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Blockchain: A Solution For IOT Based Smart Homes Security Dimensions.

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ABSTRACT

In a few years blockchain has picked up part of ubiquity since blockchain is the center innovation of bitcoin. Its usage cases are developing.in number of fields such as security of Internet of Things (IoT), banking, healthcare, education and many other. Moreover**,** internet of things provides us basis to connect different devices over the internet. Today, this is a rapidly evolving paradigm that focuses on interconnectivity of different objects with each other and users. It enables different objects with capabilities for communication. Very soon this technology will become essential while developing smart homes for bringing ease and competence in our routine matters. But this IOT technology in our homes will also bring security challenges as well. There will be new security challenges while connecting different smart devices for smart homes with the internet. These challenges may also include integrity and confidentiality for the data exchanged between these devices as well. To maintain good security is always challenging that should be overcome for all the matters of life. Security attacks on computers and their results on people surrounded by these computers should be investigated as our homes are filled with these devices. The main objective of this research We will conduct an assessment for security risks to highlight different security flaws in smart homes based on blockchain IOT. Some countermeasures will be suggested later to satisfy Requirements of Security using blockchain. The aim is to find out those blockchain implementation issues that are still unaddressed.

I. INTRODUCTION

The blockchain first appeared in 2008 when Satoshi distributed "Bitcoin: A distributed Electronic Cash System". Proposed framework depended on cryptographic confirmation rather than dependence, empowering any two gatherings to execute exchanges without the prerequisite for a of confided in outsider. Versatile features blockchain such as decentralized, Transparency, high efficiency ,smart contract , Scalability or More Addressing Space , Resilient Backend, Security , Anonymity, Persistency help improve variety of applications. The wide and promising extent of blockchain innovation gives better help with iot. This review is about how the blockchain supports the iot based smart home and show its worth. This paper highlights some of the existing issues in the iot based smart homes which can be fixed by blockchain features. We can shape this innovation by fixing this deficiency to have productive advantages. The rest of the paper is structured as follows. Section II is about related research and explores the blockchain features. In Sect. III, research methodology, research questions, and search strategy is discussed. Section IV discovers the result of research questions. Section V presents applications of blockchain in iot based smart homes. Section VI is about the various threats to validity. Lastly, Sect. VII concludes assumptions and constraints of our review and also present the future directions.

II. LITERATURE REVIEW

This area exhibits some center ideas and speculations from existing examination identified with the blockchain and its few down to earth usage in the training field. It moreover makes an examination between the current auxiliary investigations.

A. Decentralized: Decentralization can be observed as a security appliance against the attacker. besides, decentralization of the database in Blockchain give parties to keep a duplicate of all transactions that are done in Blockchain, and this work is done without involving any outsider. Data Integrity, privacy single point of failure and trustworthiness of transactions all these issues are solved by having a decentralized Blockchain appliances [1][4][5][6].

B. Traceability: Blockchain traceability include advances the discernibility of an occasion as it stores data in blocks which are immovable about by uni-directional cryptographic hash work [19]. Complete chain of blocks is kept up by mining pools, which give cloud based sites to investigating the blocks [3].

C. Contract Smart : "Smart contract is a self-executing computer program,running.on a blockchains distributed network" [7]

D. Currency: The blockchain innovation has property of digital currency, which is a sort of computerized or virtual cash that ensures the start to finish exchange making it secured and reliable. The arrangement of this cash is created by various mining calculations [19]. Accordingly, the joined type of blockchain and cryptographic money can be utilized in a few perspectives, for example, dealings of finance and accounting.

COMPARED SECONDARY STUDIES

As Blockchain innovation is generally new in the field of science, larger part of research work is in progress. While searching for optional investigations just one paper was accessible on deliberate writing audit[1] tending to Blockchain in Internet of Things area. When all is said in done, this paper investigated Blockchain issues Integrity, Anonymity, Adaptability and talked about their belongings while actualizing Blockchain with IOTs. Then again in our exploration, we distinguished IOTs issue and checked their goals with the usage of Blockchain.

III. RESEARCH METHODOLOG

A Systematic Literature Review is defined as a method of recognizing and deciphering all accessible research so as to respond to a particular research question [5]. We have performed an efficient writing audit by following the rules gave by

Barbara Kitchenham to scan for significant examinations. Steps of the rules are talked about in the accompanying subsections.

