



INTERNET of THINGS RESEARCH CHALLENGES and FUTURE SCOPE

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Abstract: Internet of things (IOT) moderately progressing as the subsequent phase of evolution of internet, it become very important to recognize the various domains having the potential for application of IOT, and challenges that are related to this application. Covering from smart cities, health care, smart agriculture, to even smart living and smart environment. In the recent years IOT allowing technologies are improving greatly, but some of its problem still needs attention to solve. This paper presents the recent improvement in IOT technologies and discuss about future scope and research challenges.

Keywords: Internet of Things (IOT), Blockchain of Things (BCOT), Agriculture, Domains of IOT.

I. INTRODUCTION

This document is a template. Internet of things may be a system of interconnected physical objects with diverse degrees of processing, sensing, and actuation that's distinct from the net, which may be a communication network that connects individuals to information. The internet of things consists of networks of connected objects and individuals interoperating and communicating using a internet as a platform. The IOT is gradually being viewed because the next evolutionary step of the web. As a result, ordinary devices are going to be able to be linked to the internet so as to attain countless absurd goals. As of now, very small number of gadgets that may be essential for IOT has been associated thus far. However, by the year of 2030, it's likely that over 60 billion gadgets have an online connection. Within the past years, there was an important propagation of internet successful devices. Specifically, the revolution of smartphones and therefore the hobby in wearable devices, connecting humans has emerge as simply a fraction of a bigger motion towards the affiliation of the virtual and bodily worlds. Accordingly, the understudy addresses the assorted potential areas for application of IOT domains and also the research challenges that are related to this application.

II. POTENTIAL APPLICATION DOMAINS OF INTERNET OF THINGS

There are numerous and diverse potential application of the internet of things, since they wave their way into virtually every aspect of our daily lives as individuals, institutions, and society. Internet of things cover wide range of fields including manufacturing, public safety, industrial sector, health sector, agriculture, smart cities, security among many others.

A. *smart cities:* -

The IOT plays a vital role in improving the smartness of cities and enhancing general infrastructure. Variety of IOT application areas in creating smart cities include, intelligent transportation systems, smart building, foot-dragging waste management, smart lighting, smart parking, and concrete maps. Moreover, IOT allows installation of intelligent and whether adaptive street lighting and detection waste and waste containers by keeping tabs of pickup schedules. Application of IOT to appreciate smart cities would require using frequency identification and sensors.

B. *healthcare:* -

Most healthcare system in many countries are inefficient, slow and inevitably at risk of errors. This will easily change since the healthcare sector relies on numerous activities and devices which will be automated and enhanced through technology. A lot of advantages that IOT application offers within the healthcare sector is most categorized into tracking of patients, staff, and objects, identifying, moreover as authenticating, individuals, and also the automatic gathering of information and sensing.



C. *smart agriculture*: -

IOT would allow to manage and preserve the amount of vitamins found in agriculture products, and regulate microclimate condition so as to create the foremost of the vegetables and fruits and their quality. Furthermore, studying climatic condition allows forecasting of ice information, drought, wind changes, rain and snow, thus controlling temperature and humidity levels to stop fungus similarly as other microbial contaminants.

D. *smart living*: -

In this domain, IOT could also be applied in remote devices whereby one can remotely switch appliances on and off hence preventing accidents similarly as saving energy. Other smart home appliances include refrigerators fitted with LCD screens, enabling one to understand what's available inside, what has over stayed and is sort of expiring further as what has got to be restocked. This information can even be linked to a smartphone application enabling one to access it when outside the house and thus buy what's needed. IOT are often applied through alarm system and cameras is installed to look at and detect window or door opening hence preventing intruders.

III. RESEARCH CHALLENGES

IOT has its challenges and implications that has got to be sorted bent enable mass adoption. While this IOT enabling technologies have greatly improved within the recent years, there are still numerous problems that need attention, hence paving the way for brand new dimension of research to be administered. Since IOT concept ensures from heterogeneous technologies that are utilized in various areas, lots of research challenges are sure to arise.

A. *security and privacy*: -

Owing to the actual fact that IOT has become a big element as regards the long term of the net with its increased usage, it necessitates a requirement to adequately address security and trust functions. Researches are tuned into the weaknesses which presently exist in many IOT devices. Furthermore, the inspiration of IOT is laid on the prevailing wireless sensor network (WSN), IOT thus architecturally inherits the identical privacy and security issues WSN possesses. Various attacks and weaknesses on IOT system prove that there is indeed a desire for wide ranging security designs which is in a position to guard data and system from end to complete. There is a desire for more research to be conducted on cryptographic security services that have the aptitude to figure on resource constrained IOT devices.

B. *monitoring and sensing*: -

Even if technologies is concerned with monitoring and sensing have made tremendous progress, they're constantly evolving particularly specializing in the energy efficiency and form aspect. Sensors and tags are normally expected to move constantly so as to get instantaneous data, this aspect makes it essential for energy efficiency especially in lifetime extension. Simultaneously, new advances in nanotechnology/biotechnology and miniaturization have allowed the event of actuators and sensors at the nanoscale.

C. *process, analysis and management of data*: -

The procedure for processing, analysis and data management is tremendously challenging thanks to the heterogeneous nature of IOT, and also the large scale of knowledge collected, particularly during this era of huge data. Currently, most system utilize centralized system in offloading data and completing computationally intensive tasks on a world cloud platform. Nevertheless, there's a continuing concern about conventional cloud architectures not being affective in terms of transferring the large volumes of information that are produced and consumed by IOT enable devices and to be able further support the accompanying computational load and simultaneously meet timing constraints. Most systems are therefore looking forward to current solutions like mobile cloud computing and fog computing which are both supported edge processing, to mitigate this challenge.

D. *blockchain of things (BCOT)*: -

blockchain of things was first implemented as an underlying technology of bitcoin cryptocurrency, it's now being employed in multifaceted nonmonetary application. Miraz argues that both IOT and blockchain can strengthen each other, in an exceedingly reciprocal manner, by eliminating their respective inherent architectural limitations. The underlying technology of IOT is WSN. On the contrary, the primary reasons for blockchain's implementation trend in nonmonetary application is due to its inbuilt security, immutability, trust and transparency. Blockchain enabled IOT ecosystems will provide enhanced overall security likewise as like each other. The blockchain of things where "blockchain" strengthens IOT by providing extra layer of security while the "things" of IOT can function participating nodes for blockchain ecosystem.



IV. CONCLUSION

The internet of things can best be described as complex adaptive system (CAS) which will still evolve within the next years, necessitating new and inventive kinds of software engineering, system engineering, project management and a spread of other disciplines to develop and manage it. IOT features a big selection of application that allow it to serve a spread of individuals with a spread of demands. Individuals, communities, and institutions are three kind of users who take pleasure in technology. As mentioned during this research paper's application section, the internet of things has undeniable potential to be massively revolutionary force which will, and to some even more evident, as different government round the world have shown an interest within the IOT concept by providing more funding within the fields that's meant to facilitate further research. Countless research groups are formed, and still be formed, in many regions of the planet, with the first goal of pursuing IOT-based research. New aspects of IOT processes, technologies involved, and objects which will be connected still develop as more research investigations are done, opening the trail for even more IOT application features.

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