

# Internet of Things (IoT) Fundamentals

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## Abstract

Internet of Things (IoT) is the network of physical objects or “things” embedded with electronics, software, sensors, and network connectivity. It enables the objects to collect, share, and analyze data. The IoT has become an integral part of our daily lives through applications such as public safety, intelligent tracking in transportation, industrial wireless automation, personal health monitoring, and health care for the aged community. IoT is one of the latest technology that will change our lifestyle in coming years. Experts estimate that as of now, there are 25 billion connected devices, and by 2020, it would reach to 50 billion devices.

The workshop aims to introduce a practical low-cost IoT system. The foundations of IoT will be discussed throughout real examples. Challenges and constraints for the future research in IoT will be introduced. Moreover, research opportunities and collaboration will be offered for the audiences. Workshop highlights include:

- History and definition of IoT
- Vision and enablers of IoT
- The evolution of the IoT
- Architecture and building blocks of an IoT system
  - Sensing nodes
  - Embedded processing units
  - Communication system (wired and wireless)
  - Software to automate tasks
- Current challenges in IoT
  - Connectivity
  - Power management
  - Security
  - Complexity
- Risks in IoT implementation
  - Privacy
  - Cybersecurity
  - Liability
- Demonstrations of different IoT frameworks
  - Utilizing Arduino microcontrollers to obtain weather information from the internet
  - Automate sending of reminders and alerts through Gmail.
  - Automate posting tweets under certain conditions
  - Automated logging data from sensors to Google spreadsheets
  - A custom low-power multi-tier IoT framework for implementation in diverse applications