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# *"Positive and Negative Role of IoT for growth of business"*

Dr. Sameer Narang[1], Dr. Satinder Kumar[2]

[2]Assistant Professor, SMS, Punjabi University, Patiala-147001(Punjab)

**ABSTRACT**

**We have touched that phase of lifetime where nearly every singular is linked to the Internet. The progression of Internet know-how took a novel shape where the whole thing round the globe can be joining amongst each other & that know-how is termed as IoT (Internet of Things). It is a mammoth notion which is developing day by day & the prospects in IoT is infinity. There are essential enabling technologies used in IoT which are mentioned in this study. The architectural layers of IoT are also discussed. The research paper gives an idea to the readers/audience about basics of IoT, its application in various areas. Further the advantages and disadvantages of IoT have been brought forward. In my viewpoint I would like to state that it depends on the organization/individual how well it makes use of IoT so that he/she/organization can take maximum benefit from its advantages while simultaneously delicately handling the risks involved.The nature of this study is qualitative and the author recommends there are many possible directions of research in IoT which can be helpful for the development of society and the world.**

**Keywords: Internet, research, study, application**

## INTRODUCTION TO IOT

We have touched that phase of lifetime where nearly every singular is linked to the Internet. The progression of Internet know-how took a novel shape where the whole thing round the globe can be joining amongst each other & that know-how is termed as IoT (Internet of Things). It is a mammoth notion which is developing day by day & the prospects in IoT is infinity. The quantity of internet facility's users & the internet facilities in the devices are snowballing day by day whichever they are associated via wires or wireless. Anybody can addition any info just at their fingertips. Earlier the origination of IoT, there were solitary two kinds of communication whichever human-human or human-devices, but the creation of IoT made it probable to institute communication amongst machines-machines (M2M). The notion of IoT dates back to 1982 where a coke machine was altered & able to join to the internet. The machine produced a report of the drinks whether the drinks were icy or not. The prime notion behind the Internet of Technology is to give-and-take info amid real-world things round us, with the aid of foremost technologies alike RFID (Radio Frequency Identification) & WSN (Wireless Sensor Network) which are detected by the exceedingly working sensor devices & are more processed by a processor for making judgements & the activities are accomplished automatically devoid of any individual's interference.In simple relations, we can say that IoT is the new-fangled uprising of the Internet. It delivers a phase where things can communicate, organize & cope by themselves.

**Brief History:**
The label "Internet of Things" was first legitimately named in the year 1990. Though the notion of IoT was used at Carnegie Mellon University in early 1982 where a altered coke machine became the first machine to institute an internet connection. The device reported whether the newest loaded drinks were icy or not. The notion of IoT was spread in the year of 1999.

## WHICH ARE ENABLING TECHNOLOGIES EMPLOYED IN INTERNET OF THINGS?

**a) Radio Frequency Identification (RFID):** This technology plays a very momentous task in IoT as it usages an electromagnetic field to diagnose & track the tags or the labels that are devoted to the things. The tags or the labels enclosed some electronic info stockpiled in. It encompasses with a two-way radio receivers-transmitters to diagnose & track those tags or labels linked to a thing. The application of this technology is found in transport, merchandizing & SCM etc.

**b) Wireless Sensor Networks (WSN):** WSN is the webs that are wireless in nature which entails of certain inter-coupled or not inter-coupled sovereign device which is acknowledged as sensors that are employed to sense or observe physical & ecological situations such as temperature, pressure etc .The WSN emanates or builds up with nodes where these nodes are couped to a singular sensor or occasionally it is coupled to more than a sensor. A scarce parts of such sensor network nodes are:

- A radio transceiver with an antenna positioned inside the radio transceiver or occasionally antenna positioned external the radio transceiver.
- A microcontroller.
- A circuit (electronic) is employed for amalgamation with the sensors together with an energy provider that might be a battery.

**c) Addressing schemes:** As we all recognize that when things get coupled to the internet, the things are addressed with certain unique digits which are termed as IP addresses. It is a very vital technique on the Internet of Technology too as this procedure helps to recognize a thing uniquely. This method is not just to find things but it also aids to control inaccessible things through the internet.

