Case Study: To Study Internet of Things Technology, its needs and Application in various Domains.

What is the Internet of Things?

The Internet of Things, or IoT, refers to the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data. Thanks to the arrival of super-cheap computer chips and the ubiquity of wireless networks, it's possible to turn anything, from something as small as a pill to something as big as an aeroplane, into a part of the IoT. Connecting up all these different objects and adding sensors to them adds a level of digital intelligence to devices that would be otherwise dumb, enabling them to communicate real-time data without involving a human being. The Internet of Things is making the fabric of the world around us smarter and more responsive, merging the digital and physical universes.

Need Of Iot Because of Following Benefits:

1) More data means better decisions

With added sensors, these devices are able to collect a large amount of data on many different areas. For example, in addition to the practical elements of being able to know which foods are going out of date in your smart refrigerator, this enhanced household item will be able to give you additional information on its power consumption, temperature, average time of the door spent open and much more. A greater flow of information means that company behind the device can analyse large trends in the data to better improve the features of the device. Many companies are realising the power of this technology and it is leading to a large increase in the market. In fact, the total market value of IoT is set to grow to over $3 trillion annually by 2026*.

2) Ability to track and monitor things

As well as tracking data for a company to use, it also greatly benefits the user. These devices would have the ability to keep an eye out on the current quality of goods at home. Knowing the state of your items will allow a homeowner to know when they need to replace an item, without them having to consistently check the quality themselves.

3) Lighten the workload with automation

Having a device doing most the work for you means that you can save more time and cost. Imagine having your fridge order a new carton of milk to be delivered when it reaches a certain level level of expiry? Sounds good to me. This greatly reduces human efforts. It also results in devices being created that need little to no human intervention, allowing them to operate entirely on their own.

4) Increases efficiency by saving money and resources

As well as saving time for the device owner, it can also result in cost savings. For example, if lights automatically turn themselves off the moment you leave the room, you could save a lot of money on you electricity bills. As you can see, connected devices can provide many useful implementations. The IoT system encourages machine to machine (M2M) communication resulting in increased long term efficiency for both the company and user. The rate of growth for machine to machine communication is high. The total numbers of connections are set to grow from 5 billion in 2014 to 27 billion in 2024*.

5) Better quality of life

In the end, all the benefits lead to an increased quality of life. Having your devices track and order things for you, turn light switches off for you, and help manage important tasks that you

may not have the time to do yourself certainly takes away a lot of stress. There is no doubting that people are generally getting busier as the years go by. With so many devices being created and new technology being implemented, it's hard to keep track of everything. It's great to be able to be able to do the things you enjoy and have a computer take care of the mundane things you know need to be done. Improvements to your lifestyle, health benefits and improved wellness are also part of the IoT future. For example, those that exercise regularly can utilise wearable technology to help them track their heart rate, body temperature, hydration to stay in shape and monitor their health.

Applications of Iot:

Smart Home

Whenever we think of IoT systems, the most important and efficient application that stands out is the smart home, ranking the highest IoT application on all channels. The number of people searching for smart homes increases every month by about 60,000 people. Another interesting thing is that the database of smart homes for IoT analytics includes 256 companies and startups. More companies are now actively involved in smart homes, as well as similar applications in the field. The estimated amount of funding for smart home startups exceeds $2.5 billion and growing at a rapid rate. The list of startups includes prominent startup company names, such as AlertMe or Nest, as well as a number of multinational corporations, like Philips, Haier, or Belkin.

Wearables

Just like smart homes, wearables remain a hot topic among potential IoT. Every year, consumers all across the globe await the release of the latest Apple smartwatch. Apart from this, there are plenty of other wearable devices that make our life easy, such as the Sony Smart B Trainer, LookSee bracelet, or the Myo gesture control.

Smart City

Smart cities, like its name suggests, is a big innovation and spans a wide variety of use cases, from water distribution and traffic management to waste management and environmental monitoring. The reason why it is so popular is that it tries to remove the discomfort and problems of people who live in cities. IoT solutions offered in the smart city sector solve various city-related problems, comprising of traffic, reducing air and noise pollution, and helping to make cities safer.

Smart Grids

Smart grids are another area of IoT technology that stands out. A smart grid basically promises to extract information on the behaviors of consumers and electricity suppliers in an automated fashion to improve the efficiency, economics, and reliability of electricity distribution. 41,000 monthly Google searches is a testament to this concept's popularity.

Industrial Internet

One way to think of the Industrial Internet is by looking at connected machines and devices in industries such as power generation, oil, gas, and healthcare. It also makes use of situations where unplanned downtime and system failures can result in life-threatening situations. A system embedded with the IoT tends to include devices such as fitness bands for heart monitoring or smart home appliances. These systems are functional and can provide ease of use but are not reliable because they do not typically create emergency situations if a downtime was to occur.

Connected Car

Connected car technology is a vast and an extensive network of multiple sensors, antennas, embedded software, and technologies that assist in communication to navigate in our complex world. It has the responsibility of making decisions with consistency, accuracy, and speed. It also has to be reliable. These requirements will become even more critical when humans give up control of the steering wheel and brakes to the autonomous vehicles that are being tested on our highways right now.

Connected Health (Digital Health/Telehealth/Telemedicine)

IoT has various applications in healthcare, which are from remote monitoring equipment to advance and smart sensors to equipment integration. It has the potential to improve how physicians deliver care and also keep patients safe and healthy. Healthcare IoT can allow patients to spend more time interacting with their doctors, which can boost patient engagement and satisfaction. From personal fitness sensors to surgical robots, IoT in healthcare brings new tools updated with the latest technology in the ecosystem that helps in developing better healthcare. IoT helps to revolutionize healthcare and provide pocket-friendly solutions for both the patient and healthcare professional.

Smart Retail

Retailers have started adopting IoT solutions and using IoT embedded systems across a number of applications that improve store operations, increasing purchases, reducing theft, enabling inventory management, and enhancing the consumer's shopping experience. Through IoT physical retailers can compete against online challengers more strongly. They can regain their lost market share and attract consumers into the store, thus making it easier for them to buy more while saving money.

Smart Supply Chain

Supply chains have already been getting smarter for a couple of years. Offering solutions to problems like tracking of goods while they are on the road or in transit or helping suppliers exchange inventory information are some of the popular offerings. With an IoT enabled system, factory equipment that contains embedded sensors communicate data about different

parameters, such as pressure, temperature, and utilization of the machine. The IoT system can also process workflow and change equipment settings to optimize performance.

Smart Farming

Smart farming is an often overlooked in IoT applications. However, because the number of farming operations is usually remote and the large number of livestock that farmers work on, all of this can be monitored by the Internet of Things and can revolutionize the way farmers operate day to day. But, this idea is yet to reach a large-scale attention. Nevertheless, it still remains one of the IoT applications that should not be underestimated. Smart farming has the potential to become an important application field, specifically in the agricultural-product exporting countries.