

Future Perspective and Current Aspects of Internet of Things Enable Design

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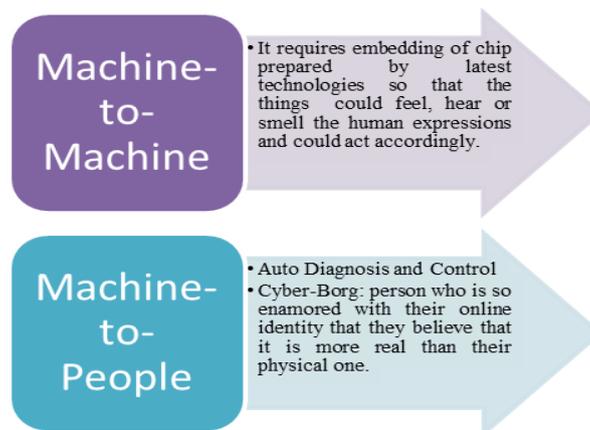
Abstract

In this work, we are going to survey the latest progress in Internet of Things (IoT) and also design IoT enable electronics design like frame buffer, content addressable memory, and key generator for encryption and decryption. We are analyzing future perspective, overall impact, and its role in every corner of life, characteristics features and current aspects of IoT. Apart from this, we study how this concept came into existence and its emergence changes our lives. In this paper, we have also designed IoT enable Frame Buffer on FPGA for Object Tracking, IoT enable Content Addressable Memory for processor and IoT enable Key Generator for Green Communication. In order to make IoT enable design, we are embedding a 128-bit Internet Protocol Version 6 (IPv6) address in each and every design that enables.

Keywords: *Internet of Things; Smart Earth; IPv6 Address; IoT Enable Design, IoTs, Machine To Machine (M2M), Machine To People (M2P)*

1. Introduction

Internet of things refers to a relation between physical entity with itself and to human using the power of networking for which internet connection which is wireless and sensors forms the backbone [1]. This relation can be Machine to Machine (M2M) and Machine to People (M2P) [2].



Origin of Internet of Things

A member of RFID in 1999 used the concept and the first internet appliance made was a Coke machine at Carnegie Mellon University in the early 1980s [3].

Benefit of This Thought

With this thought internet has become a user-friendly technology and has taken a common place, increasing the understanding of dependency and connectivity.

Why Internet Of Things?

God made human and he did wonders, and these wonders are seen through Internet of things. It describes how ideas and thoughts of human beings could create a technological or electrical connection between the things itself and people which could benefit them and can create ease in their life. Improving the resource usage ratio, Accessibility and usability, Symbiotic relationship between human and nature, Act as technologies integrator, Making marketing smarter, Work efficiency increases, Dynamic control of industry and daily life, and Faster means of communication are some of the benefits of Internet of Things. [4].

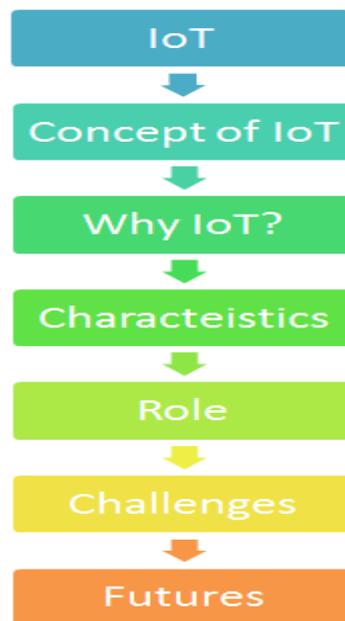


Figure 1. Flow of Internet of Things (IoT)

Characteristics of Internet of Things

Design should be such that it is flexible. Inbuilt power of thought aims that built entity should be autonomous and like humans should possess the power to react according to situation such that can adjust them to it. Event driven is a concept of providing an important power of human to machine that is to reason, think and react as per it, virtual sensors fitted in machines are made with knowledge based on real time analysis, surveys and data collected for every situation is recorded and provided to a machine thus building in it the ability to define, manage, predict events, arrange them, handle exceptional conditions, opportunities and perform actions. Logistics define a connection between the virtual and objects. Humans have set the static things to dynamic thus endeavor them the capability of motion and logistics organize this motion into target oriented way. The PI, as defined in the Roadmap, is an open global system where companies' operations and supply chain systems connect with logistics partners' scheduling and tracking systems in the cloud. It encompasses the physical conveyances that move objects from one place to another. The smart machines, products, and packaging units of so-called Internet of Things (IOT) communicate with open information systems for total global visibility in a supply chain network [16-17]. The Roadmap authors look at the physical, digital, and

operational connections that a true PI would require. Semantic interoperability means that different stakeholders can access and interpret the data uniquely. “Things” on the IoT need to exchange data among each other and with other users on the Internet. Providing unambiguous data descriptions in a way that can be read and interpreted by machines and software agents is a key enabler of automated information communications and interactions in IoT [18].



