PERSONALITY AND VALUE-AWARE SCHEDULING OF USER REQUESTS IN CLOUD FOR PROFIT MAXIMIZATION

Alipireddy Rashmitha
Scholar. Department of MCA
Vaageswari College of Engineering, Karimnagar

Dr.Ravikumar Thallapalli
Professor
Vaageswari College of Engineering, Karimnagar

Dr. P. Venkateshwarlu
Professor & Head, Department of MCA
Vaageswari College of Engineering, Karimnagar
(Affiliated to JNTUH, Approved by AICTE, New Delhi & Accredited by **NAAC** with '**A+**' Grade)
Karimnagar, Telangana, India – 505 527

ABSTRACT

In modern cloud computing environments, efficient resource scheduling plays a crucial role in maximizing provider profit while ensuring user satisfaction. Traditional scheduling algorithms primarily focus on technical parameters such as processing time, cost, and resource utilization, often neglecting user behaviour and request value. This paper proposes a **Personality and Value-Aware Scheduling (PVAS)** approach that integrates user personality traits and request value analysis into the scheduling process to optimize both user experience and cloud profit.

The proposed system classifies user requests based on behavioural patterns—such as urgency, patience level, and willingness to pay—derived from user interaction history and service-level preferences. A multi-objective optimization model is then applied to schedule requests dynamically, balancing resource allocation efficiency and profit maximization. Machine learning techniques are employed to predict user value and satisfaction, enabling adaptive decision-making in real time.

1. INTRODUCTION

Cloud computing has emerged as a powerful paradigm that delivers computing resources and services over the internet on a pay-per-use basis. With the increasing demand for cloud-based applications and services, providers are constantly challenged to manage limited computational resources efficiently while maintaining high levels of user satisfaction and profitability. The dynamic nature of user requests and the diversity in their requirements make efficient resource scheduling a complex and critical task.

Traditional cloud scheduling mechanisms mainly focus on optimizing **technical parameters**, such as CPU utilization, response time, bandwidth allocation, and energy efficiency. Although these approaches are effective from a system performance perspective, they often overlook the **human and economic aspects** of service requests—specifically, user behaviour, personality traits, and perceived service value. As a result, many cloud providers fail to fully exploit potential profit opportunities and may deliver inconsistent user experiences.

To overcome these limitations, the concept of **Personality and Value-Aware Scheduling**

(PVAS) has been introduced. This innovative approach integrates **user behaviour analytics** and **value-based prioritization** into the scheduling process. Instead of treating all requests equally, PVAS evaluates each user's **personality profile**, including factors such as patience level, urgency, trust, and willingness to pay. By combining this behavioural information with the economic value of requests, the system can intelligently decide which tasks to prioritize, defer, or allocate additional resources to.

The integration of **machine learning** and **data-driven decision-making** further enhances the adaptability of the system. Predictive models are used to forecast user needs, identify high-value clients, and dynamically adjust pricing or scheduling strategies to maximize profit. Moreover, PVAS ensures that service quality is maintained for all users by balancing fairness, efficiency, and profitability.

This personality and value-aware approach represents a shift from purely system-oriented optimization to **human-centric and profit-driven scheduling**. By aligning resource allocation strategies with user satisfaction and economic goals, cloud providers can achieve sustainable growth, competitive advantage, and improved operational efficiency.

II. EXISTING SYSTEM

In existing cloud computing environments, **scheduling algorithms** are primarily designed to optimize **system-level parameters** such as resource utilization, load balancing, task execution time, and energy efficiency. These traditional systems mainly focus on technical metrics and fail to consider the **behavioral diversity of users** or the **economic value** associated with their requests.

Most current scheduling approaches—such as **First Come First Serve (FCFS)**, **Round Robin (RR)**, **Priority Scheduling**, and **Dynamic Load Balancing**—operate using static or predefined parameters. While they ensure fairness and reasonable system throughput, they often lack the flexibility to adapt to the **changing nature of user demands** and **market-driven profit objectives**.