Table I. Motivation And Research Questions

SNO	Research Question	Motivation
RQ1	What are the major issues pertaining to the iot?	The objective is to highlight major issues obstructing the success of iot based smart homes
RQ3	What Blockchain features are used to resolve the identified issues?	The aim is to explore the emerging technology that resolves the pertinent issues and accelerate the said field.
RQ3	What are the challenges and issues to Blockchain implementation?	The aim is to find out those blockchain implementation issues that are still unaddressed

A. Motivation And Research Questions

This phase of this paper explained the research questions. Moreover, focused the research questions.

B. Search Strategy

The search term that were used for related papers "security issues in smart homes", home automation system, blockchain in iot , blockchain, through searches of there search engine. We survey different papers, and articles published in different journals and conferences.

C. Inclusion And Exclusion Criteria

During this chapter some studies establish to be exactly fixed with the research area i.e. Blockchain and iot ,while others establish to be partly or completely.out.of context. Studies published by famous publishers and impact factor journals were included. First of all, we examine the abstract of each shortlisted study according to research questions, methodology and discovery of these papers and classify them accordingly. Left searched articles were keep out because they did not include searched keywords in their titles and abstracts. Matching immaterial studies and publications were written.in. other Than the English language also keep out.

D. Data Extraction

After a deep investigation of the chose papers, various issues were highlighted to by making a graph utilizing X mind programming of each issue. Outlines were additionally made to highlight to issues which have been tended to by Blockchain.

E. Publication Trend

In our research, we rattled off the papers that were no more established than 2016. We attempted to feature those papers having high effect factor or references, so larger part paper determinations were made based on quality Publishers like IEEE, ACM and Springer.

IV. RESULTS

This section is divided into three subsections. The first section identifies the common issues in the iot based smart homes The second subsection identifies the blockchain features that resolve the issues of the smart homes security dimensions and the third subsection highlights the unaddressed issues that could be fixed in future.

RQ1: WHAT ARE THE ISSUES PERTAINING TO AREA?

A. Manipulation Risk

If the bad guys find out that you are not at home, they can plan to break into the home to cause certain actuations to enter system with wronge data attacker get data without permission.

B. Security Breach

A organization data is very important and stored into an centralized database, bad guys can access this data and control and modify data and forward by some else.

C. Difficult To Exchange Services Between Users

IOT installed asset of an owner where he thinks he has the chance to procure a profit. In this way, there is need of a platform in which the user can legitimately sell its goods in an insightful approach to clients without any Intermediary.

D. Single Failure Point:

If the central point fails all system is disturbed.

E. Access Control

It is main issue in iot network, attacker can gain access database or main node and modify the data without permission, difficult to define which node is fully right or access the data.

F. Location Tracking Challenge:

The hacker can trace easily the user's location. Through this the attacker find about the home alone so that he can break the network easily.

G. Illegal Use Of Personal Data And Apps:

The hackers or unauthorized person can inject some malicious viruses on phones to get user personal data. Through this the user's pictures, conversation recordings and location tracing can be done. Mic, camera, contact lists, phone calls and text messages are also track by the attackers. The hacker Then controls all the applications.

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RQ2: BLOCKCHAIN FEATURES USED TO SOLVE THE IDENTIFIED ISSUES?

Blockchain features study in Sect. II This section highlights how these characteristics help mark issues recognize in above section.

Decentralized: Decentralization features to a distributed network retaining redundant data. Decentralization can help reduce:

Manipulation Risk: By making it hard for an hacker to modify blockchain record retained by number of nodes . It is very hard to as compared to a exclusive node which retain all records as complete in today's centralized system.[21

Single Points Of Failure: By keeping a duplicate of information on every hub. On the off chance that any hub gets disconnected, the information won't lost as it is kept up on a repetitive system.

Traceability: Refer to the capability of tracking and connecting with everything back to its root. Traceability solve the accompanying issues.

Manipulation Risk: Can be decreased by Traceability highlight in a manner that on the off chance that somebody attempts to made illegal exchange or changes in the blockchain, at that point it very well may be followed back by getting the block data connected by hash keys from the narrative blockchain. In this way, any change or false action can be distinguished right away against a specific occurrence [21].

