**Brace Yourselves, the IoT is coming.**

Imagine waking up to your favourite alarm tunes being played, one for each day of the week . The number of miles you jog every morning is updated to a cloud service, which monitors your health and fitness. As you get ready for a shower, the smart water heater has already been triggered by the sensors in the alarm clock, which correctly estimates the time required using the data accumulated over a period of time. The smart oven has prepared your breakfast by the time you are dressed. The car has been put into ignition mode after the garage door is triggered by your smartphone. When you drive, real time data obtained using other ‘smart’ cars, lets you know the best possible route to your destination, helping you avoid traffic and other stoppages. Don’t bother locking your house, as your smartphone has done it, not before turning off the lights and asking the thermostat to lower the temperature for efficient energy usage. No, this is not part of the script from one of those futuristic Hollywood movies that are churned out at regular intervals. If things work out well, by 2020 this could be our way of life.

When Kevin Ashton coined the term Internet of Things(IoT) in 1999, he might have very well judged the impact of his proposition, in the foreseeable future. What had actually started as a bunch of sensors communicating and exchanging data has now evolved into this potential juggernaut that recommends an overhaul of our lifestyles. Technology surely does evolve at a rapid pace. The 21st century is a testament to that fact. But when technology evolves faster than the pace at which we can cope, it presents a unique problem. The IoT is one such disruptive technology. Disruptive, since it will possibly encourage a dramatic shift in consumer tastes with the promise of a smarter and technology driven lifestyle.

**A technical perspective**

Without delving too much into the technical jargon, it would suffice to say that IoT comprises of a huge set of sensors embedded into a wide range of devices. Over a period of time, the IoT has evolved into a much complex and messy system, interconnecting a variety of domains, protocols and communication systems. Imagine fitting every single electronic device in your vicinity with a bunch of sensors and assigning an IP address to each of them. The sensors exchange data over a network with a standard protocol, making use of a wireless ‘mesh’ network. In simpler terms, a ‘mesh’ network is a network topology where every node(read device) is connected to every other node. Data is exchanged between the nodes in real time, thereby turning the rather dumb devices into ‘smart’ ones. The philosophy of the IoT is to essentially connect every single device on the planet across a standard set of protocols, to make the isolated electronic devices smarter for an efficient lifestyle.

It is estimated that there will be 26 billion devices in use by the year 2030, a threefold increase in number considering the current 7 billion devices which are up and running. It essentially means that every individual will own at least 3.3 devices, all of which are of course part of the IoT.

**Big Players warm up to the IoT**

Less than two decades ago, the IoT was confined to paper presentations and the practical implementations seemed far fetched and unlikely. But the emergence of better semiconductor technology combined with massive infrastructural progress has given a necessary boost to the IoT community. Most importantly, the multinational corporations have been party to such an idea and their R&D investment and expertise has helped. When Google acquired Nest Labs, a home automation company, in early 2014 for a massive 3.2 billion, it was further proof that IoT was gaining prominence among the biggies. Very recently, Apple launched Homekit, a framework for controlling home devices by automation. It is an addition to its newly released iOS 8, taking it a step ahead in terms of practical implementation.

For bigwigs such as Google and Apple, IoT is a jackpot. Google largely earns from its advertising service and now with the possibility of sensors being ubiquitous, every smart house is an information goldmine. A recent report suggested how targeted ads could appear on your refrigerator screen, prompting you to choose the local store to buy items whose supplies are running low. For Apple, it is part of a long cherished dream to make its devices at the center of an IoT universe. Back in 2001, it was reported that Steve Jobs wanted Apple devices to be at the heart of every home automation system. With the new features in iOS 8, it is a step towards achieving that goal.

**Problems Galore**

Although IoT has made significant progress over the past decade, it would be silly to assume it is well developed. The primary concern that bugs every security analyst is the little or almost no security in an IoT environment as most of the devices will be low key home appliances. Indeed lack of progress in security and privacy mechanisms is a hindrance to IoT’s evolution. Some of the devices like heart rate monitors and health monitoring devices might deal with acutely private data, which raises significant queries over its storage and protection.

Another significant problem associated with IoT is the heterogeneity in device manufacturers. It is quite obvious that each manufacturer will prescribe to his preferred mode of protocols. For instance, there are many wireless technologies in the market, most of them fairly new. Z-wave and Zigbee technologies have been around for a few years, but they are not yet compatible with each other in terms of communication. A new entrant, Bluetooth Smart boasts of better features than the above mentioned technologies, but is again isolated with very little compatibility. There is an urgent need to level the playing field by standardizing the wireless technology to be used.

With sensors invading every possible space available, the amount of data generated per day will be massive. Structuring and utilizing the data for use will require both infrastructural and capital investments. For a startup wanting to cater to the needs of IoT enthusiasts, it is bad news.

Another issue that might be instrumental in IoT adoption is the impact on environment caused by a massive overhaul of infrastructure. When millions of new devices flood the market, the non-degradable junk leftover by the old devices will be hard to manage. A non-smart device might be valid for several years but smart devices need constant upgrades rendering them obsolete after a period of time. The costs incurred periodically might put off potential customers, who might classify them as an unnecessary expenditure.

**A brighter future**

Though IoT might receive its share of criticism for privacy and security violations, it is still a very good technology to bank upon. Yes, right now it is literally half-baked and messy, but then every emerging technology is such during its development. Technology has always found a way to refine itself over a period of time and IoT will possibly follow suit. The promise the IoT holds for better and efficient living is just too good to ignore.