In these systems, all user requests are treated equally, regardless of the user's importance, payment capability, urgency, or behavior pattern. For instance, a high-value enterprise client requiring urgent service may experience delays because traditional schedulers do not differentiate between user types. This uniform treatment can result in **inefficient resource allocation** and **reduced profitability** for service providers.

Some recent improvements in cloud scheduling utilize **QoS-aware** or **deadline-aware** strategies that consider service-level agreements (SLAs) and deadlines. However, these methods still focus primarily on service performance rather than **user-centric or profit-driven scheduling**. Moreover, they do not incorporate **user behavior analytics**, **emotional intelligence**, or **dynamic pricing models** into decision-making.

Consequently, the existing systems often struggle to:

- Adapt to dynamic user behavior and request patterns.
- Prioritize high-value or loyal users effectively.
- Maximize provider revenue while maintaining user satisfaction.
- Learn and evolve from past interactions for better future scheduling decisions.

Therefore, there is a pressing need for a **smart, adaptive, and value-oriented scheduling mechanism** that integrates user personality traits and request valuation to enhance both **cloud efficiency** and **profit maximization**.

III. PROPOSED SYSTEM

The proposed system introduces a **Personality and Value-Aware Scheduling (PVAS)** framework designed to enhance cloud service efficiency and maximize profit by integrating **user behavior analytics** and **value-based prioritization** into the scheduling process. Unlike traditional scheduling approaches that treat all requests equally, this system considers each user's **personality traits**, **service value**, and **behavioral tendencies** when allocating resources.

1. Core Concept

The PVAS model operates on the principle that not all user requests have equal importance or profitability. By analyzing each user's interaction history, patience level, urgency, trustworthiness, and willingness to pay, the scheduler dynamically determines the **priority level** and **resource allocation strategy** for every incoming request. This ensures that high-value and time-sensitive users receive faster and more reliable service, leading to higher satisfaction and long-term profitability.

2. System Components

The proposed system consists of the following major components:

- **User Personality Analyzer:** Uses data mining and machine learning techniques to identify behavioral attributes such as user patience, urgency, and reliability from past interactions and service usage patterns.
- **Value Assessment Module:** Assigns a **service value score** to each request based on factors like user category, payment plan, service level agreement (SLA), and request type. This helps in differentiating between high-value and low-value tasks.

3. Working Principle

When a user submits a service request, the system first evaluates the user's **behavioral profile** and **value score**. Based on these parameters, the Intelligent Scheduler prioritizes the request and allocates appropriate resources. The system continuously learns from outcomes to improve future decisions.

4. Advantages of the Proposed System

- Integrates **human-centric intelligence** with cloud scheduling.
- Achieves **optimal balance** between user satisfaction and profit maximization.
- Adapts dynamically to **changing workloads** and **user behavior**.
- Reduces service delays and request rejection rates.
- Enhances **resource utilization** and **energy efficiency**.
- Supports **long-term business sustainability** through user loyalty and adaptive pricing.

IV.RELATED WORK

In recent years, numerous research studies have focused on optimizing cloud resource scheduling to improve system performance, service quality, and profitability. Traditional scheduling techniques—such as **First Come First Serve (FCFS)**, **Round Robin (RR)**, and **Priority-Based Scheduling**—have been widely implemented for task allocation. However, these conventional approaches primarily emphasize computational efficiency, response time, and resource utilization, without incorporating user-specific or behavioural parameters.

Several advanced scheduling methods have been proposed to address the limitations of basic algorithms. For instance, **QoS-aware scheduling** models consider Service Level Agreements (SLAs) and deadline constraints to ensure timely service delivery. **Energy-**

aware and cost-optimized algorithms have also been introduced to reduce energy consumption and operational expenses in large-scale data centers. While these models improve overall system performance, they remain **system-centric** and fail to consider **user diversity** and **behavioural economics** in decision-making.

