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Internet of Things (IoT) and Its Applications: A Survey Paper

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Abstract
Internet, a ground-breaking invention, is constantly evolving into new hardware and applications, making it impossible for anybody to avoid. The Internet of Things (IoT) offers a bright future for the internet where the sort of communication is machine-to-machine instead of the human-to-human or human-to-device we see today (M2M). The Internet of Things (IoT) paradigm is characterised by the provision of sensors, actuators, and processors by things. To achieve a worthwhile goal, speak with one another. We covered IoT and its architecture in this paper. Moreover, we outlined many IoT applications for users, as well as its benefits, drawbacks and future scope.
Keywords: *Internet of things, Smart Farming, Smart Home*

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I. INTERNET OF THINGS

The Internet of things is also known as the network of technology. It shared the information with help of technology and provides the data from one device to another device[1]. This technology is most important for further communication with the person. The sensor stores data and provide the user. We can know everything about the world just on a single tab with the help of the internet. It makes it easy to connect with people for example calls, video calls, chatting, and other social media platforms. The internet of things is used by computer engineers[2]. The object transfers the data through the internet[3]. All the devices are connected to the technology and is shows how the internet is useful in our daily life. IOT is informed to the decision making[4].

1.1 RFID **– Radio Frequency Identification** is wireless system. It is a method of sharing the information with help of Radio Frequency Identification, RFID is part of signal[5].
1.2 **Sensors –** The sensors generate results with the help of the internet of things and provide the external information. A sensor is providing input from the physical environment[6]..
1.3 **WI-FI MOUDL –**The WI-FI is stand for Wireless Fidelity. Wi-Fi is wireless technology it used to the smart phone, computer and other device. Wi-Fi is the radio signal is connected to the nearby device[7].
1.4 **APPLICATION –** An application is refer to the application program and application software

- Word Processor
- Web browser
- Spreadsheet
- Graphics Software

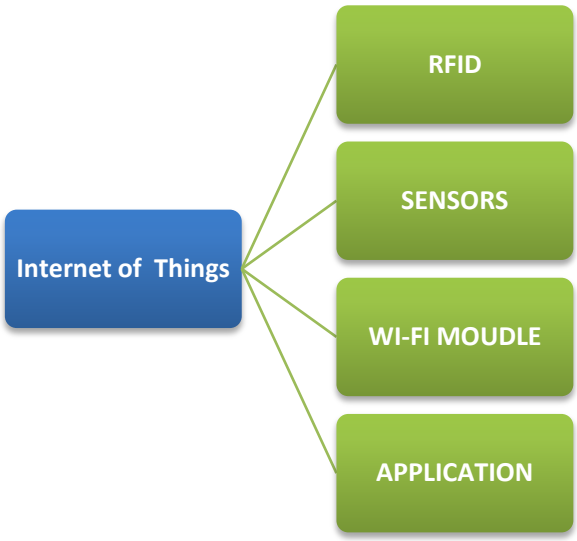

Figure 1 IOT

II. APPLICATION OF IOT

2.1 Smart Office and Home – IOT application is used to the smart home and smart office. It is control the internet and used with help of mobile. Smart office and smart home is work to the mobile control system. It is major part of internet of things[8].

