UNIVERSITATEA “1 DECEMBRIE 1918” DIN ALBA IULIA

PROJECT: THE INTERNET OF THINGS (IoT)

PRESENTED
IN

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CONTENT

The Internet of Things (IoT): Connecting the Physical World

1. Introduction to IoT

The Internet of Things (IoT) represents a revolutionary concept wherein everyday physical objects are embedded with sensors and connectivity, allowing them to collect and exchange data easily. These objects, also known as "smart devices," communicate over the Internet or other wireless networks, enabling them to interact with each other and with humans. The scope of IoT is vast and diverse, encompassing a wide range of devices such as smartphones, household appliances, environmental sensors, industrial machinery, vehicles, and even animals. By connecting these devices to the Internet, IoT transforms them into interconnected systems capable of gathering and analyzing data in real-time.

2. Historical Context[1]

- ✓ Founding: The concept of IoT dates back to the late 20th century.
- ✓ Key Milestone: In 1969, the first successful message was transmitted between two computers, laying the groundwork for IoT.
- ✓ Commercial Giant: Intel, founded by Gordon Moore and Robert Noyce, played a pivotal role in IoT development.

3. How IoT Works

At the core of IoT are the Internet Protocol (IP) and Transmission Control Protocol (TCP). These standards enable devices to connect to the Internet and each other. IoT devices process data and communicate via various networks, including Ethernet, Wi-Fi, Bluetooth, 5G, LTE cellular, RFID, and NFC[2]. Data flows from devices to IoT gateways or edge devices, which collect and transmit information to cloud computing environments for storage and processing. Networking standards ensure data sharing, bridging the physical and digital realms.

4. Advantages of IoT

- ✓ Efficiency: IoT automates complex tasks beyond human capabilities, enhancing efficiency.
- ✓ Cost Savings: Enterprises benefit from labor efficiencies, energy savings, reduced downtime, and optimized inventory management.
- ✓ Improved Safety: IoT enhances workplace safety and quality control.
- ✓ Enhanced Decision-Making: Real-time data empowers informed decisions.

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[1] https://www.cogniteq.com/blog/history-iot-how-technology-evolving

[2] https://www.cogniteq.com/blog/history-iot-how-technology-evolving

5. Disadvantages of IoT

- ✓ Security Risks: Vulnerabilities in connected devices can lead to data breaches.
- ✓ Privacy Concerns: Extensive data collection raises privacy issues.
- ✓ Complexity: Managing diverse devices and protocols can be challenging.
- ✓ Dependency on Connectivity: IoT relies on network availability.

6. Applications of IoT

a. Smart Homes: Thermostats, lighting, security systems, and appliances.
b. Healthcare: Wearables, remote monitoring, and patient care.
c. Transportation: Connected vehicles, traffic management, and logistics.
d. Agriculture: Precision farming, soil monitoring, and livestock tracking.
e. Industrial Automation: Predictive maintenance, supply chain optimization, and factory automation.

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