has been widely used for power management, traditional implementations struggle to adapt dynamically to workload variations, limiting their effectiveness. This research introduces an innovative approach that integrates Reinforcement Learning (RL) into DVFS to overcome these limitations. Using Q-learning, a model-free RL technique, the proposed algorithm autonomously learns and applies optimal CPU voltage and frequency adjustments in real time. Experimental results demonstrate a significant 20% reduction in power consumption compared to conventional DVFS methods. The model's adaptability across diverse workloads highlights RL's potential in enhancing energy efficiency. As energy optimization becomes increasingly critical, this study underscores the transformative role of RL in achieving sustainable and high-performance computing systems.

Methods and Material: Optimizing power consumption is a critical challenge in energy-efficient computing. Dynamic Voltage and Frequency Scaling (DVFS) has long been a key technique for managing power, but traditional implementations struggle to adapt to the increasing complexity and variability of modern workloads. To address these limitations, this paper proposes an innovative approach that integrates Reinforcement Learning (RL) into DVFS, enabling intelligent, real-time adjustments of CPU voltage and frequency.At the core of this approach is Q-learning, a model-free RL technique that iteratively learns the optimal policy for voltage and frequency scaling.

Result and Discussion: Unlike conventional DVFS methods with fixed configurations, the proposed system dynamically adapts to workload variations, achieving a 20% reduction in power consumption. Comprehensive evaluations on server data demonstrate the superiority of RL-based DVFS in balancing energy efficiency and computational performance.This research also explores the integration of RL-based DVFS into the Power Management Unit (PMU), covering key aspects such as communication protocols and real-time decision-making. By enhancing adaptability in power management, this research advances sustainable, high-performance computing. The following sections detail related work, the proposed algorithm, architecture, training process, results, and future directions.

Conclusion: This research demonstrates the effectiveness of Reinforcement Learning (RL) in optimizing Dynamic Voltage and Frequency Scaling (DVFS) for System-on-Chip (SoC) environments. The proposed RL-based DVFS system exhibits superior adaptability to workload variations, achieving significant power savings while maintaining or enhancing computational performance. Key findings highlight the impact of exploration-exploitation strategies and learning rates on decision-making, validating RL's potential for autonomous power management in SoCs.

Keyword: ***RL, DVFS, Energy Efficiency, Adaptive Power Management***