

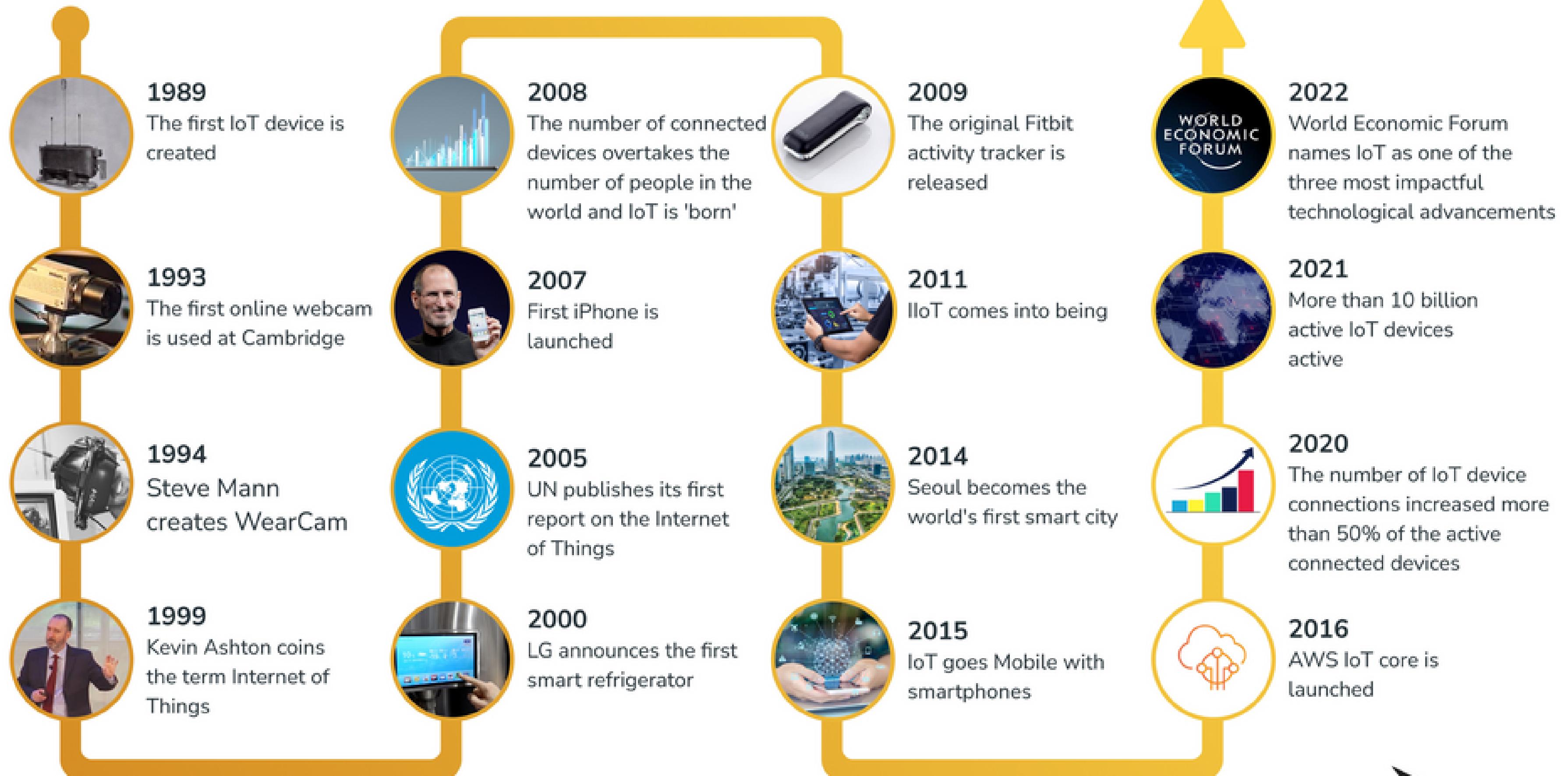
Introduction to IoT

What is IoT ?