Figure 3. Characteristics Feature of Internet of Things (IoT)

2. Role of Internet of things in Various Sectors

Medical and health care sectors had proven to be a boon for the health care processes and improving patient’s safety. The x-rays for fracture diagnosis, ECG for measuring the heart beat count, sensor chips for detecting internal organ, laser treatments. Internet is serving like a virtual doctor when real doctor is not available during the time of emergency. Transportation system is a relation between man and machine strengthened with its progress in this sector. With the ever growing population, demands also increased and as a result the number of vehicles which resulted in the traffic issues and with Internet of things monitoring of traffic is possible resulting in easy clearance. To prevent the accidents speed limit checker sensors are set up on roads and GPS service which provides information about the traffic on a particular route with the increasing communication newer technologies like cloud computing, development and adoption of smart phones provide information about travel time, origin destination and vehicle volume [3]. Now we are going in era, where animals like dog, bee and cows are internet of things enable. The back of a dog is wrapped with a kit containing microprocessors, sensors than a dog is no less than a robot for an owner. In china pizza delivery was started through drone which is an example. During implementation of networked cows, under this with the ear of cow is attached a sensor that receives data from the signs or the movement of cow and sends this data wirelessly to a computer which interprets it and flashes to the cell phone of farmer that a cow is about to give a birth [5-7]. Environment includes weather forecasting which could warn us from some unnatural disaster. Records of temperature of the earth is kept in order maintain the global warming effect and also helped in the reduction of pollution from paper waste as more and more work will be done on the laptops and PC’s. It also monitors the movement of wildlife and their habitats. In daily life, it is used to monitor our grocery list Smart refrigerators will sense when you are running low on staples such as breads, butter etc. and will automatically populate your grocery list [8]. Stores will push reminders to add items to your list when it predicts you about to run out based on your historical purchasing behavior and average buying trends. The RO system used to filter water, touch screen gas stoves all are a part of things of internet ecosystem. Well known example of Golden temple in Amritsar which uses a big automated machine to prepare langaar for more than thousands of worshiper’s in a very less time which too washes the utensils in no time. Thus in short internet of

things is like a web covering the globe which if disturbed from any end would lead to collapse of the whole system. In the world of cinema and sports too internet has paved its way. The photography, visual effects, 3D, 5D visualization involves usage of Internet of Things. We have streaming movies option available with us that is our laptops can be connected to our TV's and LCDs and we can enjoy the leisure of home theaters. Now, not only LCD's even OLED's are available to us which is advanced version of LCD [10-11]. In the sports during game of cricket, football, hockey *etc.*, to closely check the fouls committed and the behavior of players various camera's microphones are used [12]. Space is too filled with the internet of things, the information about other planets, black hole; meteorites *etc.* are available to us through man made satellites sent to space. These Satellites provide the connecting links between remote corners of the earth, acting as bridges for data transmission. Bandwidth, the term used to describe the data transmission capabilities of satellites, is leased to companies that provide Internet and broadband access to consumers through computers, smartphones and the emerging "Internet of things". With its help it's possible for us to now launch now our own personal spacecraft into an orbit of 17,000 miles an hour by making Pico-satellites (a small, lightweight satellite) [13-14].

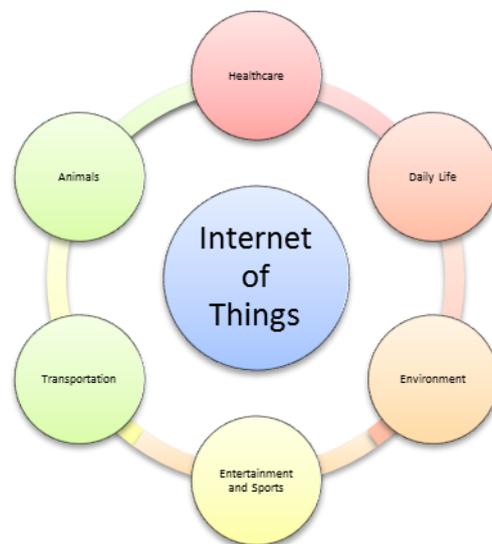


Figure 4. Role of Internet of Things in Various Sectors

Challenges of Internet of Things

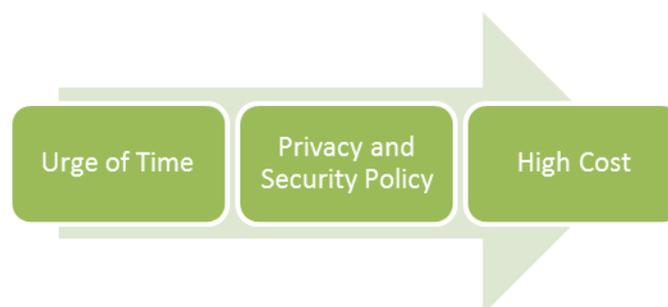


Figure 5. Challenges of Internet of Things (IoT)

