A Mini Review Paper on Internet of Nano Things Future Directions

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Hasan Rafae

Department of Electronic Engineering NED University of Engineering & Technology, Karachi

Abstract: In the 21st Century, we are coming into an era of computing, machines, intelligent devices and gadgets and soon. Internet of Things is basically a sort of a "worldwide international neural network" in the cloud which links numerous things. Nanotechnology is getting evolve day by day with the assistance of the Internet of Things. Nanotechnology has evolved so much that it is providing solutions to several applications ranging from farming to industries and soldierly. Due to many technologies are getting linked with the internet many new areas are upcoming in front, one of the area is the Internet of Nano things. This paper is planned to introduce a brief summary about the Internet of Nano things. Also, is planned to examine the future research direction of an Internet of Nano Things.

Keywords: *Internet of Things, Internet of Nano Things, Nanotechnology, Nano Sensors, Nano Robots.*

1. Introduction

Nowadays, everything is getting associated with the internet. Every object such as Mobiles, Watches, Vehicles, Trains, Buses, Home and business appliances, and even doors are being connected with the internet. The reason for getting everything linked is to create people lives stress-free. Furthermore, we can reach anything miles away from our homes so that our work can be done faster. The concept behind of getting every object linked with the internet is IOT. IOT means the Internet of Things. Internet of Things can be defined as the interrelationship of physical object allied with the Internet. In the year 1999, the idea of IOT was adapted by Kevin Ashton. IOT popularity has been increasing day by day and has made so much progress in every field that various applications such as smart homes, wearable devices, e-Health, Smart farming and much more are getting implemented or already have launched into the market. As the Internet of Thing continues to make progress in the numerous field. New domains are coming in the front to enhance the IOT field [1]. One of the domain name is the Internet of Nano Things. Nanotechnology can be stated as the study and usage of constructions among 1 nanometer (nm) and 100 nanometers in scope. Nanotechnology has better and efficient opportunities in several applications such as agriculture, military, industry, monitoring of health and etc. Nanotechnology assists nano devices to gather, generate, compute, convey and procedure information at nanoscale measurement. The IoNT can be stated as the interconnection of nano devices with present network. The main objective of this paper gives you the overview of IoNT and its future directions [2].

2. Internet of Nano Things

Nanotechnology is one of the most appealing fields in every aspect. It promises us to create cheaper, quicker, lesser and lighter devices that can offer the intelligent solutions as well as using less raw materials and consumption of energy should be less. The first ever conversation of nanotechnology was assumed by Richard Feynman an America physicist (from 1918 till 1988) in his famous speech titled:" There's Plenty of Room at the Bottom." In that speech, he discussed the significance "of operating and adjusting things on a scale which is to be smallest. Moreover, he also chatted that how they can "give us information much of great interest about the strange phenomena change their manifestation depending on scale. After an era, the term of nanotechnology was again used but this time by Japanese Scientists Norio Taniguchi (from 1912 till 1999) was first to use in 1974 in his paper on manufacture equipment's that generates matters and structures on the instruction of a nanometer. The inspiring age of nanotechnology inaugurated during the 1980s when Smalley, Kroto and Curl revealed fullerenes and Eric Drexler of Massachusetts Institute of Technology (MIT) utilized thoughts from Feynman's well-known speech and Taniguchi's entitle nanotechnology in his book titled, ''Engines of Creation: The Approaching Period of Nanotechnology ''in 1986. Drexler anticipated the impression of a nano scale ''constructor'' which would be skilled to manufacture a duplicate of this one and of different things of self-assertive unpredictability. Drexler's idea of nanotechnology is normally known as ''molecular nanotechnology [3].

The conception of the Internet of Nano things was presented by Ian F. Akyildiz and Josep Miquel Jornet from Georgia

Corresponding author Email address: *rafaehasan@gmail.com*

Institute of Technology. The definition of IoNT can be given as: - "The interrelationship of nano scale gadgets with the prevailing communication network and finally, the internet designates a networking model called the Internet of Nano Things". IoNT can be organized by combining nano scales devices with the network that is currently been used technologies such as Internet of Things, sensors network and cloud computing, etc. [4]. With the progress of development of IoNT in various applications. It has given birth to new domains line such as Internet of Bio Nano things and Internet of Multimedia – Nano things.

3. Future Direction

The development of Nanotechnologies, Internet of Things, Nano machines, nano robots and Internet of Nano Things will ensure an excessive influence in the all the areas such as medicines, military, farming, oil, gas and soon in the forthcoming years. Various researchers are working in the area of nanotechnologies to implement real live applications for the betterment of industries, homes, hospitals, business and many more. By doing this following research opinions should be taken into considerations [5]:-

3.1 Development and Designing Nano Robots in Micro Scale Dimension

Scientists, Researchers, industrialist's, Professor's and Engineers are doing their best to create gadgets at the nano scale for fields such as military, healthcare, and medicine. These nano devices can be combined together to create nano robotics.

3.2 Development of New Communication Mechanisms

To handle information in an effective and efficient manner new and improved transmission mechanism should be created because in the nano-network the nano devices transmit and receive data in the distance which less than one meter.

3.3 Improvement of Compression Techniques

Developing new procedures for compression is vital because reducing the size of pieces of information can assist in saving consumption of energy and saving power so that more amount of information or data can transfer in short period of time.

3.4 Developing of Security and Privacy Methods:

Every technology such as Internet of Things, Internet of Everything, Industrial Internet of Things, Medical, Healthcare, and Military and soon. Security and Privacy are the most significant and difficult issues to face in all areas of the fields. In IoNT, new approaches should be developed so that information can communicate carefully among nano devices inside the nano-network and sensitive data or information can be protected from unauthorized users.

3.5 Developing of New Architecture for Nano devices:

Current infrastructure for Nano devices are not suitable for communicating. In IoNT, nano devices are the foremost component creating new architecture so that nano devices can easily communicate amongst each other.

3.6 Developing and Development New Antenna for Nano Devices:

An antenna can be of many types such as Small Dipole Antenna, Dipole Antenna, Monopole Antenna Loop Antenna and many more. These kinds of an antenna are used in many devices such as mobiles, radio, television, walkie talkies and many more. But for the Internet of Nano things, a different type of antenna should be designed so that information can be transmitted and received amongst the nano devices.

4. Conclusion

Advancement of nanotechnology has led to development to nano machines, nano sensor and nano devices. The new network model called Internet of Nano things brings challenges and opportunities in the field of communication. With the assist of IoNT several applications such as agriculture, military, medicine, healthcare and many more has taken advantage and made a great impact on people lives.

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About Author

Hasan Rafae has completed his Bachelor of Telecommunication degree from Iqra University in 2016. Currently he has completed his Master degree in Telecommunication Systems from NED University of Engineering & Technology. His research interest includes Green Computing, Internet of Things and Networking.