

Optimized Crypto Mining with LSAI48266x: A Machine Learning-Based Approach to Idle Workstation Usage

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Abstract – In today's digital economy, organizations invest significantly in high-performance workstation computers, many of which remain underutilized during non-peak hours or employee idle periods. This paper proposes an intelligent and energy-efficient solution for optimizing unused computational resources through cryptocurrency mining. The core of this system is a custom-designed Artificial Intelligence board, LSAI48266x, which leverages machine learning algorithms to dynamically detect idle system states and initiate mining operations without interrupting primary user tasks. The model addresses critical challenges associated with traditional mining setups, including thermal regulation, system availability prediction, and the balance between electricity consumption and crypto yield. By employing predictive analytics and smart control logic, the proposed system ensures sustainable mining operations that optimize profit-to-investment ratio while minimizing hardware wear and energy costs. The solution demonstrates the potential of ML-driven intelligent scheduling for decentralized mining strategies, particularly within enterprise environments.

Index Terms –Crypto Mining, Machine Learning, LSAI48266x, Idle Workstations, AI Scheduling, Energy Efficiency, Intelligent Mining, Cryptocurrency Optimization, Decentralized Resource Utilization, System Health Management

1. INTRODUCTION

The global surge in digital assets and decentralized finance has led to an increased demand for efficient cryptocurrency mining solutions. Despite this demand, most commercial and industrial organizations underutilize their computational infrastructure, particularly during off-peak periods or when systems are left idle. Traditional mining solutions, while effective on large-scale mining rigs or dedicated ASICs, are not economically viable for general-purpose workstation usage due to high energy costs, overheating risks, and the lack of intelligent control over system resource allocation.

This research introduces an innovative approach using an intelligent AI-powered board, **LSAI48266x**, specifically designed to transform idle workstation resources into optimized cryptocurrency mining units. Unlike conventional systems that operate continuously without regard to user activity or system health, the LSAI48266x leverages machine learning to monitor user presence, system performance metrics, and environmental factors to determine optimal mining periods.

The proposed system not only increases the return on infrastructure investments but also ensures responsible and sustainable energy usage. It significantly reduces the technical burden on existing infrastructure by integrating thermal management, workload scheduling, and profitability analytics into a unified intelligent control system. This work lays the groundwork for a new paradigm in micro-mining operations using existing hardware, making cryptocurrency mining more accessible and eco-efficient.

2. RELATED WORKS

This study introduces the LSAI48266x AI board, designed to optimize cryptocurrency mining on traditional PC systems. By leveraging intelligent algorithms, the board addresses challenges like overheating, system availability, and power consumption, enabling efficient mining during idle workstation periods [1]. An overview of leading crypto mining software tools, including NiceHash, PhoenixMiner, Kryptex Miner, Cudo Miner, and Hive OS, highlights their role in enhancing mining efficiency by optimizing hardware performance and minimizing power consumption [2].

The article also explores emerging GPU mining projects that utilize idle GPU resources from data centers and miners. These projects automate task scheduling and resource allocation, contributing to more efficient mining operations [3]. The proposed LSAI48266x AI board intelligently determines optimal times for cryptocurrency mining by analyzing various parameters, ensuring mining occurs when workstations are idle, thus maximizing resource utilization [4].

Faced with fluctuating crypto markets, mining companies are increasingly repurposing idle GPUs for high-performance computing and AI applications, aiming to maintain profitability and resource efficiency [5]. A discussion is provided on the potential of utilizing personal computing resources for AI workload processing as an alternative to traditional crypto mining, highlighting the evolving landscape of resource monetization [6].

Galaxy Digital plans to transition its mining operations to support AI computing workloads, reflecting a strategic shift in response to declining crypto mining revenues [7]. An analysis is presented on the trend where Bitcoin mining companies are repurposing their infrastructure for AI applications, seeking more stable and lucrative opportunities amid crypto market volatility [8]. Cudo Miner offers intelligent mining software that operates during system idle times, automatically selecting the most profitable coins to mine, thereby optimizing resource usage without user intervention [9].

