Chapter 10
Future Trends and Significant Solutions for Intelligent Computing Resource Management

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ABSTRACT

Cloud providers place a high value on reducing energy consumption in cloud computing since it reduces operating costs and improves service sustainability. Cloud services are frequently replicated across providers to ensure high availability and dependability, which increases provider resource utilization and overhead. Finding the right balance between service replication and consolidation to lower energy usage and boost service uptime can be challenging for cloud resource management decision-makers. This chapter addresses this problem by presenting a ground-breaking technique known as "CRUZE," which is based on cuckoo optimization and considers energy efficiency, dependability, and comprehensive resource management in cloud computing, encompassing cooling systems, servers, networks, and storage. Using cloud resources, effectively illuminating and executing a range of jobs, CRUZE has significantly reduced energy usage by 20.1% while improving dependability and CPU utilization by effectively illustrating and executing a variety of workloads on cloud resources that have been allocated.

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1. INTRODUCTION

The efficient management of computing resources is paramount. Now a days, the landscape of Intelligent Computing Resource Management (ICRM) is poised to undergo significant transformations to meet the growing demands of various industries and sectors. he rapid expansion of Internet-based technologies in recent times has prompted multinational corporations to install dispersed computing resources globally, including cloud computing and Cyber Physical Systems (CPS) (Al-Ansi et al., 2021). ICRM has become an increasingly important area of focus in today's rapidly changing technological environment. Computing hardware is point of contact in operations and performance in majority applications like artificial intelligence, edge computing, cloud computing, data analytics, and more.

Maintenance of pc hardware has turn out to be a prime challenge within the ever-evolving environment of pc technology. As we pass into the 21st century, the demand for electronic assets will increase at an exceptional charge. With the proliferation of information-in depth applications, the upward thrust of synthetic intelligence and system gaining knowledge of, the upward thrust of cloud computing as well as the Internet of Things, or IoT, the need to reveal computing a wisely it is far never incredible.

Intelligent computer resource management is being explored and advanced for a variety of reasons. Agencies must correctly and efficiently scale their computing resources as they expand their operations, which presents challenging conditions. This demands for automated solutions that can dynamically assign resources in accordance with current needs, optimizing performance and value at the same time.

Cost effectiveness: In a generation where computer assets account for a sizable amount of operating costs, cutting costs while maintaining or improving performance is a compelling goal. To achieve this equilibrium, intelligent aid control may be helpful.

Sustainability: Concerns about the environment are becoming more widespread. However, it also increases carbon footprints because wasteful resource allocation is no longer the most efficient. Smart resource management can result in a lesser ecological footprint and less strength usage.

Technological Advancements: The establishment of technologies like surface computing, 5G networks, and quantum computing increases intricacy to support in administration. Creative and adaptable solutions are needed to completely utilize these technologies. Data surge: To suppress the exponential expansion of data generation and consumption, robust aid control is indispensable. Smart answers can support in the effective processing and analysis of massive datasets.

2. EVOLUATION OF RESOURCE MANAGEMENT

The term "resource evaluation" refers to the process by which a researcher examines a potential source of information objectively and decides, after considering its veracity and correctness, whether or not it is appropriate for a given paper or project.This entails reviewing and evaluating the effectiveness and caliber of your resource management procedures, techniques, and equipment.

2.1 Traditional Resource Allocation Challenges

Traditional resource allocation challenges were characterized by static, inflexible, and manual processes that often led to resource underutilization, overallocation, and fragmentation. Intelligent computing