

Internet of Things Using RFID and Sensors

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ABSTRACT

The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.” The industrial internet of things (IIoT) refers to interconnected sensors, instruments, and other devices networked together with computers' industrial applications, including manufacturing and energy management. This connectivity allows for data collection, exchange, and analysis, potentially facilitating improvements in productivity and efficiency as well as other economic benefits.

INTRODUCTION:

The Internet of Things is a pretty simple concept, it means taking all the physical places and things in the world and connecting them to the internet[1]. When something is connected to the internet, that means that it can send information or receive information, or both. This ability to send and/or receive information makes things smart[2]. To be smart, a thing doesn't need to have super storage or a super computer inside of it - it just needs access to it. All a thing has to do is connect to super storage or to a super computer[3]. On the Internet of Things, all the things that are being connected to the internet can be put into three categories:

- I. Things that collect information and then send it.
- II. Things that receive information and then act on it.
- III. Things that do both[4].

MATERIALS AND METHODS:

There Are the following characteristics of IoT as follows. Let's discuss it one by one.

1. Connectivity

Connectivity is an important requirement of the IoT infrastructure. Things of IoT should be connected to the IoT infrastructure. Anyone, anywhere, anytime connectivity should be guaranteed at all times Without connection, nothing makes sense.

2. Intelligence

The extraction of knowledge from the generated data is very important. For example, a sensor generated data, but that data will only be useful if it is interpreted properly. Each IoT device has a unique identity. This identification is helpful in tracking the equipment and at time for querying its status.

3. Scalability

The number of elements connected to the IoT zone is increasing day by day. Hence, an IoT setup should be capable of handling the massive expansion. The data generated as an outcome is enormous, and it should be handled appropriately.

Dynamic and Self-Adapting (Complexity)

IoT devices should dynamically adapt themselves to the changing contexts and scenarios. Assume a camera meant for the surveillance. It should be adaptable to work in different conditions and different light situations (morning, afternoon, night).

4. Architecture

IoT architecture cannot be homogeneous in nature. It should be hybrid, supporting different manufacturers' products to function in the IoT network. IoT is not owned by anyone in the engineering branch. IoT is a reality when multiple domains come together.

5. Safety

There is a danger of the sensitive personal details of the users getting compromised when all his/her devices are connected to the internet. This can cause a loss to the user. Hence, data security is the major challenge. Besides, the equipment involved is huge. IoT networks may also be at risk. Therefore, equipment safety is also critical.

SAMPLE PREPARATION:

1. Smart Homes

One of the best and the most practical applications of IoT, smart homes really take both, convenience, and home security, to the next level. Though there are different levels at which IoT is applied for smart homes, the best is the one that blends intelligent utility systems and entertainment together. For instance, your electricity meter with an IoT device giving you insights into your everyday water usage, your set-top box that allows you to record shows from remote, Automatic Illumination Systems, Advanced Locking Systems, Connected Surveillance Systems all fit into this concept of smart homes. As IoT evolves, we can be sure that most of the devices will become smarter, enabling enhanced home security.

2. Smart City

Not just internet access to people in a city but to the devices in it as well – that's what smart cities are supposed to be made of. And we can proudly say that we're going towards realizing this dream. Efforts are being made to incorporate connected technology into infrastructural requirements and some vital concerns like Traffic Management, Waste Management, Water Distribution, Electricity Management, and more. All these work towards eliminating some day-to-day challenges faced by people and bring in added convenience.

3. Self-driven Cars

We've seen a lot about self-driven cars. Google tried it out, Tesla tested it, and even Uber came up with a version of self-driven cars that it later shelved. Since it's human lives on the roads that we're dealing with, we need to ensure the technology has all that it takes to ensure better safety for the passengers and those on the roads.

The cars use several sensors and embedded systems connected to the Cloud and the internet to keep generating data and sending them to the Cloud for informed decision-making through Machine Learning. Though it will take a few more years for the technology to evolve completely and for countries to amend laws and policies, what we're witnessing right now is one of the best applications of IoT.

4. IoT Retail Shops

If you haven't already seen the video of AmazonGo – the concept store from the eCommerce giant, you should check it out right away. Perhaps this is the best use of the technology in bridging the gap between an online store and a retail store. The retail store allows you to go cashless by deducting money from your Amazon wallet. It also adds items to your cart in real-time when you pick products from the shelves.

If you change your mind and pick up another article, the previous one gets deleted and replaces your cart with the new item. The best part of the concept store is that there is no cashier to bill your products. You don't have to stand in line but just step out after you pick up your products from shelves. If this technology is effective enough to fetch more patronage, this is sure to become a norm in the coming years.