**d) Data storage and analytics:** Due to the colossal numbers of data produced by the IoT, this thought plays an inexorable task in the IoT. This forms the middleware layer of IoT that centres on the storage & scrutiny of those data. The data that are produced by the IoT is kept in a safe & systematic manner consuming innumerable algorithms such as Novel fusion algorithm is employed to create sense of the data that are composed. There are copious other techniques resembling a genetic algorithm, neural networks, temporal machine learning techniques that are founded on evolutionary algorithms etc. Since the year 2012, the cloud-based storage alongside with the cloud-based analytics & the visualization dais became popular.

**e) Visualization**: This plays a very grave job for IoT application. These technologies permit the consumer to intermingle with the surroundings. This embraces the event of visualization & finding of the info (modeled & raw data) & to epitomize the info to the end-user according to their need.

## ARCHITECTURE OF IOT

The IoT architecture consists of six layers that define all the functionalities of IoT systems. The layers of Internet of Technology are as given below:

**a) Coding Layer:** This layer is deliberated as the base layer of the IoT as this layer allots a unique ID to the things to state their identities.

**b) Perception Layer:** The layer encloses the data sensors that too in the unlike form of IR sensors, RFID etc that are employed to sense the temperature, speed, moisture & location etc of the things. One of the imperative roles of this layer is that it concomitant & converts the info congregated by the sensors into digital signals which are additional relocated to the Network layer.

**c) Network Layer:** The roles of this layer are to accept & transmit the digital data to the middleware layer that are accepted from the perception layer for treating. Those data are transferred onto the middleware layer over certain transmission medium such as Wi-Fi, 3G, & GSM etc alongside protocols like IPv4, DDS etc.

**d) Middleware Layer:** The data that are accepted from the network layer is treated in this layer. This layer employs the technologies like cloud computing, ubiquitous computer etc.

**e) Application Layer:** Based on the treated data, the IoT's outcome is finally unconfined to the end-user at this layer.

**f) Business Layer:** This layer acts as the manager for the application & services of the IoT.

## APPLICATION OF IOT

Potential applications of the internet of Things are not only numerous but also quite diverse as they permeate into virtually all aspects of daily life of individuals, institutions, and society. The applications of IoT cover broad areas which are mentioned below:

- **Smart Cities**

The IoT plays a critical role in refining the smartness of cities & augmenting general infrastructure. Some of IoT application areas in building smart cities comprise; intelligent transport systems, smart structure, traffic congestion, waste management, smart lighting, smart parking & urban maps. This may embrace diverse functionalities such as; observing accessible parking spaces inside the city, watching vibrations as well as material situations of bridges & buildings, planting in place sound observing devices in delicate parts of cities, as well as watching the stages of pedestrians & vehicles. Artificial Intelligence (AI) aided IoT can be employed to monitor, control & condense traffic overcrowdings in Smart Cities. Furthermore, IoT permits installation of intellectual & weather adaptive street lighting & recognition waste and waste ampoules by keeping tabs of trash assortment schedules. Smart highways can deliver cautionary messages & important info, such as admittance to diversions reliant on the climatic conditions or unexpected happenings like traffic jams & accidents. Use of IoT to accomplish smart cities would entail using radio frequency identification & sensors. Several of the already developed applications in this zone are the Aware home & the Smart Santander functionalities. In the USA, some foremost cities like Boston have strategies on how to implement the IoTs in maximum of their systems extending from their parking meters, streetlights, sprinkler systems & sewage grates are all planned to be interconnected & coupled to the internet. Such applications will offer momentous breakthroughs in terms of tradable money & energy.

- **Healthcare**

Maximum healthcare systems in numerous countries are unproductive, slow & unavoidably prone to error. This can effortlessly be transformed since the healthcare segment depends on plentiful actions & things that can be programmed & improved through technology. Further technology that can enable several operations like report distribution to manifold individuals & locations, record possession & supply medications would go a elongated way in altering the healthcare segment.A lot of remunerations that IoT application offers in the health-care segment is most pigeonholed into chasing of patients, staff & objects, recognizing, as well as validating, individuals & the automatic jamboree of data & sensing. Hospital workflow can be meaningfully improved once patients flow is chased. Furthermore, validation & identification diminish incidents that may be detrimental to patients, record care & fewer cases of mismatching new-borns. In addition, programmed data assemblage & transmission is vibrant in process automation, drop of form processing timelines, automated process examining as well as medical inventory management. Sensor objects permit purposes centred on patients, principally in diagnosing disorders & availing real-time info about patients health pointers.

