Illustration of IOT with Big Data Analytics

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Abstract- Internet Of Things(IOT) is the way of connecting devices using sensors and monitored by internet. But the data produced by the IOT is growing rapidly because of the large scale development of various applications. As the data is turned and crossed over terabytes and leading to petabytes, there should be a solution to manage the overwhelming increase in data. Big data is the solution for the data problem and it is considered as the future's data dream. As by using big-data, we are able to store unlimited amount of data in a secured manner, the demand for Big Data is increasing more. As IOT and Big Data are two trends in the present era, combining those will really create a technical revolution for the future generations. In this paper, we are going to present various scenarios of using big data with IOT.

Keywords- IOT, Big Data, Hadoop, technical revolution, security, Distributed file system, sensors, data bases, clusters

I. INTRODUCTION TO BIG DAT

The word big data refers to the large volume of data. Now a days, internet is producing millions of pb of data every single day,but how can the data be managed? Consider a social networking site Facebook, which has nearly 3.2 billion users, is producing 0.8 Quintillion bytes of data every day. As the total data produced in a day by the internet is 2.5 Quintillion bytes. Where can this much of data be stored? The solution is big data. By the concept of distributed file system big data handles millions of pb of data every minute.

Generally data is measured in bytes, starting with a byte, now there is a need of zetta bytes of data which may leads to the evolution of many new byte forms. As of now we have the following forms of data.

BYTE CHART

TERM	REPRESENTATION	SIZE
BYTE	B	8 BITS
KILO BYTE	KB	1024 BYTES
MEGA BYTE	MB	1024 KB
GIGA BYTE	GB	1024 MB
TERRA BYTE	TB	1024 GB
PETA BYTE	PB	1024 TB
EXA BYTE	EB	1024 PB
ZETTA BYTE	ZB	1024 ZB

II. INTERNET OF THINGS

Internet of Things is springing as the third outbreak in advancing of internet. In present era Internet of Things is the added essence in development of technology in smart way.IOT is generally documented with sensors and dictators (actuators) to operate things without any physical contact. Imagine a world where everything is interconnected through IOT, where things can automatically get operated and dropped without any human intervention. Think of devices like door lock, tube lights, vehicles like car etc. where we can automatically drive those using sensors and remote controls by just including an emerging wave called "INTERNET". In recent future IOT is expected to have an immense impact on business, education, consumer products, infrastructure, culture, startups etc. In conclusion, Internet of Things is yet to be implemented if a common man would think. Utmost all the advances needed for it, have already been made, and moreover some corporates and producers have already began implementing it mini-scale version. The vital reason why it is not truly implemented is the effect it will have on security, cultures, ethics and social fields. Moreover even an average person or a corporation may not like to share their ideas as a fear of privacy concern. As a result of these reasons IOT is not being implemented and lagged back for longer than it truly need to be.

III. LITERATURE SURVEY

Author [1] promotes the concept of smart and connected communities SCC, which is originating from the concept of smart cities. SSC says the relation between present, past and future living of a community using IOT in Big data. In [2] said that Millions of things are connected through IOT, and

these contain enormous of data .The Data processing and transmission is a hard task. This paper mainly aims at role of Big Data in IOT and discuss about protocols and structures.

In [3] Author says about methods to overcome problems related to current technology like accessing the data, installation, usability, scalability. It also says about new query rewriting techniques and temporal and streaming data processing in one platform.

In [7] Author says that cloud services have a solitary nature, and searching such services is a challenging task. Author cloud service Crawler engine collected a massive data about such services based on many links. Based on this data, it provides a better understanding of the current status of cloud servicing provisioning, and it helps the cloud research community.

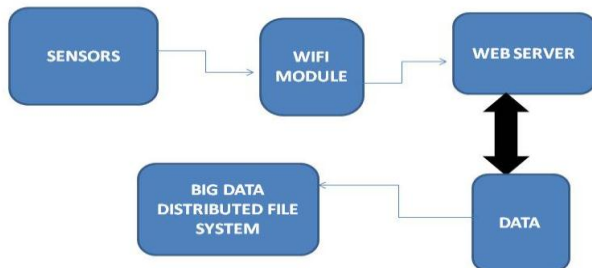## IV. BLOCK DIAGRAM SHOWING FUNCTIONING OF IOT WITH BIG DATA

Figure.1: Flow of IoT Connected With Big Data

The sensors will transmit the data to the web server through the Wi-Fimodule. The data in the web server in general should be handled by the databases in the local server, if once the data size limit crosses beyond the threshold limit, it is difficult to maintain databases. Hence big data is used to store the data.

V. MAJOR COMPONENTS USED IN IOT

GSM MODEM

A GSM modem is a specialized type wireless modem that works with a wireless network. It accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. A GSM modem can be an external device or a PC Card / PCMCIA Card. An external GSM modem is connected to a computer through a serial cable or a USB cable, When a GSM modem is connected to a computer, this allows the computer to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS message. GSM Modem sends and receives data through radio waves.

