General Overview of IoT Empower Technology

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Abstract - *Internet of Thongs (IoT) is a new form of internet. IoT compromises capabilities to identify and connect worldwide physical object into an integrated system. The IoT is a smartly connected devices and system which comprised of smart machines, infrastructures, atmosphere. The RFID and sensor network technologies will rise to meet new challenges. The major IoT importance the formation of smart environments with self-control/ autonomous devices like smart homes, smart healthcare, smart cities and so on. To develop an IoT application we need to create a architecture. it gives the concise knowledge on IoT architecture.*

Key Words: **Internet of Thing (IoT), IoT Architecture, Security and Privacy, IoT Applications, Healthcare, Smart Home.**

1. INTRODUCTION

The IoT is a concept in engineering circles and applied research perception Internet of Things (IoT) enables both communicating and non-communicating devices to connect and to interact with each other. However this road perspective of IoT cannot be consumed in a single universal definition. [1] There are a 4 core components of IoT are:

1. People
2. Things
3. Data
4. Process


Diagram 1: Components of IoT
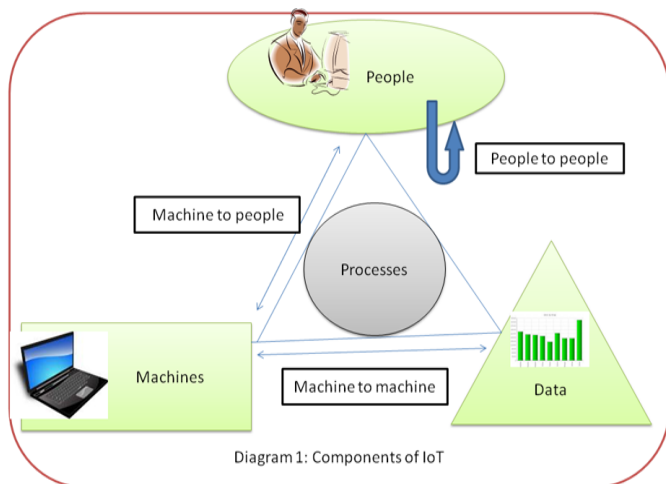
The IoT is comprised of smart machines communicating with each other machines, objects. For consumers, new IoT products like Internet appliances, home automation components are moving us towards a visualization of a "Smart Home" and other IoT devices like wearable fitness, health monitoring devices are moving us towards a vision of a "Smart Health Care".

IoT will change our life style. But there are many challenges to face related to the deployment, growth, execution and so on. [2]

2. ARCHITECTURE OF INTERNET OF THINGS (IoT)

To develop an IoT application we need to create reference architecture first. This paper serves as a standard technical briefing giving knowledge on IoT architecture. [3] Wang Chen has proposed 3 layer architecture of IoT. And Hui Suo proposed 4 layer architecture. Miao Wu has proposed 5 layer architecture of IoT. So basically it has a 6 layers as shown in the diagram.

Diagram 2: Layered architecture of IoT (Internet of Things)
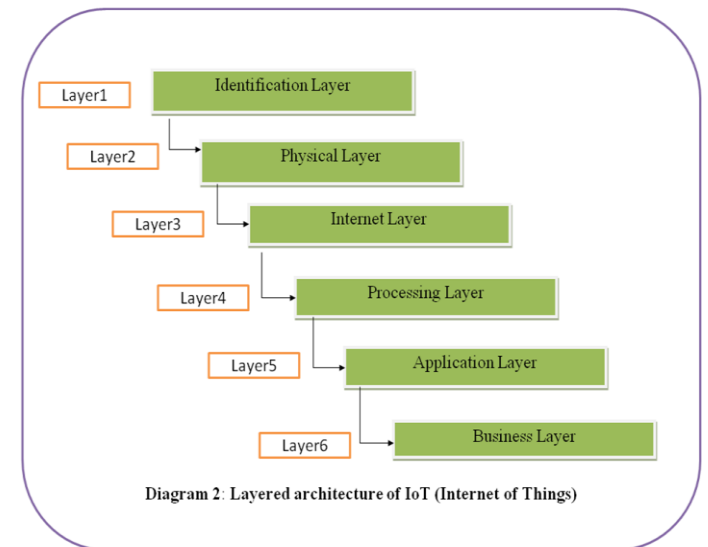
2.1 Identification Layer

In Identification Layer, each device is assigned with unique key or ID which gives essential recognition to the device. [4] Identification ID is like a primary key.