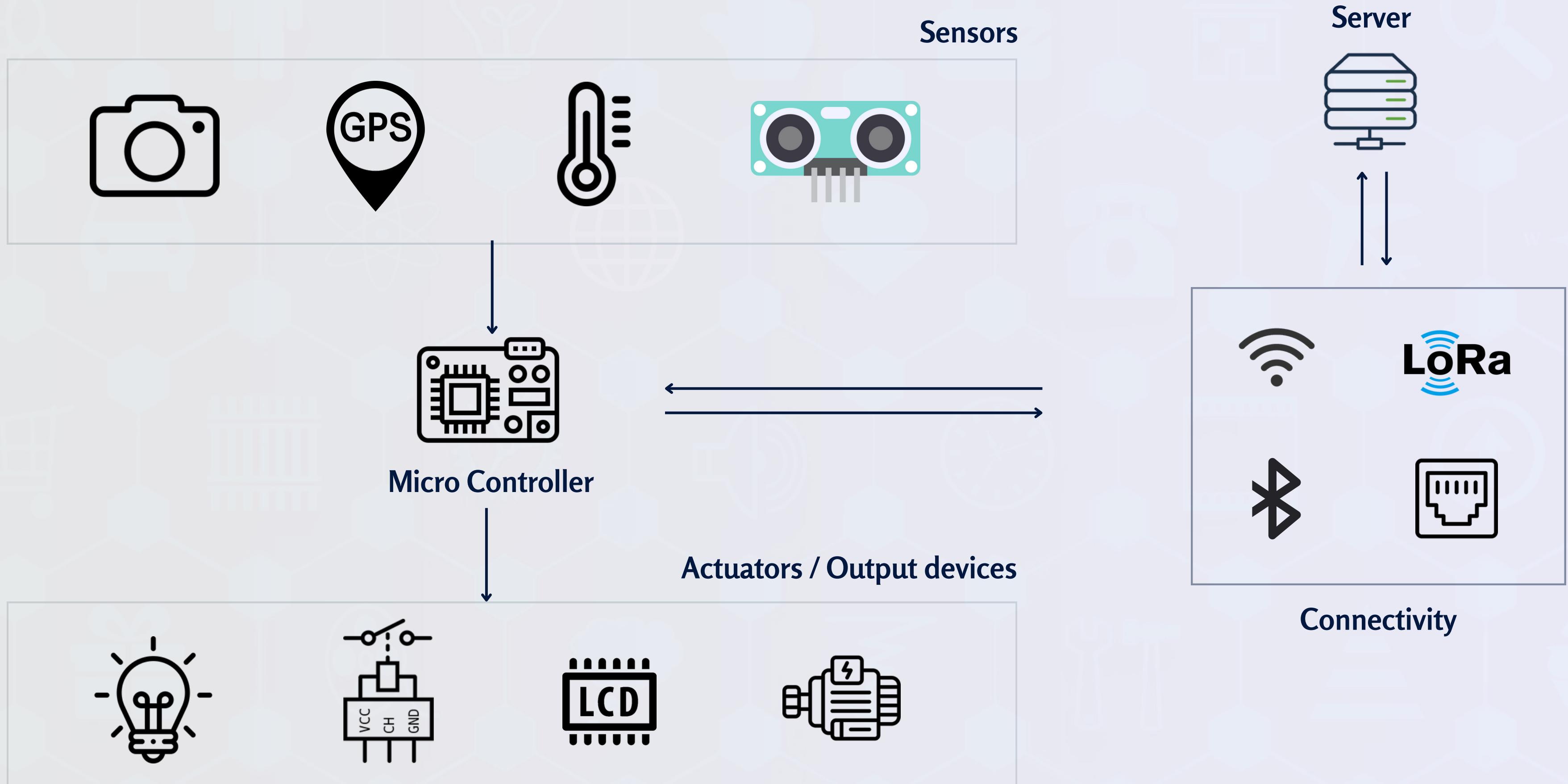
- Network of physical objects
 - Sensors + Softwares + Connectivity
 - Smart devices



History



How IoT works?

