

The internet of things (IoT)

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Data Collection
Analysis of Data
Smart Applications

Introduction

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- What is the IoT
- Why is the IoT important today
- Overview of the platform
- What we will cover tonight

What is the Internet of Things (IoT, or ThingSpeak)

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- Network of connected physical devices (eg: Microcontrollers)
- Employs sensors, software and the internet to communicate
- Enables data collection
- Useful for smart homes, various wearables even vehicles

Examples of IoT uses

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- Wearable devices such as smart watches
- Industrial machines
- Vehicle monitoring
- Agricultural equipment monitoring
- Environmental sensors
- Home appliances like refrigerators and air conditioners

Sensors in IoT

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- Temperature sensors
- Humidity sensors
- Motion sensors
- Light sensors
- Pressure sensors

Components of IoT

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- Microcontroller sensors with Wi-Fi 4-5 G or Bluetooth
- LoRa WAN
- Ethernet
- Cellular Networks
- Cloud platform
- User interface (address, login name, password OR dashboard app)

Hoe does IoT work

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- Sensed data from the environment
- Sends Data to the Cloud
- Processes Data and analyses data
- Automates Data
- Displays Results
- Allows real-time monitoring
- Allows decision choices

The Role of Data in IoT

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- Data is the foundation of IoT
- Predicts Data storage real time
- Allows visualization
- MATLAB analysis
- Developed by mathematical algorithms (MathWorks)
- AIM: Monitor conditions, improve efficiency and safety

Wide uses of ThingSpeak, via Channels

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- Education
- Research
- Prototyping
- Smart monitoring systems

How ThingsSpeak Works

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- Creates a channel
- Assigns an API Key
- Sends data from the microcontroller
- Stores this data in the Cloud
- Enables charts, tables or graphs to be seen and then analyzed

ThingSpeak's Architecture

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- Sensors (ESP32 / Arduino)
- Internet connection
- ThingSpeak cloud server
- Dashboard and graphs
- User access via web/mobile

ThingSpeak Applications

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- Weather monitoring
- Smart agriculture
- Healthcare monitoring
- Smart homes
- Industrial monitoring

Benefits of ThingSpeak

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- Easy to use
- Free for beginners
- Real-time visualization
- MATLAB analysis tools
- Supports many devices

Challenges and Limitations of IoT

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- Security risks
- Privacy concerns
- Internet dependency
- Message rate limits
- Sensor accuracy issues

What Could be the Future of IoT

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- Billions of connected devices
- AI and machine learning integration
- Smart cities
- Very likely that SAMG will with AI stride ahead