2.2 Physical Layer:

Physical layer also called as Device layer and Object layer. It consist of data sensors in a different forms (image sensor, temperature, pressure, water quality, smoke, location, speed of the device, etc. [4]

2.3 Internet Layer:

In internet layer, accept the necessary information in the form of digital signals from physical layer and then transmit this data to the processing system in the middle layer. [5]

2.4 Processing Layer:

Processing Layer is called a middleware layer. It is most essential layer in bidirectional mode. Processing layer contain the technologies like cloud computing, ubiquitous computing which provides a direct access to the database to record all significant data in it.[5]

2.5 Application Layer:

Application Layer recognizes the applications of internet of things for all types of production based on the administered data. This layer is very useful in huge scale development of internet of things applications could be smart transportation, smart homes, smart planets, smart health care, etc. [5]

2.6 Business Layer:

The Business Layer manages the overall IoT system activities and services. It is at this layer business model, graph, flowchart, etc. are built based on the received data from the lower layer.

3. IoT CHALLENGES:

3.1 Security:

Security is the serious issues for internet connect industrial/organization system industrial attacks are becoming increasingly common. We require specific data isolation techniques to provide proper privilege to the end users according to their authority. [6]

3.2 Energy Optimization Solution:

Energy is a main constraint of Internet of Things as numerous devices are connected via network. Energy spent for data communication between different devices. [6]

3.3 Privacy:

Privacy is particularly critical in the context of IoT to take care of security issue made by IoT utilization without bounds, the protection arrangement of each and every space must be determined. [6]

3.4 Location and tracking Capabilities:

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3.4 Location and tracking Capabilities:

The Smart object requisite be tracking and recognized of them is necessary.

3.5 Technical:

Technical challenge is to secure internet connected device from cyber network attacks, such as well as local physical attacks. [6]

3.6 Self-Organization Capabilities:

In IoT, self organization is necessary that the smart object should sense the surroundings and autonomously respond to real world situation without copious human interventions. [7]

4. INTERNET OF THINGS (IoT) APPLICATIONS:
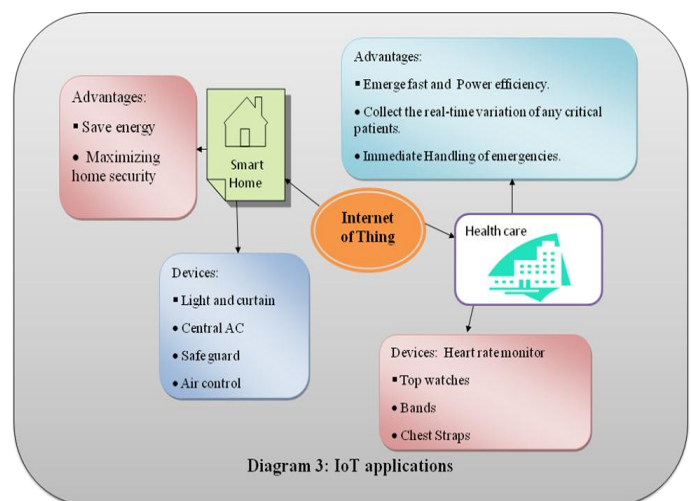
IoT Application are : Smart Home, Health Care, etc.

Diagram 3: IoT applications

4.1 Internet of Thing in Smart Home

Smart Home makes life easy and more comfy. Products can think and act makes the smarter home. IoT has capabilities of providing solution for home security. The smart home can be easily controlled through a smart phones, tablet or computer.

The smart door locks are used to lock and open the door at any time and also from anywhere. Smart lock and door bells helps us to know who is at the front of our house using smart phones even in our nonexistence. If the smart lock is Bluetooth enables then one has to be within 40 feet to operate it. [8]

Diagram 4: IoT for Smart Home

Features of Smart home:

- Unlock the doors.
- Electricity bills are reduced. Because if there is no one at the room. Lights are automatically turn off.
- Makes the task easy for old people.

4.2 Internet of Things in Health Care

IoT in the healthcare application is used to monitoring the healthcare application is used to monitoring the health condition is one end from other end of the spectrum especially it is more useful for patient in the remote location.

Diagram 5: IoT for Smart Healthcare

IoT healthcare solution can remotely monitor patient suffering from various disorders like diabetes, cardiac arrhythmia, dementia, etc. This application will not only to improve the access to care while increasing the quality of care but also reduce the cost of care.

The applications in hospital could be categorized into tracking of hospital staff and patients, identification and authentication of people, automatic data collection and sensing and remote healthcare. [9]

Features of healthcare

- Emerge fast and Power efficiency
- Immediate Handling of emergencies
- Collect the real-time variation of any critical patients.

5. CONCLUSIONS

In this paper, we survey the state-of-art on the IoT which include the architecture, challenges and application of IoT. The applications will range from smart home to smart healthcare with advance technology. In smart healthcare we automatically monitoring and tracking of patients. We stored all data into the database.

The smart home has the control center where one person can manage the house with the help of a mobile phone, Tablet or Computer.

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