Patent Search

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Inventor

Name	Address	Country	Nat
Dr Gaurav Vishnu Londhe	Associate Professor, Department of Digital Transformation, Alliance School of Business, Alliance University Bangalore, Karnataka, India	India	Indi
Mr. Narender Chinthamu	MIT (Massachusetts Institute of Technology) CTO Candidate, Enterprise Architect ,USA	India	Indi
Dr. Malathy S	Professor, Department of ECE, Faculty of Engineering Karpagam Academy of Higher Education, Coimbarore, Tamilnadu, India	India	Indi
Mageshkumar Naarayanasamy Varadarajan	12225 Manor Crossing Drive, Glen Allen, VA 23059	India	Indi
Dr. Ashish	Associate Professor , Department of Computer Science & Engineering, Koneru Lakshmiah Education Foundation, Guntur Dost- 522302, Andhra Pradesh, India	India	Indi
Dr. Panem Charanarur	Assistant Professor, Department of Cyber Security and Digital Forensics, National Forensic Sciences University Tripura campus, Tripura, India	India	Indi
Dr. Bechoo Lal	Associate Professor- CSE, Department of Computer Science and Engineering, Koneru Lakshmaiah Education Foundation (KLEF), KL University Vijayawada Campus, Green Fields, Vaddeswaram, Andhra Pradesh 522302, India	India	Indi
B. Sravanthi	Assistant Professor, Department of Chemistry, Institute of Aeronautical Engineering, Dundigal, Hyderabad,Telangana-500043,India	India	Indi
A. Srilakshmi	Assistant Professor, Department of Mathematics, Koneru Lakshmaiah Education Foundation, Bowrampet, Hyderabad-50043, Telangana, India	India	Indi
S. Abdul Rahuman	Student, Department of CSE, K.S.R College of Engineering, Tiruchengode, Namakkal DT, Tamil Nadu, India	India	Indi

Applicant

Name	Address	Country	Nat
Dr Gaurav Vishnu Londhe	Associate Professor, Department of Digital Transformation, Alliance School of Business, Alliance University Bangalore, Karnataka, India	India	Indi
Mr. Narender Chinthamu	MIT (Massachusetts Institute of Technology) CTO Candidate, Enterprise Architect ,USA	U.S.A.	Indi
Dr. Malathy S	Professor, Department of ECE, Faculty of Engineering Karpagam Academy of Higher Education, Coimbarore, Tamilnadu, India	India	Indi
Mageshkumar Naarayanasamy Varadarajan	12225 Manor Crossing Drive, Glen Allen, VA 23059	U.S.A.	Indi
Dr. Ashish	Associate Professor , Department of Computer Science & Engineering, Koneru Lakshmiah Education Foundation, Guntur Dost- 522302, Andhra Pradesh, India	India	Indi
Dr. Panem Charanarur	Assistant Professor, Department of Cyber Security and Digital Forensics, National Forensic Sciences University Tripura campus, Tripura, India	India	Indi
Dr. Bechoo Lal	Associate Professor- CSE, Department of Computer Science and Engineering, Koneru Lakshmaiah Education Foundation (KLEF), KL University Vijayawada Campus, Green Fields, Vaddeswaram, Andhra Pradesh 522302, India	India	Indi
B. Sravanthi	Assistant Professor, Department of Chemistry, Institute of Aeronautical Engineering, Dundigal, Hyderabad,Telangana-500043,India	India	Indi
A. Srilakshmi	Assistant Professor, Department of Mathematics, Koneru Lakshmaiah Education Foundation, Bowrampet, Hyderabad-50043, Telangana, India	India	Indi
S. Abdul Rahuman	Student, Department of CSE, K.S.R College of Engineering, Tiruchengode, Namakkal DT, Tamil Nadu, India	India	Indi

Abstract:

The present invention discloses a novel method and system for leveraging blockchain technology to enhance data security and privacy in Internet of Things (IoT) environm Traditional IoT architectures often face challenges related to centralized data storage, single points of failure, data breaches, and unauthorized access. In contrast, the prop invention introduces a decentralized data management framework using blockchain, ensuring data resilience, integrity, and confidentiality. The core of the invention lies ir integration of blockchain's decentralized architecture, cryptographic security features, smart contracts, and privacy-enhancing mechanisms into IoT systems. This integrati enables a distributed ledger system where data transactions are recorded as immutable blocks, creating a tamper-resistant audit trail. Cryptographic hashing and time sta mechanisms further ensure the authenticity and chronological order of data entries. The invention also incorporates smart contracts to automate and enforce predefined for data access, sharing, and payment settlements within IoT networks. These smart contracts enhance security, transparency, and efficiency in data transactions among Io devices and entities. Additionally, the invention employs encryption techniques and selective data disclosure mechanisms to protect sensitive information, allowing secure privacy-preserving data exchanges within the IoT ecosystem. Furthermore, the invention includes a secure identity management system for authenticating and authorizing and devices, preventing unauthorized access, and ensuring accountability. Blockchain-based payment protocols and tokenization mechanisms facilitate secure and transp financial transactions between IoT devices, eliminating the need for intermediaries and reducing transaction costs. Overall, the invention provides a comprehensive and innovative solution to address the fundamental challenges of data security, integrity, privacy, authentication, and payment mechanisms in IoT environments. By leveraging blockchain technology, the invention enhances trust, reliability, and scalability in interconnected IoT systems, paving the way for a more secure and interconnected digital

Complete Specification

Description:FIELD OF THE INVENTION

The present invention relates to a method for enhancing data security and privacy in Internet of Things (IoT) environments, specifically through the utilization of blockcha technology. More specifically, the invention pertains to the integration of blockchain-based solutions to ensure secure and private transmission, storage, and processing data within IoT ecosystems. By leveraging the inherent security features of blockchain, such as decentralized consensus, cryptographic hashing, and immutability, the invention aims to address key challenges related to data integrity, authentication, and access control in IoT networks. The proposed method offers a robust and scalable approach to safeguarding sensitive information in interconnected IoT devices, thereby mitigating risks associated with unauthorized access, data tampering, and privacy breaches.

BACKGROUND OF THE INVENTION

The rapid proliferation of Internet of Things (IoT) devices has revolutionized numerous industries, enabling seamless connectivity and data exchange between physical objects and digital systems. IoT ecosystems encompass a wide range of devices, including sensors, actuators, wearables, and smart appliances, collectively generating va amounts of data. However, this interconnectedness also introduces significant challenges related to data security and privacy. Traditional IoT architectures often rely on centralized servers or cloud platforms to store and process data, raising concerns about single points of failure, data breaches, and unauthorized access. Moreover, the sensitive nature of IoT data, such as personal information, health records, and industrial telemetry, necessitates robust security measures to protect against cyber threat and privacy violations

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