Application spheres in this sector include; being capable to monitor a patient's amenability with prescriptions, telemedicine elucidations & alerts for patients welfare. Thereby, sensors can be useful to outpatient & inpatient patients, dental Bluetooth objects & toothbrushes that can give info after they are employed & patient's reconnaissance. Additional elements of IoT in this capability include; RFID, Bluetooth & Wi-Fi amid others. These will greatly augment measurement & observing techniques of perilous functions like blood pressure, temperature, heart rate, blood glucose, cholesterol levels & countless others. The applications of Internet of Things (IoT) & Internet of Everything (IoE) are auxiliary being prolonged through the manifestation of the Internet of Nano-things (IoNT). The opinion of IoNT, as the name infers, is being engineered by assimilating Nano-sensors in diverse objects (things) expending Nano networks. Medical application is one of the key concentrations of IoNT implementations. Application of IoNT in human, for cure purposes, facilitates admittance to data from in situ parts of the human body which were hitherto in accessible to sense from or by expending those medical instruments amalgamated with colossal sensor size. Thus, IoNT will empower new medical data to be collected, leading to new-fangled discoveries & improved diagnostics.

- **Smart Agriculture and Water Management**

IoT has the capability to fortify & boost the agriculture sector through groping soil moisture & in the example of vineyards, observing the trunk diameter. IoT would permit to control & preserve the magnitude of vitamins found in agricultural produces & adjust microclimate conditions in order to make the utmost of the creation of vegetables & fruits & their eminence. Additionally, studying weather conditions sanctions predicting of ice info, drought, wind variations, rain or snow, thus regulating temperature & humidity levels to avert fungus as well as extra microbial contaminants.

When it comes to cattle, IoT can help in recognizing animals that graze in open locations, detecting damaging gases from animal excreta in farms, as well as governing growth settings in descendants to enrich chances of health & survival and so on. Furthermore, through IoT use in agriculture, a lot of wastage & spoilage can be dodged through proper observing techniques & management of the all-inclusive agriculture meadow. It also hints to superior electricity & water control.As explain, in water management, the function of IoT includes swotting water fitness in seas & rivers for both intake & agriculture usage, identifying pressure deviations in pipes & liquid occurrence outside tanks as well as observing levels of water deviation in dams, rivers & reservoirs. These IoT applications use Wireless sensor networks. Examples of prevailing IoT applications in this purview include; SiSviA, GBROOS, & SEMAT.

- **Retail & Logistics**

Implementing the IoT in Supply Chain or retail Management has sundry paybacks. Several include; noting storage conditions through the supply chain, product tracing to assist trace ability purposes, fee processing reliant on the position or activity epoch in public transportation, theme parks, gyms & others. Inside the retail buildings, IoT can be useful to innumerable applications such as path in the shop grounded on a preselected list, fast fee processes alike automatically inspection out with the assistance of biometrics, sensing probable allergen products & regulatory the turning of products on shelves & warehouses in order to program restocking processes. The IoT components mostly employed in this setting include; wireless sensor networks & radio frequency identification. In retail, there is a existing usage of SAP (Systems Applications and Products), while in logistics copious instances include class consignment conditions, element location, sensing storage unsuitability issues, fleet tracing amongst others. In the industry sphere, IoT aids in noticing levels of gas & leakages within the industry & its environment, keeping track of noxious gases as well as the oxygen stages within the boundaries of chemical plants to guarantee the protection of goods & workers & witnessing levels of oil, gases & water in cisterns & stowage tanks. Application of IoT also helps in upkeep & overhaul because systems can be put in place to forecast equipment faults & at the same automatically list periodic upkeep services before there is a catastrophe in the equipment. This can be accomplished through the installation of sensors inside equipment or apparatus to monitor their functionality & infrequently send reports.

- **Smart Living**

In this purview, IoT can be useful in remote control objects whereby one can distantly switch appliances on & off hence thwarting accidents as well as tradable energy. Further smart home appliances comprise refrigerators built-in with LCD (Liquid Crystal Display) screens, facilitating one to know what is obtainable inside, what has over stayed & is nearly perishing as well as what prerequisites to be restocked. This info can also be connected to a smartphone application empowering one to access it when external the house & therefore purchase what is required. Moreover, washing machines can permit one to distantly monitor laundry. In addition, a extensive range of kitchen things can be interfaced through a smartphone, hence making it probable to regulate temperature, alike in the case of an oven. Several ovens which have a self-cleaning feature can be effortlessly scrutinized as well. In terms of protection in the home, IoT can be useful through alarm systems & cameras can be mounted to monitor & spot window or door openings hence inhibiting intruders.

