

The Power of IoT in the Era of Digital Transformation

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Abstract:- This paper discusses how Internet of Things (IoT) transforms the day-to-day life and how it becomes an integral part of the digital transformation journey that different businesses undertake to pursue operational excellence.

- **Data Analytics** to perform data analysis and make more informed decisions.
- **IoT Application** to enable the user to control the overall system, set parameter, adjust preferences, set up devices, etc.

I. INTRODUCTION

You might not be aware of it or not so familiar to it but you must have at least experienced it, the use of Internet of Things (IoT), in one of your daily activities. Nowadays, IoT coupled with Artificial Intelligence drives most of the digital transformation advancements that we witness not only in our day-to-day life but also in every business pursuing operational excellence and aiming to create competitive advantage in the era of Industrial Revolution. For example, people use surveillance camera and interconnect them to the internet and cloud to monitor their homes and business remotely and at any time. In this specific example, IoT is the enabling platform that allows people to remotely access and monitor their facilities. In other words, IoT has reshaped the way we live, work, and interact with the world around us. This takes us to the basic question of what is IoT?

II. IoT FUNDAMENTALS

In its simplest form, IoT is the network of interconnected devices and physical objects that have embedded sensors and applications that allow the collection and exchange of data to make more effective decisions. This setup enables these systems to communicate and interact with each other via the internet. These devices include but not limited to smart phones, surveillance cameras, household appliances, and industrial machines. The different components forming the IoT is summarized in figure 1 and this includes the followings:

- **Hardware** such as but not limited to actuators, sensors, and actuators that are responsible for gathering data or controlling certain mechanism.
- **Connectivity** powered by communication protocols or gateways that transfer data to the cloud or get commands. For example, the connectivity can be established via Wi-Fi, Bluetooth, or cellular technology such as 5G networks.
- **IoT Cloud** which is used for data storage.

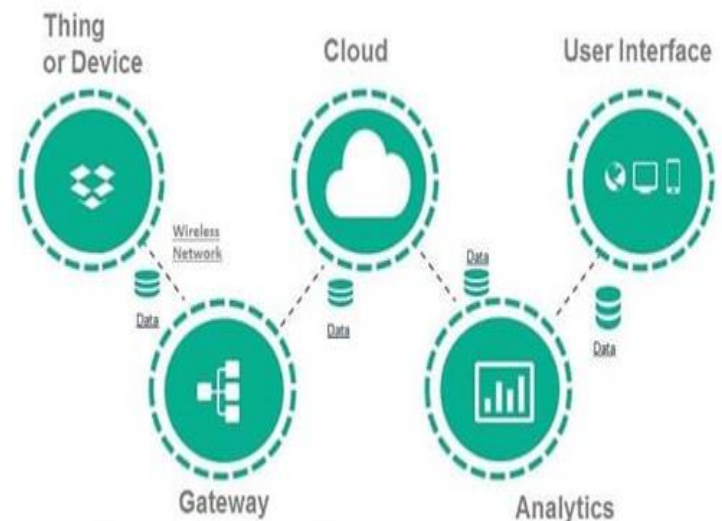


Fig 1: The major components of IoT

III. IoT APPLICATIONS & BENEFITS

There are vast and diverse applications of IoT in our daily life and in the different business segments. For example, IoT gives us the capability to remotely control and monitor our home appliances, lighting, and security systems. Moreover, smart cities leverage IoT to optimize the flow of traffic, manage the disposal of waste, and improve energy efficiency. Healthcare is also another field where IoT devices are used to help monitoring the patients, gauging the medication adherence, and providing early disease detection. Zooming into the oil and gas industry, we find that IoT is also used to gather, process, and analyze raw data in real time to get a holistic visibility of all processes at the facilities, optimize energy consumption, enhance operational efficiency, enable effective hazard management, minimize the negative environmental impact, improve the proactive maintenance, and boost profitability. As a matter of fact, IoT solutions cover all major industry segments including;

- **Upstream** uses IoT to improve the drilling and extraction processes as well as to eliminate the non-productive time.
- **Midstream** utilizes IoT to enhance fleet management as well as to improve the maintenance of pipeline and storage.

- **Downstream** leverages IoT to achieve optimized oil and gas processing and distribution.

IV. CONCLUSION

It is true that IoT offers abundant opportunities to create personalized experience, empowers businesses to build new streams of revenues, and enhances the way we live and work. However, it also comes with different challenges that we must take them seriously. Privacy and security are among the top challenges due to the transmission and collection of huge data including personal information. Compatibility and interoperability are also another challenge due to the availability of diverse devices which makes the integration more complicated. Additionally, the rapid changes in technological advancements require regular and frequent updates as well as security measures. In spite of these challenges, the future of IoT appears to be more promising with the emergence of 5G connectivity. This will enable IoT devices to be even more interconnected and capable of processing tremendous amounts of data. Edge computing is also another factor that will allow IoT devices to achieve faster processing with reduced latency. Moreover, the integration with artificial intelligence will enable more smarter and autonomous decision making. As we advance more in these related technologies, the power of IoT will continue to play a big role in shaping the future of businesses and the modern day-to-day life. In other words, IoT will the pave the road for a more interconnected and efficient future.

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