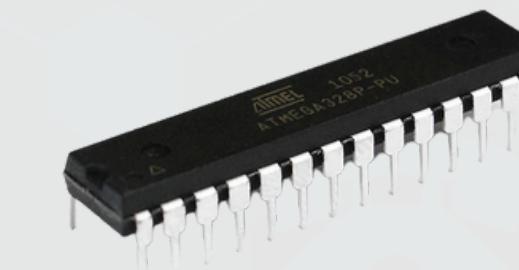


Microprocessor



- General-Purpose Processing
- Complexity
- Memory and Peripherals
- Operating Systems
- Expensive
- Consume more power

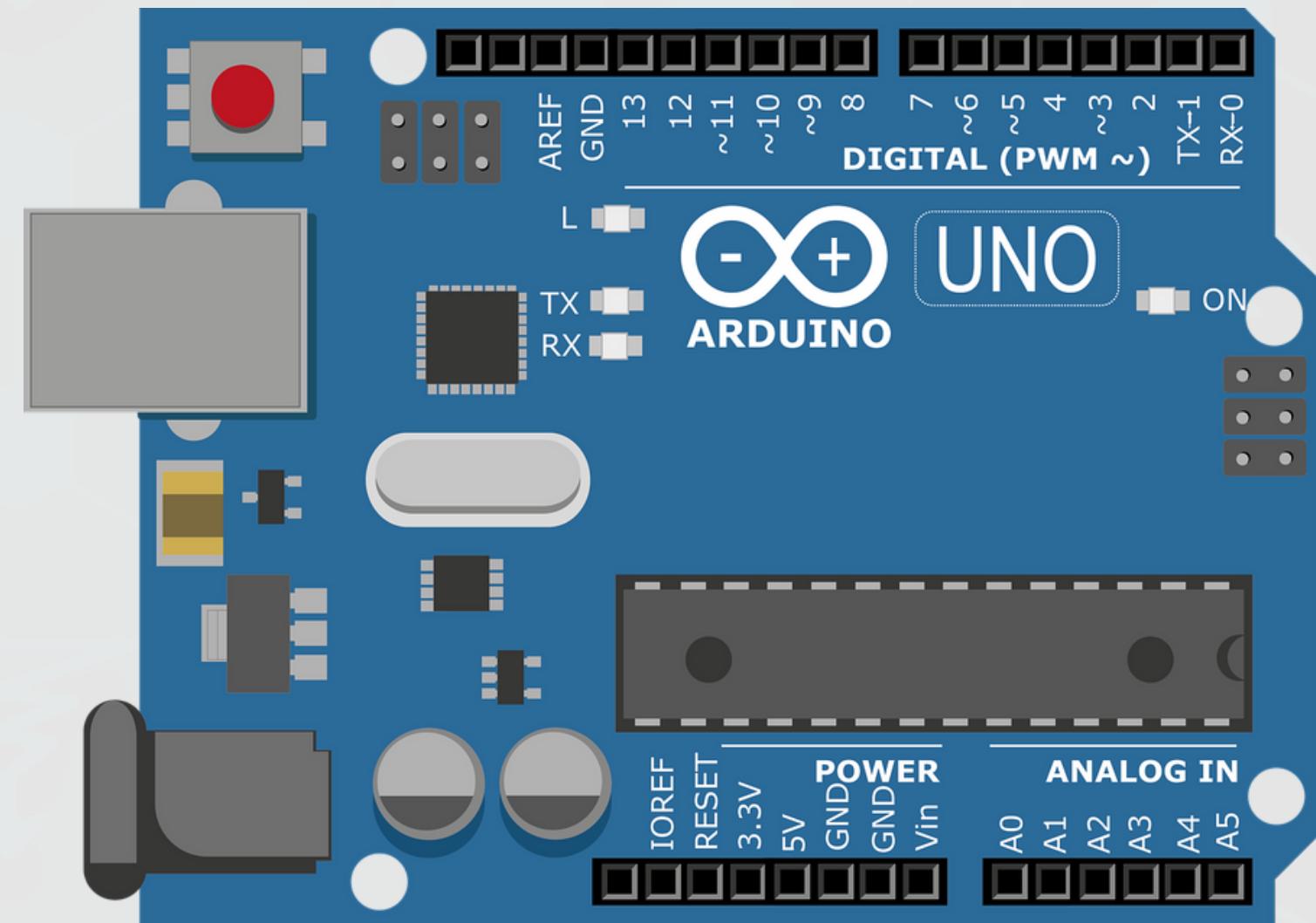
Microcontroller



- Specialized Processing
- Simplicity
- Integrated Peripherals
- Real-Time Operation
- More cost-effective
- Low power consumption