5. Farming

Farming is one sector that will benefit the most from the Internet of Things. With so many developments happening on tools farmers can use for agriculture, the future is sure promising. Tools are being developed for Drip Irrigation, understanding crop patterns, Water Distribution, drones for Farm Surveillance, and more. These will allow farmers to come up with a more productive yield and take care of the concerns better.

6. Wearables

Wearables remain a hot topic in the market, even today. These devices serve a wide range of purposes ranging from medical, wellness to fitness. Of all the IoT startups, Jawbone, a wearables maker, is second to none in terms of funding.

7. Smart Grids

One of the many useful IoT examples, a smart grid, is a holistic solution that applies an extensive range of Information Technology resources that enable existing and new gridlines to reduce electricity waste and cost. A future smart grid improves the efficiency, reliability, and economics of electricity.

8. Industrial Internet

The Industrial Internet of Things consists of interconnected sensors, instruments, and other devices connected with computers' industrial applications like manufacturing, energy management, etc. While still being unpopular in comparison to IoT wearables and other uses, market research like Gartner, Cisco, etc., believe the industrial internet to have the highest overall potential.

9. Telehealth

Telehealth, or Telemedicine, hasn't completely flourished yet. Nonetheless, it has great future potential. IoT Examples of Telemedicine include the digital communication of Medical Imaging, Remote Medical Diagnosis & Evaluations, Video Consultations with Specialists, etc.

10. Smart Supply-chain Management

Supply-chains have stuck around in the market for a while now. A common example can be Solutions for tracking goods while they are on the road. Backed with IoT technology, they are sure to stay in the market for the long run.