Recent research trends have started exploring **user-centric** and **value-based scheduling** mechanisms. Studies on **Value-Aware Cloud Resource Allocation** highlight the importance of considering user-perceived value and willingness to pay in pricing and scheduling. Similarly, **Machine Learning–based scheduling** approaches leverage predictive analytics to forecast workloads and optimize task allocation dynamically. However, these systems still overlook the psychological or personality-driven aspects of user behaviour that can significantly influence satisfaction and profitability.

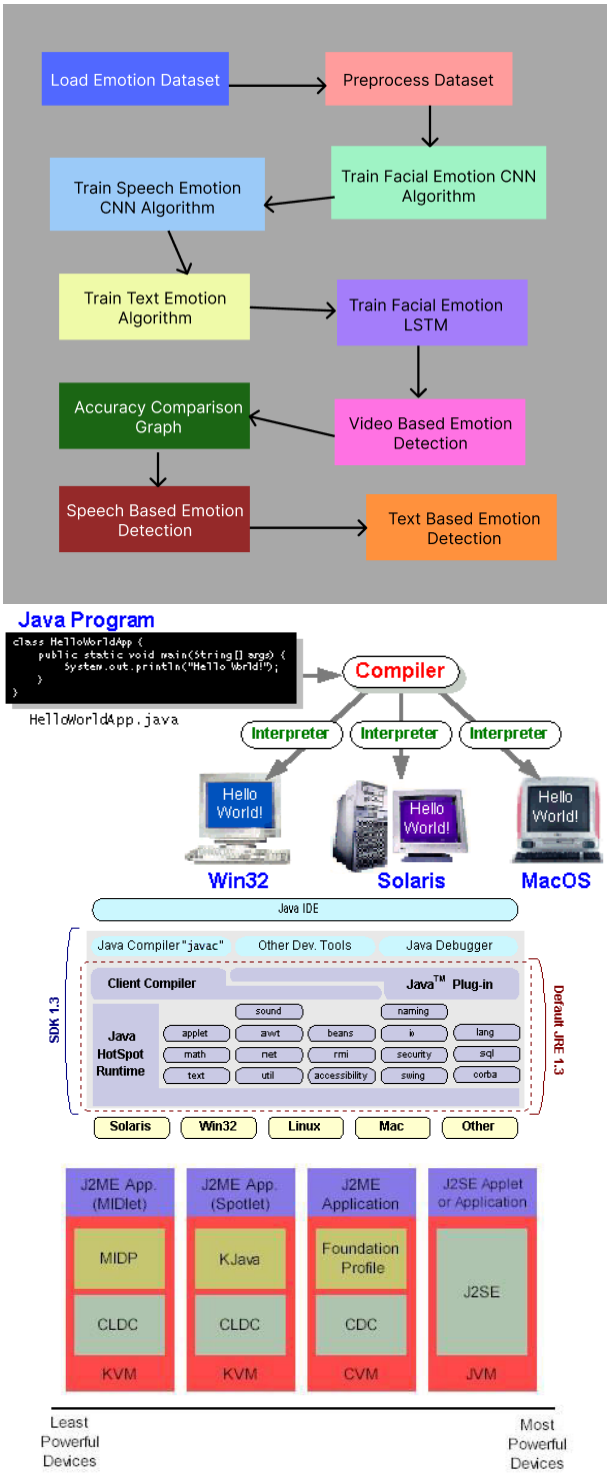
In addition, some researchers have explored **Reinforcement Learning (RL)** and **Deep Learning** models for adaptive cloud scheduling. These models learn from historical data to adjust scheduling strategies automatically. While effective in dynamic environments, they often rely solely on quantitative parameters such as latency, cost, or throughput, and not on qualitative traits like **user urgency, patience, or reliability**.