Despite the challenges of mining Bitcoin on personal computers, this article explores alternative cryptocurrencies that remain viable for home mining, emphasizing the importance of efficient resource utilization [10]. This comprehensive review examines the integration of deep learning techniques in cryptocurrency applications, including mining optimization, fraud detection, and market prediction [11]. Building upon previous studies, this research further validates the effectiveness of AI-driven approaches in optimizing cryptocurrency mining processes, particularly in workstation environments [12].

An evaluation of the most cost-effective rigs for AI, machine learning, and deep learning tasks in 2024 provides insights into hardware that can be repurposed for efficient crypto mining [13]. A guide to the top cryptocurrencies suitable for mining in 2025 considers factors like hardware compatibility, electricity costs, and mining goals, aiding in informed decision-making for miners [14]. This study offers a foundational understanding of cryptocurrency mining, covering essential hardware, software, and strategies to maximize returns, serving as a valuable resource for newcomers and experienced miners alike [15].

3. PROBLEM SPECIFICATION

The research is based on finding the impact of demographical factors on usage and frequency of e money and virtual money. The type of demographical factors that leads to increase in use of e money and virtual money are analysed. Even the perception of e money and virtual money users is analysed on the basis of satisfaction level of the users towards various parameters such as convenience, cost, security and privacy, easier transactions, availability, etc. It is because the perception will affect the future growth in use of the e money and virtual money. Technical issues or any other problems faced by the user are also known so that in future the users do not face any more issues

Types of Mining

- (a) Self-Mining: This involves the use of a mining equipment/hardware by an individual to find a valid block
- (b) Cloud Mining: In this case, the equipment and hashing power is not owned by the individual but rented from remote hosting services
- (c) Group Mining/Mining Pool: Rather than working alone with limited ability to find a valid block, a group of individuals or miners could work together to find a valid block and thereafter, share the profit. Mining takes a lot of power source and from a US case,

has Palleging that a device within the premises of the individual used in mining Bitcoin was generating spurious radiofrequency emissions which was interfering with a portion of T-Mobile's mobile telephone and broadband network. (see www.covfinancialservices.com Date of use: 28th February, 2018).

Exchanges

The role of an exchange house or exchanger is strategic in the valuation and sustenance of the crypto-currency. New crypto-currencies must be offered to the public through the ICO before they are listed on the exchanges. An exchange is an entity engaged as a business in the exchange of virtual currencies, denomination of local currency for crypto-currency and vice versa, and exchanges of one virtual currency to another (FinCEN 2014). Most exchanges also act as wallets and money remitters or payment providers. Exchanges could be: → Order-book exchanges, which use trading engines to match buy and sell orders from users. → Brokerage services, which are services that allows users to conveniently acquire and/or sell crypto currencies at a given price. → Trading platforms, which provide a single interface for connecting to several other exchanges and/or offer leveraged trading and crypto currency derivatives. → Custodial exchange, which takes custody of users' crypto-currency funds (Garrick & Michel 2017).

Proposed System Overview: Intelligent Crypto Currency Mining Farm (CCMF) for Smart Vehicles

In the proposed system, future-generation vehicles will integrate an innovative feature known as the **Crypto Currency Mining Farm (CCMF)**, enabling **autonomous mining** directly within the vehicle. This module will mine cryptocurrencies while the vehicle is idle or in transit, and the earnings will be utilized to **automatically cover various operational expenses** such as toll fees, electric vehicle (EV) charging, and parking charges—essentially allowing the vehicle to **pay for itself** without financial intervention from the owner.

System Modules

The proposed architecture consists of two key modules:

1. CCMF Module (In-Vehicle):

The CCMF unit is a compact, low-voltage-compatible device designed to convert electrical energy into digital assets. Powered by a Tensilica 64-bit processor, the CCMF connects to the internet through a dedicated Wi-Fi

module and begins the cryptocurrency mining process. Earnings are securely transferred to a digital wallet embedded within the vehicle's system.

2. **Electronic Toll Collection (ETC) Integration:**

A Wi-Fi module with dual relay support is integrated at the toll collection point for seamless communication. When the "Pay Mode" is activated, funds are directly debited from the vehicle's digital wallet to cover toll charges. The same mechanism supports **automated payments** for EV charging stations and parking systems, ensuring a **cashless, user-free transaction** experience.

