Harnessing IoT for Next-Generation Data Processing and Smart Environmental Networks

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Abstract - **The work takes into account a brief description of promising areas for the use of Internet technology (IoT). The author offers a brief analysis of technology market dynamics describes the general IoT process and offers a list of promising areas of technological development, taking technical advantages and disadvantages into account. Finally, it is automatic that technology is used by an improvised use. However, it requires a competent approach in the area of integration of the security system, the preservation of personal data and monitoring chess protection.**

Keywords: Internet of things, artificial intelligence, IOT, automation, sensor networks, data processing, data collection, smart home, cloud computing.

I. Introduction

Internet of Things (IoT) is a concept that describes a network of physical devices interconnected and with the Internet. IOT technology (Internet of things) was described and proposed by Kevin Ashton in 1999, when he worked at Procter & Gamble. In his work, he described the idea of connecting physical objects to the Internet to collect and exchange data between them [1]. From this moment, the development of this concept and further development and improvement of IOT technology went. The connected devices can be varied: from household items, such as refrigerators and smart houses, to industrial equipment, vehicles and medical devices. The goal of IoT is to allow devices to interact with each other and people, collect and exchange data based on existing sensors and images, and make our life more convenient and productive. It is predicted that by 2023 there will be more than 30 billion connected smart devices at the level of the world market. M'Son & Partners Consulting has published the results of a study by the Russian and global Internet markets (Internet of Thing, IoT) and intermasive communications (M2M).

The process of work is presented with algorithm of different stages:

1. Settings of devices such as sensors, microcontrollers and actuators that are used by dumplings of other devices. They can be built into various objects or be as part of wearable devices.

2. Connection: Devices must be connected to the network to exchange data. This can be wired or wireless, including Wi-Fi, Bluetooth, NFC special protocols data for IoT.

3. The collection and transfer of data: Devices collect data using their sensors or receive data from other devices. Then they can transmit data on the network using data transmission protocols such as MQTT or HTTP.

4. Data processing: the collected data can be processed and analyzed on the device of the sulfur server. Iot -to - thelert part of the IOT -improving volume volume -to - use of the use of anomalization of the reinforcement of the navigables.

5. Management and actions: depending on goals and capabilities, IoT devices can control other devices or perform specifics. For example, a smart house system can control lighting, temperature or safety in the house and transfer information to the owner's smartphone.

The basic process of the algorithm for setting and checking the start of smart things is presented in Figure 1.
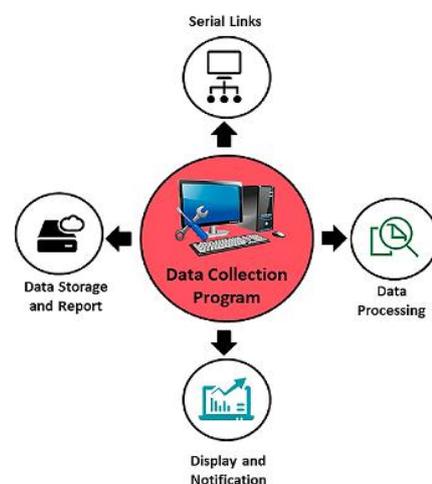

Figure 1: The basic process for IOT algorithm setting

The presented stages are the basis of IoT, and each specific implementation of technology can have its own characteristics and protocols and gateways. Figure 2 shows

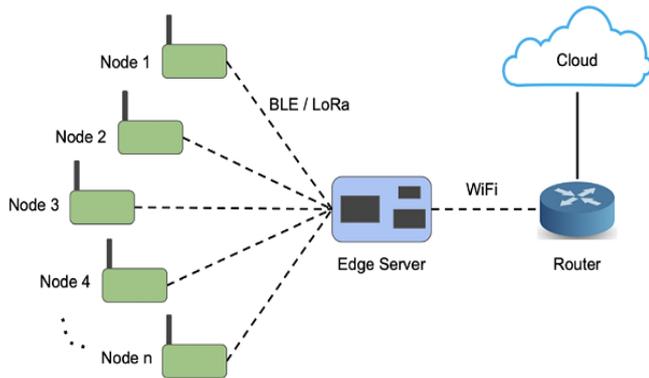how the devices transmit data to the gateways, from there they can go to the data center or cloud storage.