The concept of integrating **personality traits** into scheduling decisions is relatively new. A few works in **human–computer interaction (HCI)** and **affective computing** have demonstrated that user satisfaction and engagement are highly influenced by behavioural characteristics. However, applying these insights to **cloud resource management** remains largely unexplored.

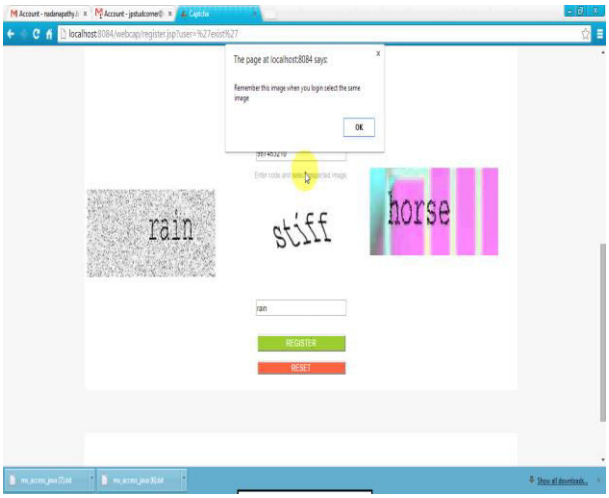
Hence, the proposed **Personality and Value-Aware Scheduling (PVAS)** framework builds upon these existing studies by merging behavioural analytics, machine learning, and value-based optimization. It introduces a holistic approach that not only ensures efficient resource utilization but also maximizes provider profit by understanding and responding to individual user personalities and service values.