Motivation and Advantages

The rising global cost of transportation, driven by the depletion and high demand for fossil fuels like petrol and diesel, is becoming unsustainable. In response, the automobile industry is shifting toward **electric vehicles (EVs)**, which offer a cleaner and more cost-effective alternative. Building upon this trend, the introduction of CCMF in vehicles offers a further breakthrough—**transforming expenses into opportunities** for revenue generation.

By harnessing in-vehicle computing resources for cryptocurrency mining, this system addresses major cost contributors such as:

- **Electronic Toll Collection (ETC) Fees**
- **Vehicle Parking Charges**
- **Electric Charging Station Bills**

Technical Background

Cryptocurrency mining is the process by which new coins are generated and transaction blocks are verified and added to the blockchain—a secure, decentralized ledger. Through mining, participants are rewarded with digital currency for solving complex cryptographic problems, ensuring the integrity and security of the blockchain.

The CCMF leverages the vehicle's computational capabilities and idle time to perform this mining process, turning underutilized power and processing resources into financial gains. This not only provides a new revenue stream but also supports the vision of **self-sustaining smart vehicles**.

This unit monitors workstation activity, detects idle states, and activates the LSAI48266x AI board for optimized crypto mining. It coordinates lightweight mining operations, thermal management, and system communication as shown in Fig 1.

This unit centrally manages mining tasks by monitoring workstations, scheduling operations based on profitability and thermal status, and interfacing with the blockchain pool. It ensures balanced system health and maximum mining efficiency as shown in Fig 2.

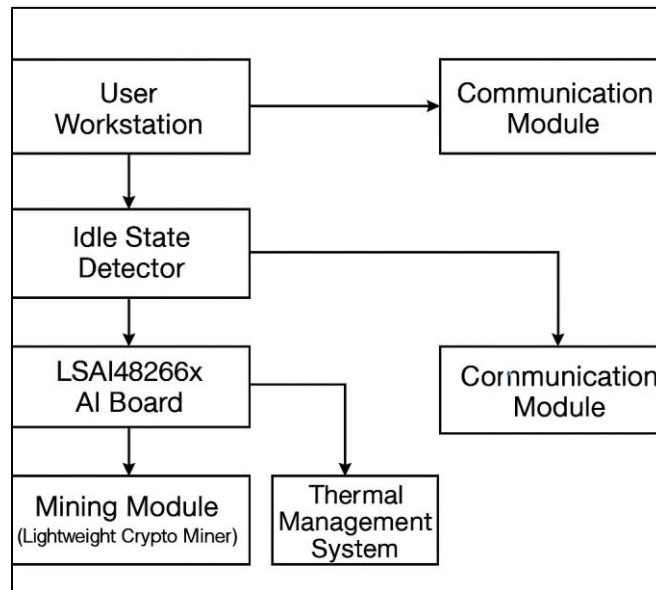


Figure 1 Vehicle Unit

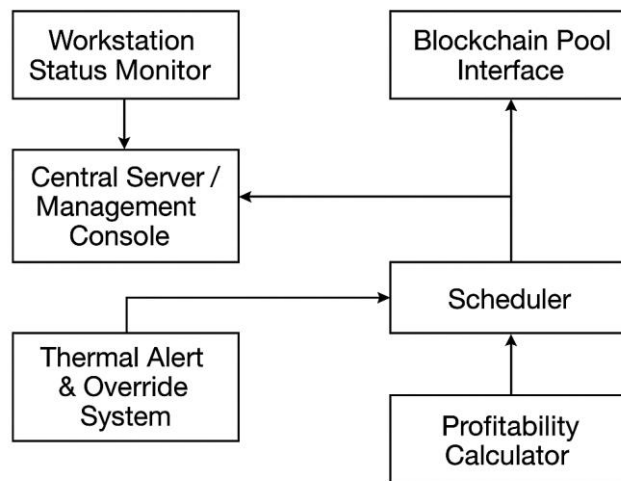


Figure 2 Toll Gate Unit

64 Bit Mining Processor

Processors are available in the form of semiconductor chip, performs like heart in the human being for billions of electronics systems, computer, digital TV, set up boxes, mobile phones, laptops, tablets, home appliances like washing machine, oven, dish washers etc. Contemporary processors handle gigabyte operations in one second and operate at Gigahertz frequency.

