Exploration of Research Challenges and Potential Applications in IoT

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INTRODUCTION

Information, whereas the internet is an interconnected system that deals with physical elements that differ in their capacities to process, to sensor and to control and to communicate over the internet (Raun, 2016). Thus, the main objective of the Internet of Things is to make it possible for objects to be connected with other objects, individuals, at any time or anywhere using any network, path or service. The Internet of Things (IoT) is widely seen as the next phase in the growth of the internet. In order to achieve numerous different objectives, IoT will make it feasible for common items to connect to the internet. The amount of devices that might be included in IoT is currently estimated at just 0.6% (Ryan, 2017). By 2020, however, over 50 billion gadgets are projected to be connected to the internet.

The internet has evolved from a basic network of computers to a network of diverse devices, whereas IoT functions as a network of various "connected" devices, or a network of networks (Miraz, 2018), as illustrated in Fig. Smartphones, automobiles, industrial systems, cameras, toys, buildings, household appliances, industrial systems, and a plethora of other items may now all communicate data through the Internet. These devices can perform smart reorganisations, tracing, positioning, control, real-time monitoring, and process control regardless of their size or function.

In recent years, Internet-capable gadgets have spread significantly. Although its commercial effects were most important in the area of consumer electronics; in particular the smartphone revolution and the interest in wearable devices (watches, headsets etc.), connecting people has become a fragment of a larger movement towards the combination of digital and physical worlds. With all this in mind, it should continue to expand its reach for the number of devices and functions that can be operated by the Internet of Things (IoT).

This is obvious from the ambiguity in the phrase of "Things" which makes it impossible to specify the ever-growing limitations of the IoT (Borgia, 2016). While commercial success continues to emerge, the Internet of Things (IoT) continues to provide an almost endless supply of potential, not just in industry but also in research. As a result, the course examines the many prospective areas for IoT domain applications as well as the research difficulties that come with them.

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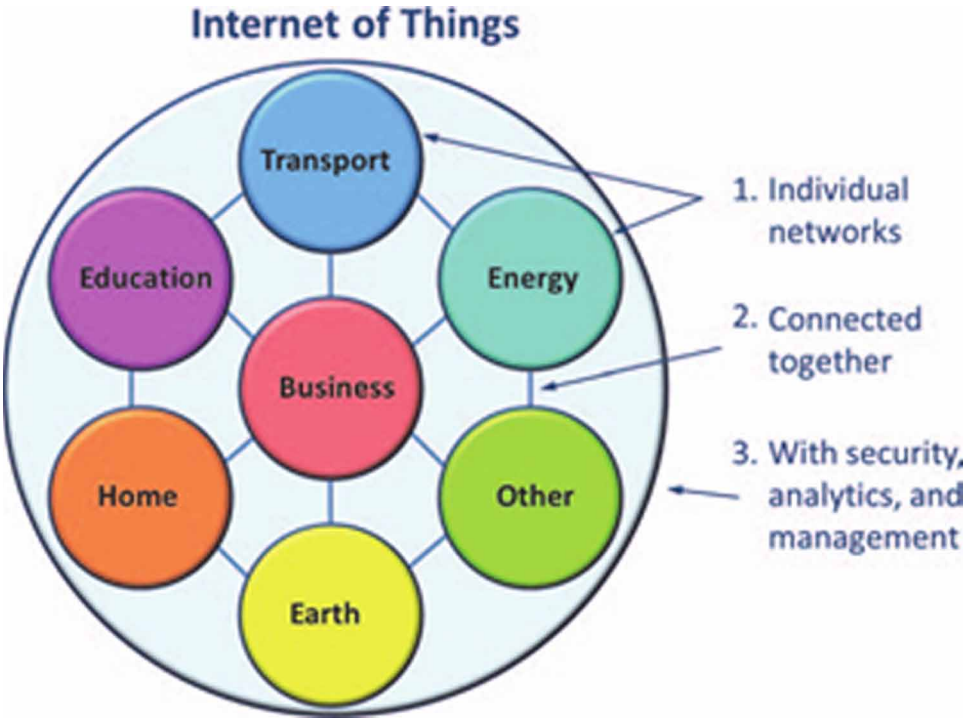
Figure 1. IoT can be viewed as a Network of Networks
(Bedi, 2021, Paul, 2020, Ezeofor, 2021, Prakash, 2019, Bansal, 2018)



II. APPLICATION OF IOT

The internet of Things' potential applications are not only many but also diversified, since they pervade almost every element of people's, institutions', and society's everyday lives. According to (Patel, 2016), IoT applications span a wide range of industries, including manufacturing, healthcare, agriculture, smart cities, security, and disaster relief, among others.

A. Smart Cities

The IoT plays an essential function to enhance city smartness and general infrastructure, according to (Zanjal, 2016). Smart transport systems (Jain, 2018), intelligent smart building, traffic congestion (Jain, 2018, Soomro, 2018) waste management (Mahmud, 2018), smart lighting, smart parking and urban mapping are some of IoT's application areas for the development of intelligent cities. This may involve the monitoring of available parking spots inside the city, the monitoring of vibration, as well as bridges and buildings material conditions and the installation of sound monitoring instruments in sensitive urban areas and the monitoring of pedestrian and car levels.

Artificial Intelligence (AI) has made it possible. In Smart Cities, IoT may be used to monitor, regulate, and alleviate traffic congestion (Zanjal, 2016). Furthermore, the Internet of Things enables the installation of intelligent and weather-adaptive street lighting as well as the identification of waste and waste containers by tracking trash pickup schedules. Intelligent highways can send out alerts and vital information, such as access to other routes based on weather conditions or unforeseen events such as traffic jams and accidents.