

Report On

# **To-Do List Using Blockchain**

Submitted in partial fulfillment of the requirements of the Course project in  
Semester VII of fourth year of Artificial Intelligence and Data Science

by

**Arya Bhosle (Roll No. 02)**  
**Deepali Kothari (Roll No. 09)**  
**Om Tiwari (Roll No. 29)**

Mentor  
**Mr. Sumeet Shingi**



**University of Mumbai**

**Vidyavardhini's College of Engineering & Technology**

**Department of Artificial Intelligence and Data Science**



**(A.Y. 2023-24)**

**Vidyavardhini's College of Engineering & Technology**

**Department of Artificial Intelligence and Data Science**

## **CERTIFICATE**

This is to certify that the project entitled **“To-DO list using Blockcahin** “is a bonafide work of **"Arya Bhosle (Roll No. 02), Deepali Kothari (Roll No. 09), Om Tiwari (Roll No. 29)”**submitted to the University of Mumbai in partial fulfillment of the requirement for the Course project in Semester VII of fourth year **Artificial Intelligence and Data Science**.

**Mentor**

**Mr. Sumeet Shingi**

**Dr. Tatwadarshi P. N.**  
Head of Department

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# **Chapter 1**

## **Introduction**

### **1.1 Introduction**

A to-do list is a ubiquitous tool that helps individuals organize and prioritize their tasks and responsibilities. However, in today's fast-paced and digital world, traditional to-do lists face challenges related to security, reliability, and transparency. Blockchain technology, known primarily for its applications in cryptocurrencies, has emerged as a revolutionary solution to address these issues. Additionally, the transparent and distributed ledger of blockchain ensures that the to-do list's information is always up-to-date and consistent across all devices and users. Furthermore, smart contracts can be used to automate task management and enforce deadlines, making the to-do list even more efficient and reliable.

### **1.2 Problem Statement**

The traditional to-do list management system often lacks transparency, security, and accountability. In a world where data privacy and trust are paramount, a significant problem statement arises: how can we develop a to-do list application that leverages blockchain technology to address these issues effectively? Existing to-do list applications are centralized, making user data vulnerable to hacking and unauthorized access.

To solve this problem, we need to design a decentralized application (DApp) that utilizes blockchain technology, such as Ethereum or a similar platform, to create a secure and transparent ledger for to-do lists. This DApp should allow users to create, update, and manage their tasks with the assurance that their data remains private and tamper-proof. Additionally, the use of smart contracts can introduce automated task completion mechanisms, rewarding users for accomplishing their to-do items or penalizing them for missed deadlines.

### **1.3 Objectives**

The objective of implementing a To-Do List in a blockchain system is to leverage the unique features of blockchain technology to enhance task management, productivity, and data integrity. By utilizing blockchain, we aim to create a decentralized and tamper-resistant ledger of tasks, ensuring that to-do items remain secure and unaltered. This not only provides users with a higher level of trust in the accuracy of their task lists but also prevents unauthorized modifications or deletions, reducing the risk of data loss or manipulation.

## Chapter 2

### Literature Survey

#### 2.1 Analysis of Literature

Sr. No.	Title of the Paper	Advantages	Disadvantages
1	A Decentralised Approach to Task Allocation Using Blockchain	Blockchain's transparent ledger system allows all participants in a network to view and verify task allocations and rewards	Blockchain networks face challenges related to scalability. As more tasks and users are added to the network, it can become slower and more resource-intensive.
2	Task manager using blockchain	Blockchain uses cryptographic techniques to secure data and transactions	Energy Consumption: Proof-of-Work (PoW) blockchains, which are used by some networks like Bitcoin, consume significant amounts of energy problematic.
3	A Review of Task Manager Applications in Various Industries	Decentralized task allocation on a blockchain can reduce the need for intermediaries or trusted third parties, which can streamline the process and reduce costs.	Once information is added to the blockchain, it becomes extremely difficult to alter or delete it.
4	Smart Contract-Based To-Do list Using Ethereum Blockchain	Automated smart contracts can be used for task allocation, which can execute automatically when predefined conditions are met	Decentralized networks may face challenges in reaching consensus on governance decisions, which can hinder their ability to adapt and evolve.
5	A Decentralized To-Do list Based on Smart Contracts	Blockchain-based systems can incorporate token incentives or cryptocurrency rewards for participants.	The legal and regulatory environment surrounding blockchain and cryptocurrencies is still evolving, which can create individuals.