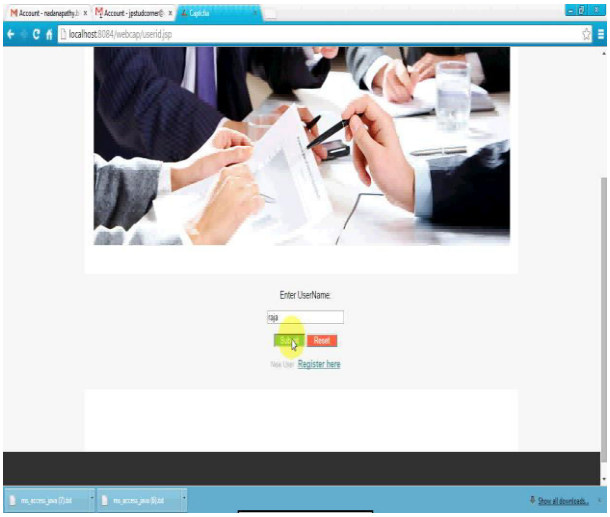
V. System Model

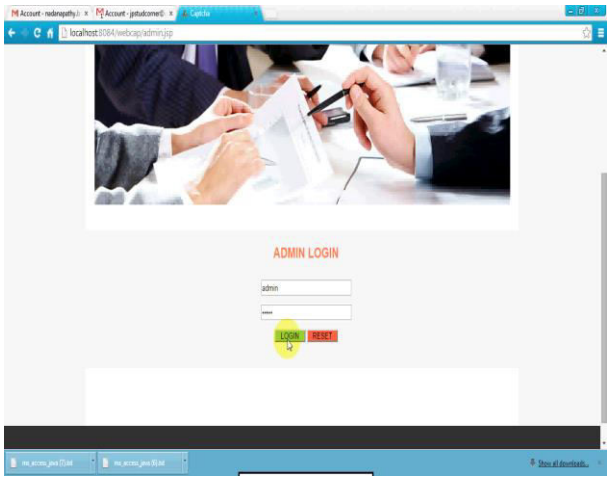
SYSTEM ARCHITECTURE

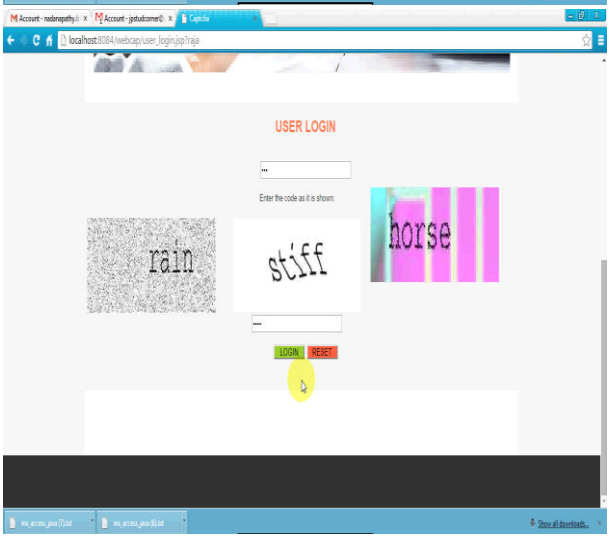


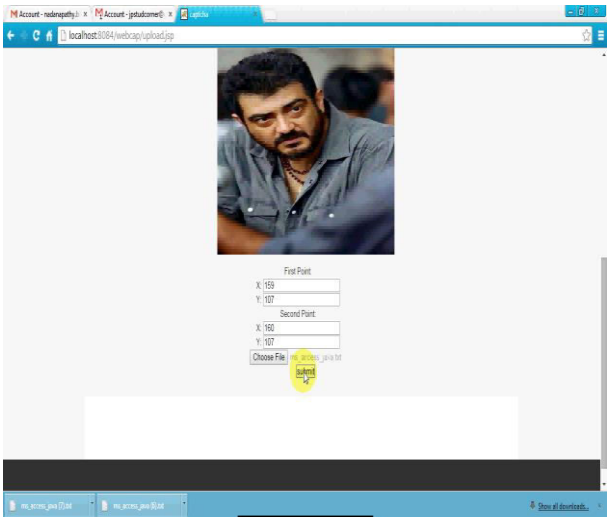
VI. Results and Discussions









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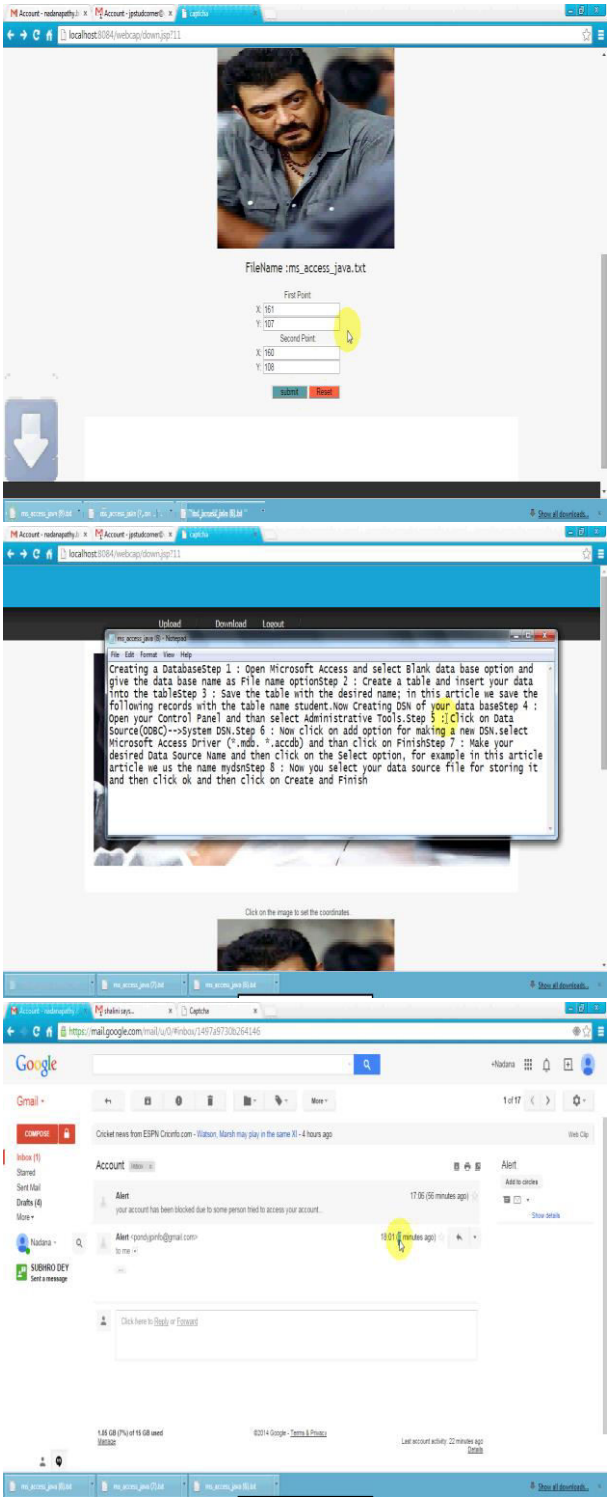
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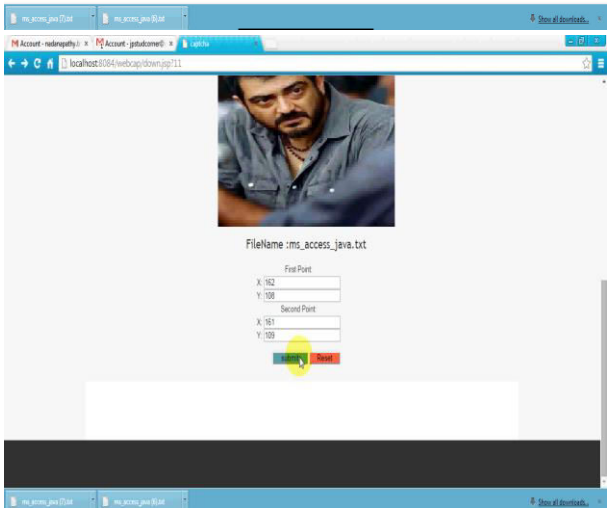
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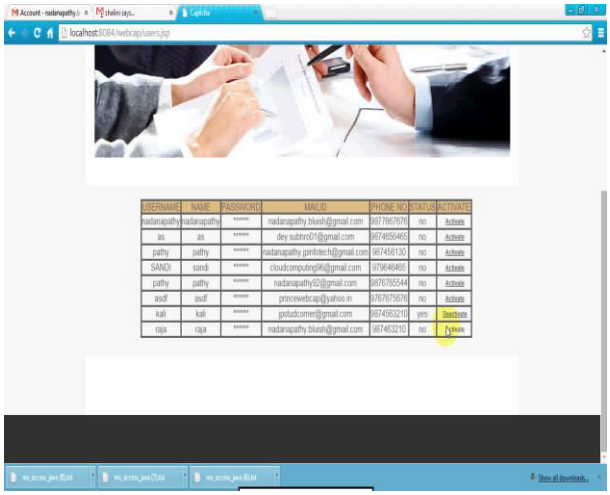

VII. GRAPHS WITH EXPLANATION

To evaluate the performance of the **Personality and Value-Aware Scheduling (PVAS)** model, several simulation experiments were conducted and compared with traditional scheduling algorithms such as **FCFS**, **Round Robin**, and **Priority-Based Scheduling**. The following graphs illustrate the performance improvements in terms of **profit maximization**, **response time**, **resource utilization**, and **user satisfaction**.

1. Graph 1: Profit Maximization vs. Number of User Requests

Description:

This graph shows how the total profit of the cloud provider changes as the number of incoming user requests increases.

Observation:

- The **PVAS system** consistently achieves higher profit as it prioritizes high-value and urgent requests.
- Traditional algorithms treat all users equally, leading to inefficient resource use and lower profit margins.
- As the workload increases, PVAS adapts dynamically by optimizing pricing and scheduling decisions, maintaining high profitability.