1. IoT Block Diagram

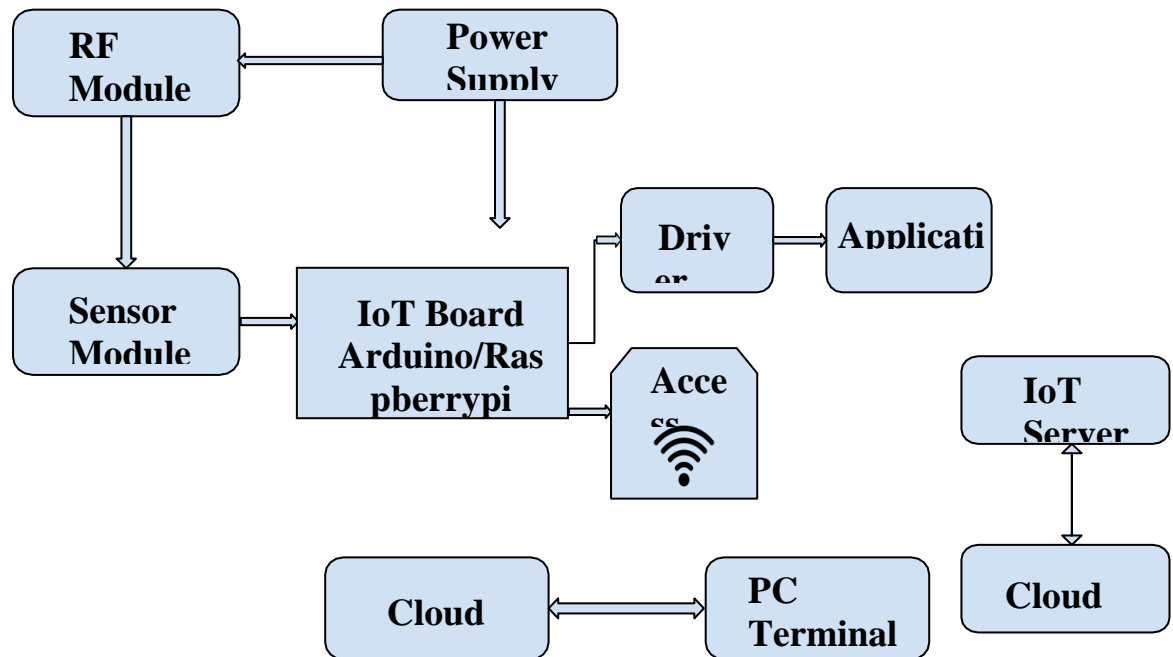


Fig1: IoT Block Diagram

2. A Block Diagram for My own Application.

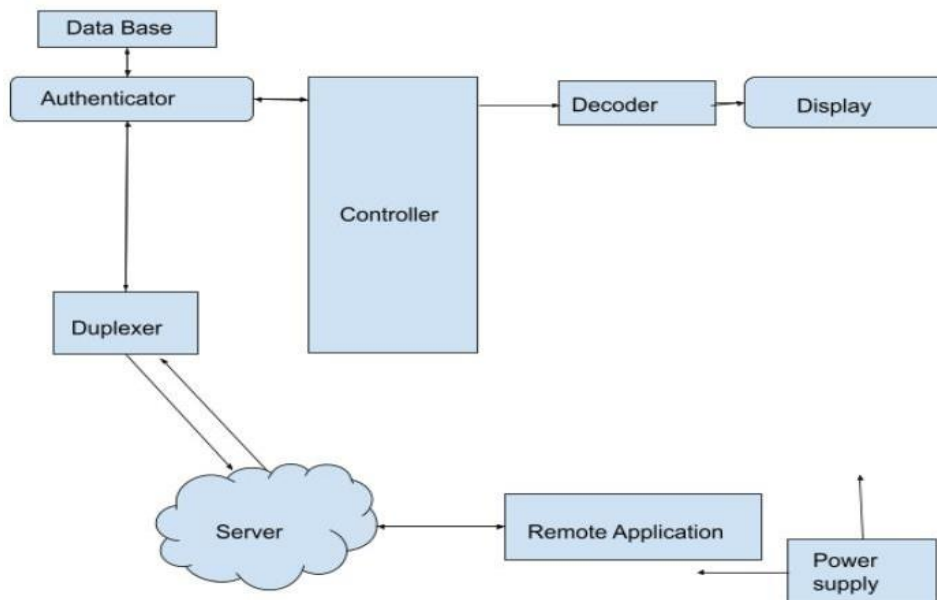


Fig2: IoT Based Digital Display

BLINK LED

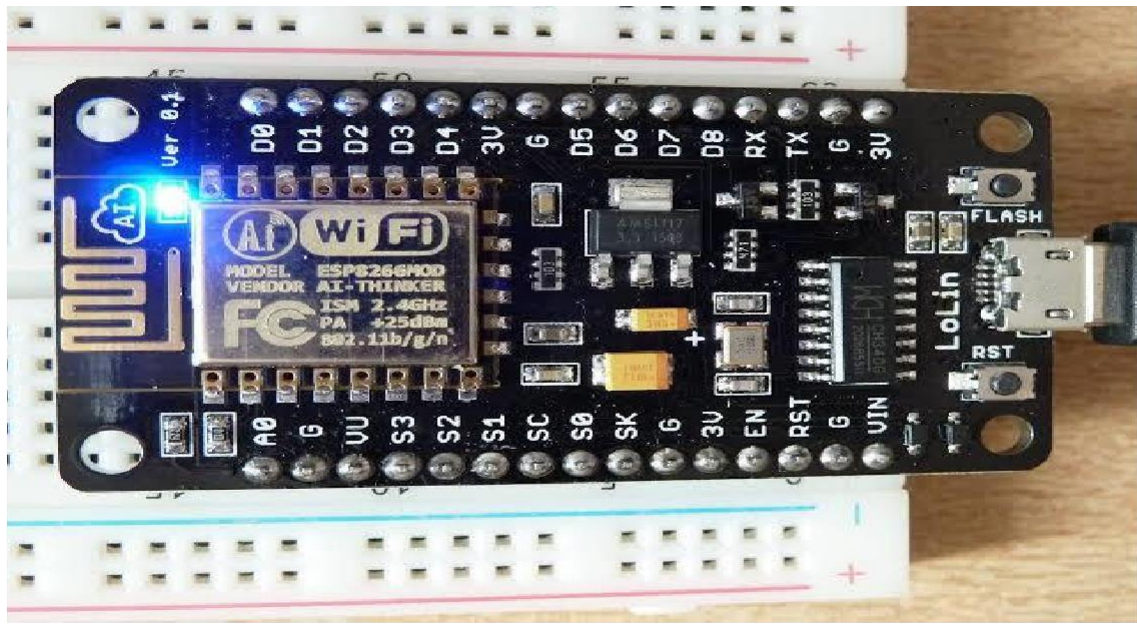


Fig3. (a) Blink led

```
#include <Arduino.h>int led = D0;

void setup() {
  // put your setup code here, to run once:pinMode(led,OUTPUT);
}

void loop() {
  // put your main code here, to run repeatedly:digitalWrite(led,LOW);
  delay(2000); digitalWrite(led,HIGH);delay(5000);
}
```

RESULTS:

The industrial internet of things (IIoT) refers to interconnected sensors, instruments, and other devices networked together with computers' industrial applications, including manufacturing and energy management. This connectivity allows for data collection, exchange, and analysis, potentially facilitating improvements in productivity and efficiency as well as other economic benefits.

CONCLUSION:

In conclusion, Internet of Things is the concept in which the virtual world of information technology connected to the real world of things. The technologies of Internet of things such as RFID and Sensors make our life become better and more comfortable.

REFERENCES:

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3. Hendricks, Drew (10 August 2015). "The Trouble with the Internet of Things". London Datastore. Greater London Authority. Retrieved 10 August 2015.
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