Security Breach: By making a model of proof- of existence and possession [15] Blockchain technology establish a digital signature for each single transaction which unachievable to reestablish as compared to electronic signature [7].

Difficult To Exchange Services Between Users: A Blockchain based system where crypto currencies forms of money are traded can solve the issue of Services sharing [4]. Clients can straightforwardly sell their things to different clients on the system without the need of a trusted middle person. Indeed, even with Smart IOTs set up gadgets can have their own financial balances on the Internet where they can sell their assets legitimately to different gadgets or clients for the purpose of income winning. Because of Traceability on Blockchain exchanges are more dependable and reliable without the need of trust between the executing parties.

Location Tracking Challenge: The hacker can trace easily the user's location when the smart home onwer is not at home so that he can break the network easily. if someone tries to make illegal transaction or alter in the blockchain, then it can be tracked back by getting the block data associate by hash keys to the chronicle . Thus, any fraudulent tasks detected instantly against a specific entity [21]

Consensus Mechanism: Consensus Mechanism alludes to the shared endorsement of all the nodes related to the blockchain organize. Consensus mechanism can encourage in solving the accompanying issues:

Manipulation Risk: As the information is summarized in blockchain through an alternate Consensus mechanism as, isn't dealt with by a each single instance. There are less odds of misrepresentation and slip-ups in light of the fact that each new approaching exchange is checked by the other hubs of the system.

Removing Third-Party Risks: Blockchain technology makes the devices able of accomplish operations without the third party, thus make it risk-free from an attacker [4].

Smart Contract : "Smart contract can encourage in solving the accompanying issues:"

Access Control: By using smart contract, only the authorized user is assessed to the IOT device and perform some actions.

Difficult To Exchange Services Between Users:
By making the real-time payments under the smart contract, hence, payments can be automatically executed via smart contract and real-time rewards could be given to users on the basis of their services [13, 19].

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RQ3: Blockchain Implementation Problem?

1) **Scalability:** A tremendous measure of information is created by IOTs and it gets troublesome and costly for Blockchain to keep up and store this much data. This inability is fundamentally in light of the fact that IOT gadgets have constrained assets and there is need of such arrangement engineering where just part of information required for IOT exchange is put away by IOT gadgets. Second Scalability issue throughput, because of the trouble of Proof of Work. Once more for restricted capacity IOTs, high trouble of evidence of work is hard to figure. Bringing down the trouble of PoW will cause security issues, indeed, this issue is the tradeoff among Scalability and Security. These Scalability Issues of Blockchain should be tended to in future research as these make Blockchain ineffectively appropriate for IOTs [1]

V. Threats To Validity

To condense the current proof identified with the utilization of blockchain in the IOT based smart homes, we attempted to assemble however many related essential investigations as could be expected under the circumstances for the extraction of information. As the related research was in the exploratory stages, in this manner, little companion inspected writing was found right now. As our extraction situation depended on the impression of the characterized inquire about inquiries, so there may be chances that the peruse can recognize a few qualities that we didn't consider and can be useful later on. Additionally, the vast majority of the work was on the highlights and inventive applications; less was on its confinements. At last, there may be some work done that we was unable to allude in our paper during the time of production, as the scientists are constantly centering to fix the issues in instructive organizations through blockchain.

CONCLUSION AND FUTURE WORK

In this study, we marked to map all feasible related primary studies by using a systematic literature approach. By investigate and analyze all the features of blockchain, we presented the appropriate solutions to deal iot based smart homes related problems in a accurate way. Since this technology is in preliminary experimental stages, so, it still to go through an progressive process. In future, it is belief that a superior review could be written as the world is moving towards revolution and the people are becoming more adapted technology.

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Table II: Issues and Features

	issues	**Blockchain Features**				
		Decentralized	Consensus Mechanism	Traceability	Crypto-Currency	Smart Contract
Digital certificate	Manipulation risk	✓	✓	✓		
	Security Breach			✓		
	Difficult to exchange services between users	✓		✓	✓	✓
	Removing third party risk	✓	✓			
IOT based smart homes	Acess control	✓				✓
	Location tracking challenges.	✓		✓		
	Illegal use of Personal Data and apps	✓		✓		

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