Figure 2: Protocols and gateways of IOT Cloud Storage

The Internet system uses various protocols for the exchange of information between devices and networks. Some of the main protocols used in IoT include:

- MQTT (Message queuing Telemetry Transport). This is a reasonable protocol, which is evident for transmitting messages in low -speed and undemanding networks. It provides effective data delivery and supports the scalability of networks of devices.
- CoAP (Constrained Application Protocol). Pre-border - limiting decorations with limited resources, such as sensors and microcontrollers. CoAP provides the ability to transmit data and control of devices on the IOT network.
- HTTP (Hypertext Transfer protocol). It is likely to a VVEB application, it can also be used in IOT systems for interacting with devices. HTTP provides the transmission of data on the network and maintains flexibility when working with various types of data.
- Lorawan (Long Range Wide Area - The Protocol provides a large range of data transmission in IoT networks and is optimized for use with low -consuming sensors and devices. Oon -spell -sapwoods, and a non-consumption of sprayed communication.

It is important to note that the choice of the protocol depends on the requirements of a particular IOT system and the devices used in it. The combination of different protocols can be used to ensure the necessary efficiency in the IOT network.

Further in this review article, 5 promising areas of development of IOT technology will be considered, namely in education, in medicine, agriculture, architecture, artificial intelligence.

II. Internet of things (IOT) of the Absorption

One example of the application of the Internet of things in education is the use of "smart classes" or "smart schools". This concept intends to use various IOT devices to optimize the learning process and create a comfortable smart environment. Some Examples of IOT Applications are follows.

- Smart boards: Instead of conventional magnetic boards, smart boards are used in the class that allow the teacher and students to interact with various interactive materials, for example, draw, drag o information, educational tablets of students.
- Smart the measurement of the measurement and monitoring: Glasses are placed by the attempts for measuring parameters, for example, temperature, noise level. This helps optimize comfortable conditions in the classroom and manage them.
- Smart backpacks and scheduled tracking devices: Using RFID or Bluetooth technologies, you can track the movements of students in school, control their attendance at classes.
- Memorials of self-security: School building is able to establish a settings, such as video cameras, motion sensors and smoke sensors, for the safety of students and staff, parents can get access to the cell to monitor their child directly during the educational process.

All security systems work, they exchange aid to control special software, which allows you to create "intellectual" and effective educational environment.

III. Internet of things (IoT) of the Extra Economy

The Internet of things (IoT) plays an important role in agriculture, ensuring automation, monitoring and optimization of processes. Here are some main examples of using IoT in agriculture:

1. Multiplying:

- Monitoring temperatures of the Environments.
- Automatic moisture and watering systems, which are regulated based on data from sensors.
- Automatic personnel administrations, founded by temperature and humidity.

2. Smart Life farming:

- Installation and monitoring of Animals.
- Systems of Automatic feeding for the animals.
- Tracking lifetime of animal health.

3. Monitoring of the change in the environment:

- The use of a sensor for weather monitoring.
- Integration of the Sensor Data for decisions making.

4. Automation of processes:

- The use of autonomous robots to carry out harvesting, pruning of plants or applied fertilizers.
- Automatic determination of ourselves a wish -free of special stationary devices

IV. Internet of things (IOT) Architecture

The Internet of things (IoT) has a significant impact on various industries, including architecture. Several key aspects of using IoT in architecture are presented:
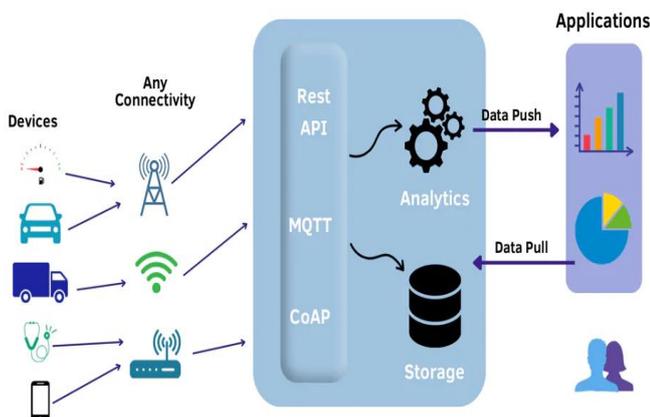

Figure 3: Internet of things (IOT) Smart City Architecture

Smart House: IoT allows you to create smart houses in which devices and systems interact with each other to ensure comfort, safety and energy efficiency. For example, the devices of the enlightenment, the focus systems are canceled and controlled through the central platform and the closed network, as indicated in Figure 3.