- **Smart Environment**

The environs has a vibrant role within all facets of life, from people, to animals, birds & also plants, are all affected by an harmful environment in one way or another. There have been copious efforts to produce healthy environs in terms of jettisoning pollution & plummeting wastage of assets, but the presence of industries, as well as transport wastes attached with irresponsible & detrimental human activities are common place elements which steadily damage the environs. Subsequently, the environs requires smart & novel ways to aid in watching & handling waste, which deliver a substantial expanse of data that forces govts to put in place systems that will safeguard the environs. Smart environment schemes amalgamation with IoT technology should be shaped for sensing, tracing & valuation of things of the environs that offer probable benefits in accomplishing a sustainable life & a green ecosphere. The IoT technology consents witnessing & handling of air eminence through data assortment from far-flung sensors across cities & providing round the clock geographic coverage to achieve better means of managing traffic congestions in key cities. Furthermore, IoT technology can be useful in gauging pollution levels in water & subsequently educate decisions on water use. In waste management, which comprises of several kinds of waste, like chemicals & pollutants being negative to the environs & to people, animals, & plants as well, IoT can also be employed. This can be attained by environmental safeguard by means of adjusting industrial pollution through prompt observing & management systems pooled with supervision in adding to choice making networks. This serves to lessen waste.

In weather predicting, IoT can be applied to provide a important precision & high resolve for watching the weather by info division & data exchange. Through IoT technology, weather systems can amass info such as barometric pressure, humidity, temperature, light, motion & other info, from vehicles in motion & transmit the info wirelessly to weather locations. The info is accomplished by mounting sensors on the vehicles & even on structures after which it is stowed & analyzed to help in weather predicting. Radiation is also a menace to the environs, human & animal health as well as agricultural yield. IoT sensor networks can switch radiation through continuous observing of its levels, mainly around nuclear plant buildings for sensing leakage & proliferating deterrence.

**Objective of Study**

- The First objective of the study is to throw light on the IoT and enabling technologies that are used in IoT.
- The Second objective of the study is to know more about architectural layers of IoT.
- The Third objective of the study is to give the audience an idea about the IoT Application in various areas and further the Advantages & Disadvantages of the IoT and Suggesting a direction for future research in same.

## METHODOLOGY OF STUDY

- The methodology of the research work is derived from the systematic and theoretical analysis of the methods to evaluate correct specific method for application. It constitutes qualitative techniques.
- This study is Qualitative in nature and is conducted based on the data collected from secondary sources of information such as published reports, journal articles, newspapers and magazines.

## ADVANTAGES OF IOT

**1.Monitor Data**
The primary and main advantage of IoT is monitoring. It helps us Know the precise quantity of supplies or the air quality in your home, it can also provide more data that could not have previously been possible to collect easily. For instance, knowing that you are low on printer ink could save you another trip to the store in the near future. Also, monitoring the expiration of products will improve safety.

**2.Ease of Access**
Right now, you can easily gain the required information in real-time, from (almost) any location you are at. It only takes a smart device and internet connection. We use Google Maps to see our location, instead of asking a person in real life. Booking tickets is simpler than ever. Information is also easily accessible, even from the latest scientific research, or business analysis. It is only a click away.

**3.Speedy Operation**
All this data pouring in enables us to complete multiple tasks with amazing speed. For example, IoT makes automation effortless. Smart industries automate repetitive tasks, thus allowing employees to invest their time and effort into more challenging things.

**4.Adapting to New Standards**
As IoT is an ever-changing topic, its changes are minimal compared to the other techs of the high-tech world. Without IoT, it would be complicated for us to keep track of all the latest things.

**5.Better Time Management**
Overall, it is a clever time-saving tool. We can look up the latest news on our phones during our daily commute, or check a blog about our favourite pastime, purchase an item in an online shop, we can do almost all the things from the palm of our hands. Eventually, we end up with much more time for us. However, nothing is perfect.