ESP8266 Wi-Fi module

It is the leading IOT devices in the world in which it is very cheap and effective to use. The hardware connections required to connect to the ESP8266 module are fairly straight-forward but there are a couple of important items to note related to power:

- The ESP8266 requires 3.3V power–do not power it with 5 volts!
- The ESP8266 needs to communicate via serial at 3.3V and does not have 5V tolerant inputs.so you need level conversion to communicate with a 5V microcontroller like most Arduinos use.
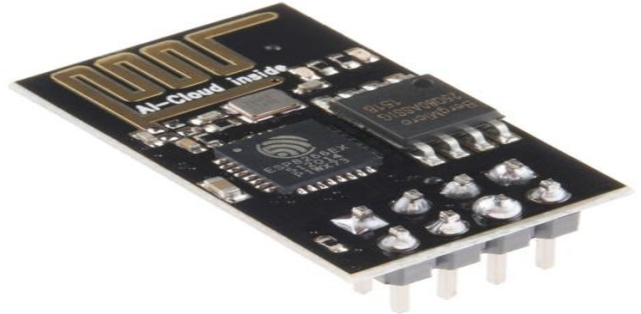

Figure.2: ESP8266 Wi-Fi module

Arduino Microcontroller

Arduino microcontroller is a special type of microcontroller designed especially for IOT. It controls and monitors the entire sensor propagation. The code should be written in the Arduino software which is open source to control the sensors.
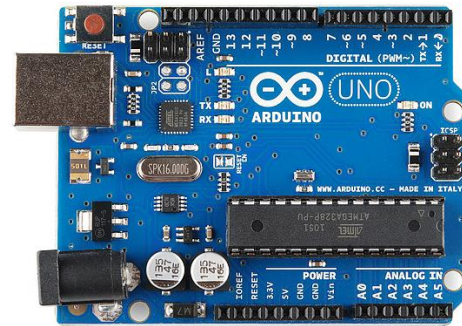

Figure.3: Arduino Microcontroller:

VI. IOT APPLICATIONS WITH BIG DATA

Trash monitoring system:

In this system, the trash levels in every dustbin placed at every street in the city is detected through ultrasonic sensors and data is transmitted through Wi-Fi module to the web server. The continuous monitoring at the web server will reduces the garbage level as the truck driver will be instructed at regular intervals to clean the trash. The data send to the web server will be huge as the entire city data will be collected at the server end, so big data is used to maintain the regular data storage at time.
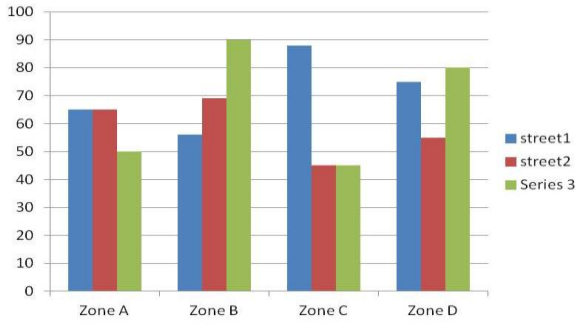
Figure.4: Smart Trash Monitoring System in a City.

By using the data analytics of this project, we can able to analyze in which zone and street the problem of garbage is more and so that we can reduce the problem immediately.
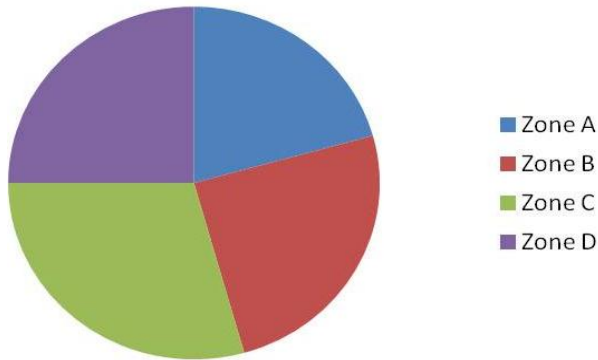

Figure.5: Zone -Wise Trash Level

Smart water level indicator:

In this project, we will find the water level of the particular pond by using the sensors; this can be very much helpful to monitor the needs of the people and water problem in irrigation and industries. This is very veryful in irrigation and it can be used to control the monitor the water level by sitting in the home.
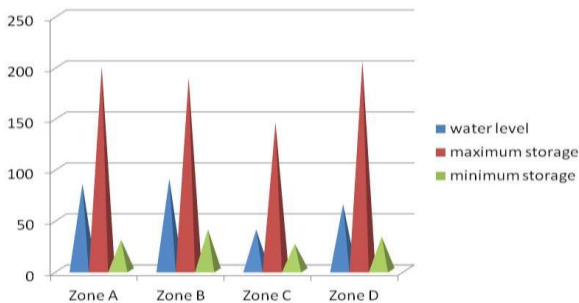

Figure.6: Water Level in Various Zones in a Region

VII.   CONCLUSION

IOT and Big Data are the two hotcakes which everyone is talking about, the relation between these two will gets tightly bonded as the days are passing ,the reason is because of the rapid increase in usage of internet. There is no chance that this will decrease because as the days are passing, the internet users are increasing but not decreasing. The statistics are clearly mentioned that the internet users will be approximately 6 billion by 2025.Then it would be left to our imagination that how much data will be produced in the internet every minute. So there is a need of IOT and big data should be combined to be reliable and be strong from the data obstacles in the future.

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