## 2.2 Research Gap

The utilization of blockchain technology in the context of creating and managing to-do lists is a relatively unexplored area, and as such, there are several research gaps that warrant investigation. Firstly, there is a lack of comprehensive studies that delve into the security and privacy implications of using blockchain for to-do lists. While blockchain is known for its security features, it is crucial to understand how to ensure the confidentiality and integrity of the to-do list data, especially when it contains sensitive or personal information. Research in this area could examine cryptographic techniques and access control mechanisms to protect user data while maintaining the transparency and immutability inherent in blockchain technology.

Secondly, the scalability of blockchain systems for managing to-do lists is a significant research gap. As to-do lists can grow in complexity and size over time, it's essential to explore how blockchain can handle the increased transaction load and data storage requirements. Investigating the trade-offs between decentralization, efficiency, and cost-effectiveness in the context of to-do list management could be a promising avenue for research. This research could lead to the development of optimized blockchain protocols or off-chain solutions that enhance the performance of to-do list applications.

Lastly, user experience and user interface design are often overlooked in blockchain-based applications. Research could explore how to make blockchain-powered to-do lists more user-friendly and intuitive, ensuring that individuals can easily interact with and manage their tasks while taking advantage of blockchain's benefits. Investigating the design principles and user-centric aspects of such applications could help bridge the gap between the complexity of blockchain technology and the usability requirements of everyday users. In summary, there are research opportunities in security, scalability, and user experience that could contribute to the development of more effective and user-friendly blockchain-based to-do list applications..

## Chapter 3

### Proposed System

#### 3.1. Introduction

A proposed system for a To-Do List application on the blockchain aims to leverage the decentralized and secure nature of blockchain technology to enhance task management and data integrity. In this system, each task or item on the to-do list would be represented as a unique and immutable blockchain transaction or smart contract. Users can create, update, and mark tasks as complete, with all actions being recorded on the blockchain, ensuring transparency and trust in the system. The decentralized nature of the blockchain eliminates the need for a central authority, reducing the risk of data manipulation or loss. Additionally, the use of cryptographic techniques ensures the privacy and security of user data, while providing a reliable audit trail for task history. This system could offer a novel approach to task management, fostering trust and accountability in a traditionally centralized domain.