Smart buildings: IOT can also be used in smart buildings where many devices and systems are assembled to manage and optimize various aspects of the building, in lighting, ventilation systems and climate control, safety and energy consumption.

Monitoring and control: IOT allows architects and engineers to track and control the various parameters of the building, such as temperature, humidity, lighting and ceiling.

Smart cities: IoT also finds the use of smart cities in the development of smart cities, where various aspect - infrastructure, tax system, city management, cleaning of waste collection.

V. IoT and Artificial intelligence

The relationship of the Internet of things (IoT) and artificial intelligence (AI) is one of the key aspects of the development of future information and analytical technologies.
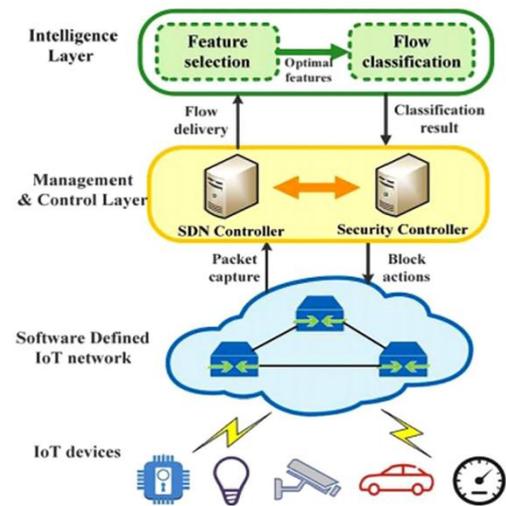

Figure 4: IoT and Artificial intelligence

Artificial intelligence makes a significant contribution to the development and use of IOT technologies:

AI allows you to analyze the large volumes of data collected by IoT devices. It can process, classify and extract information from these data to obtain valuable insights and decision making.

Automation and optimization: AI can improve the functionality of IoT devices by optimizing their operation. For example, AI can control intellectual home devices and optimize their energy consumption in accordance with the load of networks.

Improving analytics: Using AI, you can develop more accurate analytical models based on IoT data. This allows you to make more accurate forecasts, to recognize patterns in the definition of amalia systems: artificial intelligent abdominal in the development of autonomous IOT systems, which can independently make decisions and act on the basis of the collected data. For example, autonomous cars based on AI and IoT can independently process information about the road environment and make decisions on choosing a safe route.

The interaction of the Internet of things and artificial intelligence opens up new opportunities for the development of information and analytical technologies of the future. It can lead to the appearance of intellectual, autonomous and effective systems.

Disadvantages of the IOT technology

Internet of Things has its own set of disadvantages and vulnerabilities associated with its use:

1. Privacy and data security. With IoT, there are problems of confidentiality and data security. The collection, storage and processing of personal information of users in various IOT devices requires appropriate security protocols and data protection.

2. Dangerous is the timely stitched. If IoT systems do not have a reliable backup system, this can lead to the loss of important information resources.

3. Resource intensity and complexity of implementation. Design, implementation and support of IOT systems can be resource-intensive and complex tasks. The need to connect a large number of devices, setting up networks and providing communication between them require high-quality technical examination and financial resources.

4. Education and training of staff. The use of IOT requires training and training of personnel so that it can effectively use IOT tools in his work. Personnel preparation and ensuring its technical literacy can be complex and costly processes.

5. The risk of dependence on technical systems. The introduction of IoT, for example, in education can create a risk of dependence on technical systems. If the IOT devices cease to function, there will be a potential risk to problems in training and organizing a training process.

VI. Conclusion

Based on the foregoing, we can conclude that IoT technology has more advantages than disadvantages, provided that a competent approach to solving the issue of data security, storage and processing of information. The essential advantages of IOT technology include such properties as automation and optimization: IoT allows you to automate various tasks and processes, which leads to an increase in efficiency and optimization of resources. IT will allow you to renovate, time-based systems of processes. This allows you to effectively monitor and manage the operation of devices and systems. IT is contributing to the construction of the intelligent muddy vehicles, which are allowed to improve the quality of life of people, increase safety and comfort. IoT opens up new business opportunities. Companies can collect data and analyze requests to receive valuable consumer information and optimize their services. In addition, IoT is allowed to make up the products of services, associated with the Estate devices of items of the systems. And iot can be integrated with other technologies such as artificial intelligence, cloud computing and data analytics. This allows you to create more complex and innovative solutions.

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