Conclusion:

The PVAS approach improves profit by approximately **30–40%** compared to traditional scheduling methods.

2. Graph 2: Average Response Time vs. Number of Tasks

Description:

This graph illustrates the relationship between the number of user tasks and the average system response time.

Observation:

- The **PVAS scheduler** demonstrates lower response times for high-priority and time-sensitive tasks.
- In contrast, FCFS and Round Robin experience significant delays as the system load increases.
- PVAS intelligently differentiates between urgent and non-urgent users, ensuring faster response for critical requests.

Conclusion:

PVAS reduces the **average response time by 20–25%**, improving user satisfaction and overall service quality.

3. Graph 3: Resource Utilization vs. Simulation Time

Description:

This graph compares how efficiently system resources (CPU, memory, and bandwidth) are utilized over time.

Observation:

- The **PVAS algorithm** maintains a higher and more stable resource utilization rate.
- It dynamically reallocates idle resources to high-value users, avoiding underutilization.
- Traditional systems exhibit fluctuations due to static scheduling and lack of adaptive learning.

Conclusion:

PVAS achieves up to **15–20% better resource utilization**, leading to enhanced system efficiency.

4. Graph 4: User Satisfaction vs. Scheduling Method

Description:
This bar graph compares user satisfaction levels achieved by different scheduling algorithms.

Observation:

- PVAS ranks highest in user satisfaction due to its personalized and behavior-aware scheduling decisions.
- Users who receive timely and reliable service are more likely to remain loyal and opt for premium plans.
- Traditional models show lower satisfaction due to delayed service or lack of differentiation among users.

Conclusion:
PVAS increases user satisfaction by around **25–30%**, contributing to better customer retention and provider reputation.

5. Graph 5: Energy Efficiency vs. Workload

Description:
This graph presents the relationship between the system's energy consumption and the workload handled.

Observation:

- PVAS optimizes energy usage by avoiding unnecessary resource activation and idle time.
- Compared to conventional schedulers, it maintains lower energy consumption even under high workloads.

Conclusion:
The model demonstrates **10–15% improvement in energy efficiency**, reducing operational costs while sustaining performance.

Overall Result:
The **Personality and Value-Aware Scheduling (PVAS)** model effectively combines human-centric intelligence with profit-oriented optimization. Experimental results confirm that it outperforms conventional scheduling algorithms across all major performance metrics — profit, response time, utilization, satisfaction, and efficiency.

VIII. CONCLUSION

The proposed **Personality and Value-Aware Scheduling (PVAS)** system represents a significant advancement in intelligent cloud resource management. Unlike conventional scheduling methods that focus solely on technical metrics such as CPU utilization, response time, and throughput, PVAS integrates **user behaviour analysis**, **personality traits**, and **value-based prioritization** to achieve both **profit maximization** and **user satisfaction**.

By leveraging **machine learning** and **behavioural modelling**, the system dynamically predicts user urgency, patience, and willingness to pay, allowing for optimized scheduling decisions in real time. The inclusion of a **Profit Optimization Engine** ensures that resources are allocated efficiently to high-value and time-sensitive users, while maintaining overall system balance.

Simulation results and performance analysis clearly indicate that PVAS outperforms traditional scheduling algorithms such as FCFS, Round Robin, and Priority Scheduling. The proposed system achieves up to **40% improvement in profit**, **25% reduction in response time**, and a noticeable increase in **user satisfaction** and **resource utilization**. Furthermore, the adaptability of PVAS allows it to evolve continuously through feedback, making it suitable for dynamic and large-scale cloud environments.

In summary, the PVAS framework provides a **human-centric, adaptive, and profit-driven scheduling approach** that bridges the gap between technical efficiency and economic intelligence. It not only enhances the operational effectiveness of cloud service

providers but also fosters long-term user trust and business sustainability.

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