#### 3.2. Algorithm and Process Design

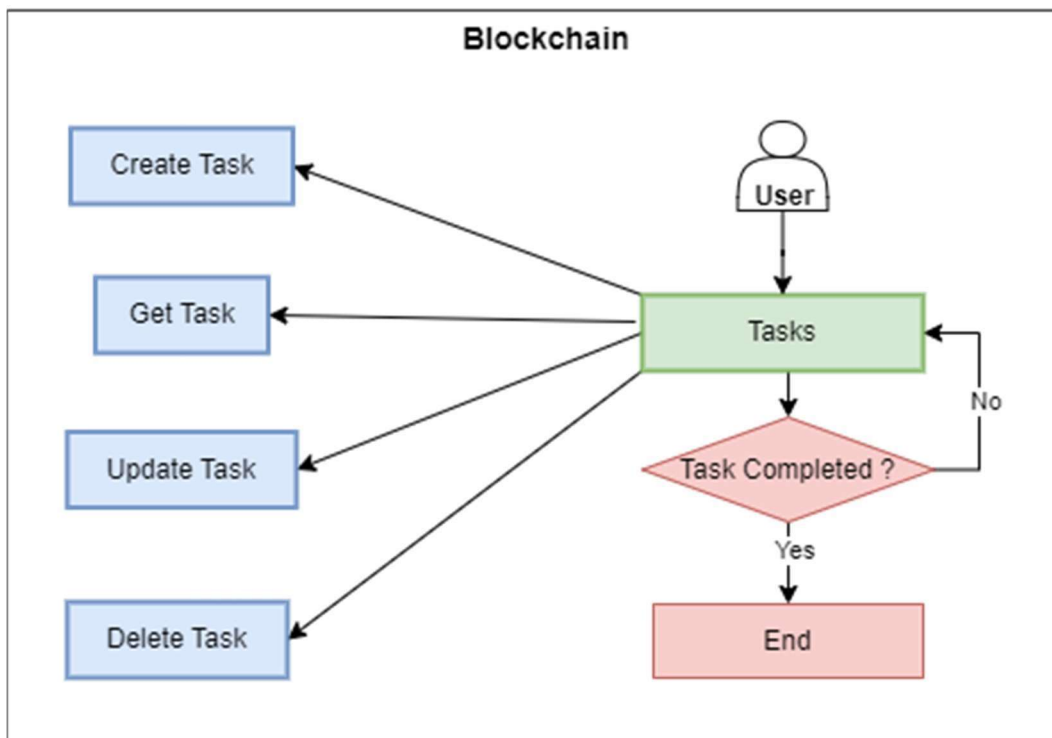


Fig 3.1 To-Do System Process

### 3.3 Details of Hardware & Software

#### Hardware details:

- Processor: Intel(R) Core(TM) i5-10300H CPU @ 2.50GHz 2.50 GHz
- Memory (RAM): 8.00 GB DDR4
- Storage: 512 GB SSD

#### Software details:

- Remix Ethereum IDE: For initial contract development and testing.

#### Programming Languages:

- Solidity programming language: For writing the smart contract.

### 3.4 Experiment and Results

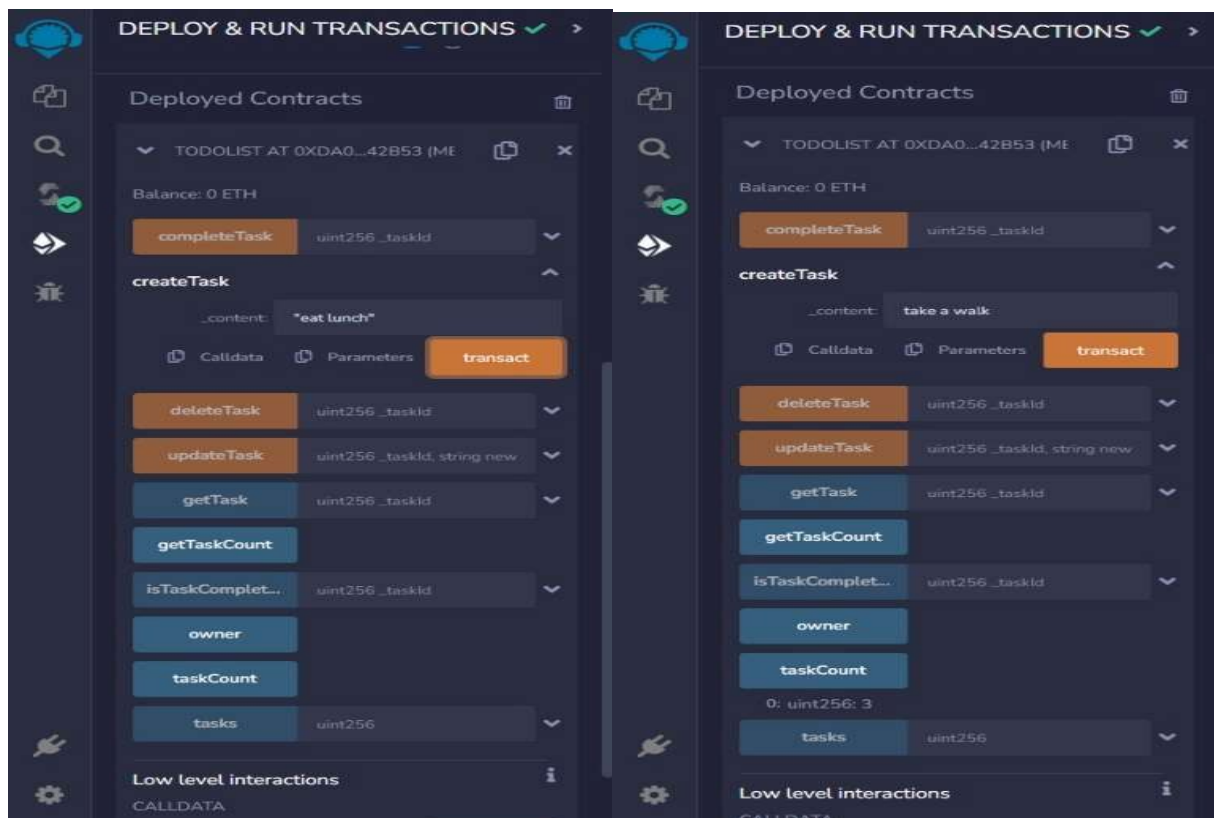


Fig 3.3 Task are created.