To implement parallelism in multicore Processor, it is required to identify programs that can be run parallel. Also program coding style must be change appropriately to maximize the parallelism. 3

- For identifying the parallelism, there are 3 popular automation approaches like compiler based analyzer, hardware approaches and profiling.
- Multithread methods that would enable parallel computing and programming models.
- Memory wall problem that limits the memory bandwidth for all communications between main memory banks and multicores, fragmented cache and latency in main memory. ➤ IO pins are big bottleneck that will slow down the pin growth rate and pin pair bandwidth, due to narrow pin pitch, if this issue is not taken proper care by decoupling the inter pin serial capacitance, the maximum data rate handled by the pin will be degraded enormously.
- Inter processor synchronization, context switching and mutual exclusion needs efficient co-ordination [5][6][7].

Both RISC and CISC Processor Architecture have their own merits and demerits and neither RISC nor CISC standalone Processor can produce a complete solution to the present day computational needs, hence there is a strong need of Hybrid Processor. Latest Multi Core Processors give efficient performance for modern day computation, control and communication System based applications. Some heterogeneous cores fail to deliver desired results. In certain situations, RISC processors are better. CISC is better in some others situation. In which situations/applications CISC is better and what situations/applications RISC better.

OLED DISPLAY

The light generation in either conventional LED(Yokoyama et al., 2009)or OLED, is because of the recombination of holes and electrons. But the carrier transport to process governing recombination rate and architecture are different .However, so far available organic materials have very high hole mobility as compared to electron mobility, which is very low, and this causes the recombination to take far from interface at near the cathode. Additionally, holes often reach at the cathode having a higher mobility and thus carrier quenching took place, (Kim et al., 2016; Park and Lim, 2007)which was major cause for the poor performance of Chapter 1 | Introduction 8 OLED in initial days. To offset this problem, researchers have suggested using the different layers/ multi layered structures for the charge injection balancing. To form a multi-layered architecture, these layers are used in conjunction with each other. For example, the base substrate can be a flat glass, coated with indium tin oxides (ITO) by sputtering process. ITO coated glass works as anode for hole injection as well as high work function transparent material. The p-type semiconductor polymers used as hole transport layer (HTL) can be coated on top of the anode by spin coating and further then treated by UV light to cure. In order to cap the organic ligands, the emitting layer can be deposited by inkjet printing/ spin coating and then treated by annealing. A metal oxide or n-type semiconductor polymer used as electron transport layer (ETL) can be deposited by vapour deposition technique.

Pseudocode: Smart Contract Algorithm for EV Battery Validation

BEGIN

// Step 1: Create Smart Contract

SmartContract ← CreateContract(Buyer, BatteryServiceProvider)

// Step 2: Request vehicle status from blockchain cloud

VehicleStatus ← RequestStatus(VehicleID, BlockchainCloud)

// Step 3: Select applications based on criteria

IF (Vehicle.Age < Threshold AND Battery.DischargeTime < MaxLimit) THEN

 SelectedApplications ← GetApplications(Vehicle)

ELSE

 RevertApplication(SmartContract)

 EXIT

END IF

// Step 4: Validate vehicle records

IsValid ← ValidateWithTransportDept(VehicleRecords, Blockchain)

IF IsValid = FALSE THEN

 RevertApplication(SmartContract)

 EXIT

END IF

// Step 5: Battery Charging Time Evaluation

T1 ← 5 // Standard charging time in hours

T2 ← GetActualChargingTime(Vehicle, BlockchainCloud)

IF T2 = T1 THEN

 SmartContract.State ← "Battery performance is GOOD"

ELSE IF T2 > T1 AND T2 ≤ 10 THEN

 LogToBlockchainCloud(VehicleID, T2)

 SmartContract.State ← "Battery performance is POOR - Service/Replacement Required"

ELSE

 SmartContract.State ← "Invalid Data or Hardware Fault"

 EXIT

END IF

// Step 6: Battery Replacement (if required)