The main concerns for implementation of Internet of Things are urge of time, privacy and security policies and high cost. The most important unanswerable question arises here that whether the newly developed things with latest to latest technologies will be readily acceptable by the people such that they agree to buy these newest things. For example I

already own a BMW than am I able to it by newly invented automated driven car? Privacy and security polices –the Internet of things does not fully satisfy or ensure safety to an individual user as every devise requires personal details of an individual and this data can be illegally used by the hackers which going to turn this boon into a fatal and as result people would show low interest in the new internet of thing. In the preparation of design use of high quality material, microprocessors, sensors and other technology hikes the product cost thus making it unaffordable for the common man.

3. Design and Implementation of IOTs Enable Design

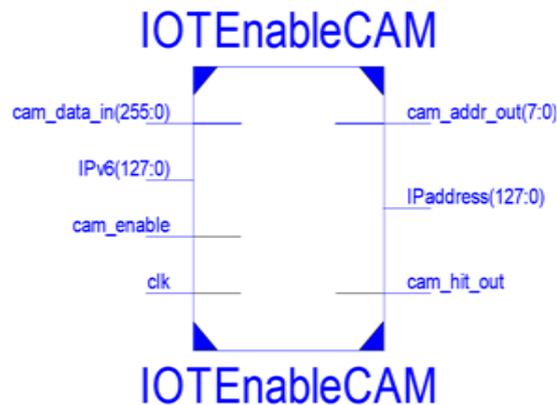


Figure 6. Internet of Things (IoTs) Enable CAM Design

We embed 128-bit IPv6 address into content addressable memory (CAM) in order to make it IoTs enable CAM. Using this assigned IPv6 address, we can access and control this CAM from any part of this world with only requirement of simple internet connection. CAM is an integral part of processor. Therefore, IoTs enable CAM can be extended to design of IoTs enable processor as shown in Figure 6.

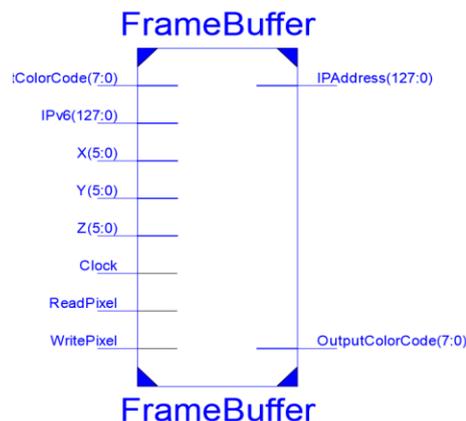


Figure 7. Internet of Things (IoTs) Enable Frame Buffer

We insert IPv6 address into frame buffer in order to make it IoTs enable frame buffer as shown in Figure 7. Using this assigned IPv6 address, we can access and control this frame buffer from any part of this world with only requirement of simple internet connection. Frame buffer is a component of object tracking system and digital image processor. In future, we can also design IoTs enable object tracking system and IoTs enable digital image processor.

4. Future of Internet of Things

As per the progress in technology there is going to be the time when apart from aero plane we would be able to see the flying cars, motor bikes *etc.*, being used, in order to reach the destination using displacement vector (medium as air) rather than distance vector (medium through road). The glimpse of this scenario of thought is already being shown in Hollywood as well as Bollywood movies like in the Bollywood movie of *lovestory2050*. There will be as many as 20 to 40 billion connected objects and it will change from everything to anything and anything to everything. It is believed that toy like rockets could someday carry tiny satellites and human ashes to the space [15]. The internet of things will transform the business and will pose challenge that seek to take action and tangible results as it can seem expensive and complicated. It would not be wrong to say that in 2020 we are going to have a new terminology of earth that is Smart Earth. Frame buffer is a component of object tracking system and digital image processor. In future, we can also design IoTs enable object tracking system and IoTs enable digital image processor with help of IoTs enable frame buffer. In future, we can also design IoTs enable green communication system with use of IoTs enable key generator.

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