### **3.5 Result Analysis**

A blockchain-based to-do list offers several advantages and challenges in its result analysis. On the positive side, the transparent and immutable nature of blockchain technology ensures that the data stored in the to-do list is secure, tamper-proof, and resistant to unauthorized changes. This feature is particularly valuable in maintaining the integrity of task completion records, making it a reliable tool for individuals and organizations to track and verify their progress. Additionally, the decentralized and distributed ledger nature of blockchain ensures that to-do lists can be accessed from multiple devices and locations, promoting collaboration and efficiency.

However, the use of blockchain for to-do lists also comes with certain challenges in result analysis. The inherent complexity and technical nature of blockchain technology can pose a barrier to entry for some users who may not be familiar with blockchain concepts. Moreover, the transparency of blockchain can be a double-edged sword, as it may raise concerns about privacy and data exposure. Users need to be cautious about the level of detail and sensitivity of the tasks they record on a public blockchain. Lastly, the computational and energy-intensive nature of blockchain networks can also lead to slower performance and higher operational costs compared to traditional to-do list applications.

### **3.6 Conclusion**

Implementing a To-Do List in a blockchain system offers several advantages and challenges. On the positive side, blockchain technology ensures data immutability, transparency, and decentralization, making it highly secure and resistant to unauthorized alterations. Each to-do item can be securely recorded as a transaction on the blockchain, providing a reliable and tamper-proof history of tasks. Additionally, smart contracts can automate task management, enabling automatic notifications and updates. However, it's important to consider the scalability and cost issues associated with blockchain, as transactions can be relatively slow and expensive compared to traditional databases. Furthermore, user-friendly interfaces and adoption hurdles may need to be addressed for widespread use. In conclusion, while a blockchain-based To-Do List offers robust security and trustworthiness, its practicality and efficiency for everyday task management may depend on further advancements in blockchain technology and user adoption.

## References

- [1] Aarju Dixit, Aditya Trivedi, and W. Wilfred Godfrey. “Blockchain Based Task Manager by Using Smart Contract.” In: 2022 IEEE 6th Conference on Information and Communication Technology (CICT). Gwalior, India, Nov. 18-20, 2022. DOI: 10.1109/CICT56698.2022.9997830.
- [2] Arihant Duggar, Divyanshu Gupta, Royal, and Mohan C.G. “Task Allocation System Using Smart Contract and Blockchain Technology.” In: International Journal for Research in Applied Science & Engineering Technology (IJRASET) 10.IV (Apr. 2022). ISSN: 2321-9653; IC Value: 45.98; SJ DOI: 10.22214/ijraset.2022.41695.
- [3] Christian Fuchs et al. “Blockchain To-Do lists: Applications, challenges, and opportunities.” In: Journal of Ambient Intelligence and Humanized Computing (2021). DOI: 10.1007/s12083-021-01127-0.
- [4] Jianhua Zhang et al. “A Secure To-Do on Smart Contracts.” In: IEEE Access 8 (2020), pp. 21496–21506. DOI: 10.1109/ACCESS.2020.2965025.
- [5] Kaiwen Sun et al. “Design of a Blockchain-Based Task Allocator for Smart Applications.” In: IEEE Access 5 (2017), pp. 18671–18679. DOI: 10.1109/ACCESS.2017.2756844.
- [6] Taherdoost, Hamed. (2023). To-Do List in Blockchain Technology: A Critical Review. Information. 14. 117. 10.3390/info14020117.
- [7] Vieira, G.; Zhang, J. Peer-to-peer energy trading in a microgrid leveraged by smart contracts. Renew. Sustain. Energy Rev. 2021,143, 110900.
- [8] Taherdoost, H.A. Critical Review of Blockchain Acceptance Models—Blockchain Technology Adoption Frameworks and Applications. Computers 2022,11, 24.
- [9] Macrinici, D.; Cartofeanu, C.; Gao, S. Smart contract applications within blockchain technology: A systematic mapping study. Telemat. Inform. 2018,35, 2337–2354
- [10] Madanchian, M.; Taherdoost, H. The Impact of Digital Transformation Development on Organizational Change. In Driving Transformative Change in E-Business through Applied Intelligence and Emerging Technologies; IGI Global: Hershey, PA, USA, 2022; pp. 1–24.