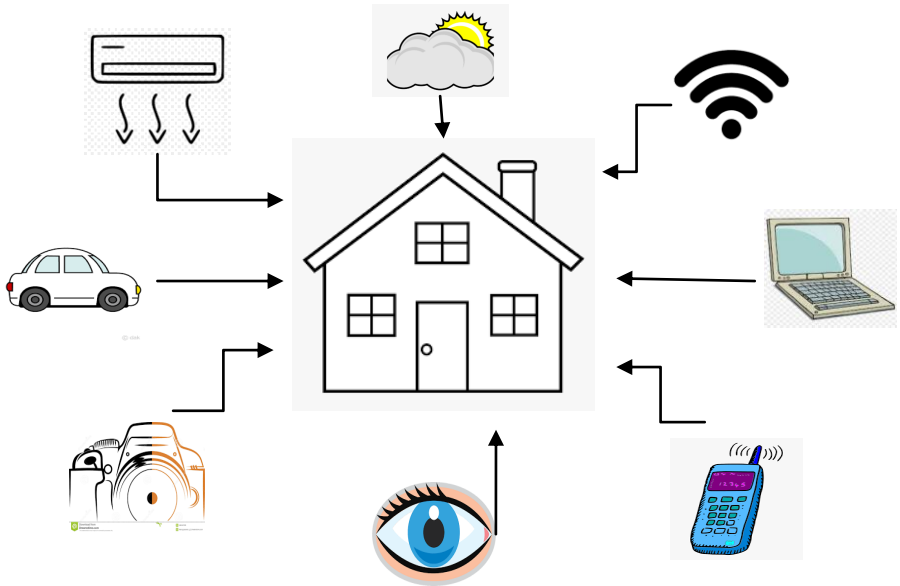

Figure 2 Smart Home

- **2.1.1 Door Control System –** The door control system is popular system. The smart door control system is very easy system and this system is control to the mobile internet. Smart door control system is access with mobile app and lock to the person.
- **2.1.2 Lighting Control System**–The Smart light bulb to make a smart home, it is necessary to have a smart light bulb in the house. Smart light bulbs can control from a single device and you can adjust their brightness and color according to the situations.
- **2.1.3 Gate Control System –** The gate control system is part of sensor technology and internet of things. Gate can be connected to the mobile phone. The Gate is open and closed to the mobile phone.
- **2.1.4 Traffic Monitoring System –** The traffic monitoring system is control all the traffic signals. All cars can connect to the internet of things. And the car's sensors are connected to the traffic Monitoring System. Traffic Monitoring System provides the security.

- **2.1.5 Solar Control System –**The Solar Control Systemic part of IOT. The sun is traveling to the other side and solar system all so moving same side. And a solar system consumes all the energy and generates the power. With the help of Internet of things.

2.2 Smart Farming –The IOT is an important part of agriculture and farming. Agriculture and farming researchers are part of the Internet of Things. The youth are not interested in agriculture and farming. Smart technology is important for agriculture and farming. There are more challenges in growing vegetables, plants, and horticulture to feed the population at large.

- **2.2.1 Smart irrigation -** The smart irrigation system is IOT based system. It is process that will not only automatically irrigate the moisture level of water in the soil but also send the data blank application to track land condition.
- **2.2.2 Smart Greenhouse–**Greenhouse farming is a successful agriculture method that is used to artificially controlling the environment expands production of vegetables and fruits[10].

One of the successful agriculture methods is greenhouse that issued to artificially controlling the environment expands production of vegetables and fruits.

2.3 Autonomous Driving–The internet of things technology is connected to multiple devices through the internet. All the vehicles are connected to the sensors and shared the information on board. Smart **Phones** cyclists and walking as well connected to the IOT.

Figure 3 Autonomous Driving

AI sensors provide information for vehicles provide safety and efficiency. The automatic deriving cars are connected to the AI and the future is connected to the internet of things. AI is the most important part of the internet of things. AI provides the information for the road, vehicle condition, road condition, and other object. Autonomous Driving is combination of cameras, sensors and artificial intelligence.

2.4 Wearable Technology –Wearable technology is a major part of human life. It is the most important part of the internet of things. This is a life-changing application. It refers to high-speed data and provides information. This is the technology that is connected to human life. Wearable technology is a fitness activity tracker and it is connected to the person. Like smart phone and smart watch are also a wearable.

- **2.4.1 Smart watch and Health Tracker –** Smart watch and health tracker is a major part of human life smart watch provide heart rate, Fitness, and personal activity. This is a minicomputer of humans and it is also connected to the mobile phone[9].

Figure 4 Wearable Technology

III. How does IOT work?

The internet of things is automobile-connected to the device-to-device, person-to-person, and person-to-device. Devices and items with built-in sensors are connected to the Internet. IOT is connected to the Sensors, cameras, microphones, etc. To provide security at all times For Example CCTV cameras, Mobile phones, camera doorbell, etc.

The WI-FI is stand for **Wireless Fidelity**. It is wireless technology it used to the smart phone, computer and other device.

IV. Major Component of IOT Ecosystem

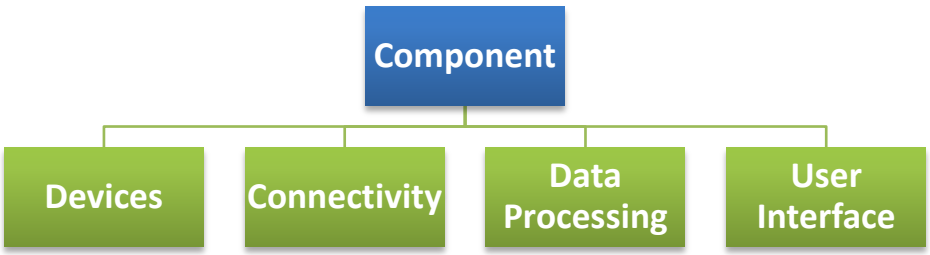

Figure 5 Components Of IOT

4.1 Devices – The Leading component to review in internet of things technology is devices. A device takes up all the information from an ecosystem. The ecosystem can have many difficulties. These devices are collecting all the data to be used expired.

4.2 Connectivity – The connectivity is that process in which all the connection between all the points in the ecosystem. Like Wi-Fi is reliable providing good IOT connectivity once you have running correctly. Just thing about how many people use Wi-Fi to power their (Alexa and Siri) assistant and (Tesla) Smart cars.