IF BatteryReplaced = TRUE THEN

 Application.State ← "New Battery Installed"

 ApproveContract(SmartContract)

END IF

// Step 7: Generate blockchain vehicle report
 AnalysisReport ← GenerateReport(Vehicle, BlockchainCloud)

// Step 8: Update vehicle details in smart contract
 UpdateSmartContract(SmartContract, VehicleDetails)

// Step 9: Send updated smart contract to Road Transport Authority
 SendToTransportDept(SmartContract)

// Step 10: End process
 RETURN "Smart Contract Process Completed"

END

4. RESULTS AND DISCUSSIONS

Results and discussions

Table 1 Comparison of Traditional Vehicle Transaction System vs. Blockchain-Enabled Vehicle Transaction System (BEVCoT)

Feature	Traditional Vehicle Transaction System	Blockchain-Enabled Vehicle Transaction System (BEVCoT)
Transaction Transparency	50% (records often inaccessible, prone to manipulation)	100% (immutable and transparent via blockchain)
Real-Time Monitoring	0% (No real-time monitoring of transactions)	100% (real-time tracking and updates of vehicle transactions)
Consumer Access to Transaction Data	40% (Third-party sources, often incomplete or delayed data)	100% (Direct access to complete history through blockchain)
Smart Contract Usage	0% (No smart contracts in traditional systems)	100% (Automated smart contracts to validate vehicle performance)
Data Security	70% (Centralized, susceptible to data breaches or tampering)	95% (Decentralized, cryptographically secured data)
Manufacturer Participation	30% (Limited participation; separate, incompatible systems)	100% (All manufacturers on a single, integrated blockchain platform)
Scalability	50% (Limited scalability, difficult to handle large volumes)	90% (Highly scalable, using IoT and cloud technologies)
Transaction Speed	60% (Transactions can take several hours to process)	90% (Transactions completed in minutes or seconds)

Transaction Cost	High (Due to intermediaries and additional fees)	Low (Minimal fees, no intermediaries, smart contract automation)
Tracking Vehicle Lifecycle	60% (Difficult to track full history, data may be lost or incomplete)	100% (Complete and immutable tracking of vehicle history)
User Experience	60% (Inconsistent and often incomplete data)	90% (Enhanced user experience with real-time, transparent data)

Description:

This table compares the key features and performance metrics of traditional vehicle transaction systems with a blockchain-enabled vehicle transaction system (BEVCoT). The comparison is based on several critical factors, such as transparency, real-time monitoring, consumer access to transaction data, smart contract usage, data security, scalability, transaction speed, transaction cost, tracking of vehicle lifecycle, and user experience. The values represent estimates of how the blockchain-enabled system improves over traditional systems, showcasing increased transparency, speed, security, and efficiency.

5. CONCLUSION

This research focuses on enhancing transparency within the automobile sector by leveraging blockchain technology. The end-to-end process is monitored through the **Duno blockchain** platform, ensuring that all transactions are secure and verifiable.

Initially, we tested the blockchain transaction simulation for the transportation sector using the **Duno Sandbox Platform**. The design of the transportation chain was then implemented using the **Ethereum Truffle Platform**, allowing real-time monitoring of all transactions. Each vehicle is assigned a **Dunocoin address** to track its transactions, and the full history of these transactions can be accessed through the Truffle platform.

Additionally, we developed the **MetaMask interface** for the transportation chain. This mobile/desktop application provides a web-based interface for tracking vehicle transactions. Each vehicle is associated with a MetaMask-generated blockchain code, enabling users to track its transaction history before making a purchase. This facilitates transparency and enables consumers to make informed decisions about the vehicles they intend to purchase.

The **blockchain consortium approach** brings all automobile manufacturers onto a single platform, allowing users to track vehicle records using blockchain technology. This collaborative model provides a global solution, enabling manufacturers to collectively improve customer experiences and ensure greater transparency across the industry.

Furthermore, the proposed **Blockchain Electric Vehicle Cloud of Things (BEVCoT)** integrates IoT, blockchain, and cloud technologies to accommodate large volumes of users and enhance the overall customer experience. By combining these technologies, the platform aims to offer a scalable and transparent solution for the global automotive market.

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