**6.Automation and Control**
Due to physical objects being connected and controlled digitally and centrally with wireless technology structure, there is a huge amount of automation and control in the workings. Without human interference, the machines are communicating with each other providing faster and timely output.

**7.Saving Money**
Another main advantage of IoT is saving money. If the cost of the tagging and monitoring machines are less compared with the amount of money saved, this is the reason for the Internet of Things being very widely adopted. IoT mainly aids to be helpful to people in their daily life by making their devices communicate with each other in an efficient manner thereby saving and conserving energy and cost. Allowing the data to be communicated and shared between devices and then translating it into our required way, makes our systems efficient.

## DISADVANTAGES OF IOT

**1.Data Breach**
Having access to data is excellent. Unfortunately, our personal data is more exposed. A credit card number is the most compromised information, followed by a debit card number. Data breaches are stressful. Companies also worry about them and can lose trust if their details are compromised by their clients. The worst devices are said to be: off-brand IoT gadgets, second-hand smart devices, and suspicious apps.

**2.Dependence on Technology**
IoT is mainly dependent on the internet connection. When there is none, it can’t be used. On the other hand, we have become primarily dependent on the IoT’s everyday usage. Business and private lives are also dependent on IoT. If we don’t get access to the desired information quickly, we become upset, even about the most unnecessary content. IoT has contributed to the great decrease in our attention spans.

**3.Complexity in Operation**
IoT may seem to be managing tasks with ease, a lot of complex operations are done behind it. If by mistake the software makes a wrong calculation, this will affect the rest of the process. The above-mentioned can be very critical sometimes. We don't know how to deal with the wrong temperature in our home. At worst, an error code in water dam software could cause a disastrous flood. That is the reason, many times a mistake in IoT is not always easy to debug.

**4.Our Safety**
Imagine if a clever hacker changes your medicine prescription. Or if a store automatically ships you a product that you are allergic to, or a flavor that you do not like, or a product that is already expired. As a result, safety is ultimately in the hands of the consumer to verify. As all the household appliances, industrial machinery, public sector services like water supply and transport, and many other devices all are connected to the Internet, a lot of information is available on it. This information is prone to attack by hackers. It would be very disastrous if private and confidential information is accessed by unauthorized intruders. IoT has brought us many amazing things and it continues to surprise us in lots of sectors: business, healthcare, our private lives. As for the downsides, now that you are more aware of them, try to keep those under control. Protect your data and be aware of how automation and easy access can affect you or your business.

**5.Inter Compatibility**
As devices from various manufacturers will be interconnected to each other, the issue of compatibility in tagging and monitoring increases. This disadvantage can be overcome if manufacturers make a common standard, but there is still a possibility that the technical problems may still persist. Nowadays, we have wireless-enabled devices and compatibility problems still exist even in this technology! Compatibility issues may result in people buying devices from a different manufacturer, leading to its monopoly in the market.

**6.Lesser Employment of Menial Staff**
The non-educated workers and helpers may lose their jobs as an effect of automation of daily activities. This can lead to unemployment in society. This is a problem with the overexposure of any technology and can be overcome with education. With daily activities getting automated, naturally, there will be fewer requirements of human labor, primarily, workers and less educated staff.

**7.Technology Takes Control of Life**
Our lives are increasingly controlled by technology and will be dependent on it. The younger generation is already addicted to technology for every little work to be done. We have to decide how much of our daily lives are we willing to mechanize and be controlled by technology.

## CONCLUSIONS AND FUTURE SCOPE

This research introduces IoT and enabling technologies that are used in IoT. Then it discusses architectural layers of IoT. Further the research paper gives an idea about the application of IoT in various areas. This research paper is theoretical in nature and data was collected from secondary sources such as Thesis, research papers, magazines, reports etc. The research concludes that IoT has definitely revolutionized how Internet technologies are applied these days across the Globe in various application areas which include manufacturing or the industrial sector, health sector, agriculture, smart cities, security and emergencies among many others.

There are advantages as well as disadvantages of Cloud Computing mentioned in this study. In my viewpoint I would like to state that it depends on the organization/individual how well it makes use of IoT so that he/she/organization can take maximum benefit from its advantages while simultaneously delicately handling the risks involved. The research approach followed in this research paper is qualitative. Further scope of research is also there where the theoretical framework can be proposed and tested by statistical tools and techniques.

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