4.3 Data Processing – it is process to convert the row data into machine understandable form. Whenever machine performs any kind of operation then data can be included under the data processing [].

4.4 User Interface: IOT contains the User interface Feature that helps to interaction between user and computer system. For example, Screen icons, pages, buttons, etc.

V. Features of Internet of Things

All the technology devices and sensors are connected to the internet of things.

5.1 Artificial Intelligence (AI) – The IOT is combination of artificial intelligence. it is connected to the all-artificial intelligence devices. In just a few years, internet of things fully connected to the artificial intelligence devices. For example, Alexa is Virtual Assistant for Amazon. And Siri is Apple personal assistant for IOS .

Artificial intelligence is most important part of internet of things. and the 5G network is 5th generation network. It is high speed network. It is the example of internet of things. []

5.2 Safety – The internet of things is major part of safety. The working areas safety is most important. It provides the safety and managed to help by improving working conditions, data collection, streamlining operations, and increasing productivity [].

The internet of things devices is not providing the security to workers. IOT technology is providing the physical health of the employs services and it allows help to the limited employee risks and exposure to prevent accidents from happening. The safety is most important part of every device and every sensor. Safety can also refer to the control of recognized hazards in order to achieve an acceptable level of risk.

5.3 Analyzing – Today almost population is connected to the IOT devices. And giga bytes data is flowing in a mile second. This is the big deal in internet of things. The Internet of things is also known as the network of technology. It shared the information with help of technology and provides the data from one device to another device. This technology is most important for further communication with the person. The internet's of things are shared and transfer the data one devices to another device. It collects the data from IOT devices like; audio, video, image and sensors.

5.4 Dynamic Nature –Dynamic nature is part of Internet of things. It collects all the data from its environment. It provides the dynamic changes the devices. For example, connected and disconnected, speed, location, waking. The devices also dynamic changes with a person.

VI. Present Status Internet of Things

Nowadays all the things are totally depended upon the internet most of the things in our daily life like: Smartphone's, smart watches, smart TV's, etc. we are totally depending on internet, it plays major role in our daily life. This time is very important time and internet of things saving the human time and reduces all the human effort. Present all devices connected to each other devices and interact to every person. These time internets of things provide the security and secure all the devices. All the sensors and devices are used to IOT technology and change to the environment according. Without sensors and without technology present is not work efficiently. The young generation is totally depended 24/7/365 day in internet of things.

VII. Future Scope of IOT

The IOT is biggest empire of the technology around the world. Artificial intelligence and machine learning is combination of IOT. Artificial intelligence and machine learning is easily connected to the IOT. We will discuss the future scope of IOT in Agriculture, Healthcare, Smart city System.

7.1 Agriculture–Agriculture and farming researchers are part of the Internet of Things. The youth are not interested in agriculture and farming. Smart technology is important for agriculture and farming. The smart irrigation system is IOT based system. It is process that will not only automatically irrigate the moisture level of water in the soil but also send the data blank application to track land condition. Basics tool of Agriculture is Agriculture Drones, Smart Farming [].

- **7.1.1 Agriculture Drones –** Drones is one of the best applications of Agriculture and Farming. Drones are part of IOT and it is command-based system. It use to the user. Users send the command and operate the drones. Drone based farming is possible with the help of smart IOT based devices that are used to make agriculture drones [].
- **7.1.2 Smart Farming –** The IOT is an important part of agriculture and farming. Agriculture and farming researchers are part of the Internet of Things. The youth are not interested in agriculture and farming. Smart technology is important for agriculture and farming. There are more challenges in growing vegetables, plants, and horticulture to feed the population at large [].

7.2 Healthcare – IOT is most important of Healthcare Sector. The IOT is proved it be one of the best tools for the healthcare industry. It provides the best facility to the patients, doctors, and researchers. The IOT is providing the best equipment in the healthcare industry. IOT devices have reduced unnecessary strain on the healthcare system. The IOT is directly send patients health data to the doctors over a safe network.

7.3 Smart city System - The smart city is connected to the sensors, light, meters through the IOT. It stored the data and analyze. IOT provide the real time information. IOT is controlled to the traffic and provide the security. For example Smart Traffic system.

- **7.3.1 Smart Traffic Management** - Smart traffic management is connected to the roadside devices and intelligent vehicles to communication directly to the intersection. It providing the priority access to the police, Ambulance, and fire services.

VIII. Conclusion

Through a variety of technologies and applications, IoT has been progressively introducing a sea of technological changes into our daily lives, which in turn helps to make our lives easier and more comfortable. IoT has various uses across all industries, including healthcare, manufacturing, transportation, education, government, mining, and habitat, among others. In this study, numerous IoT applications are discussed. IoT is working to make human life more "connected" and "smart" both now and in the future.

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