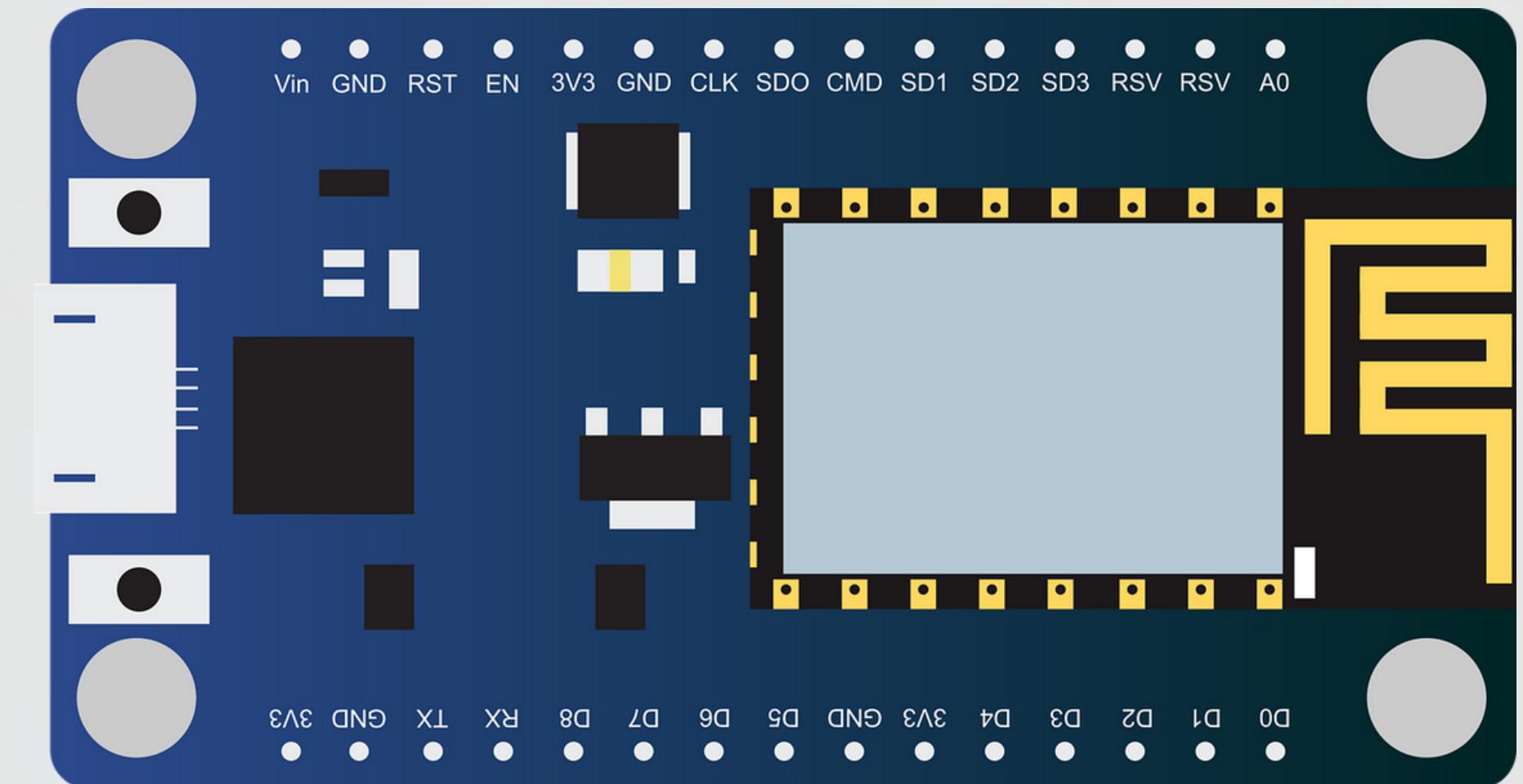
Arduino (ATmega-based)

- ATmega series (e.g., ATmega328 for Arduino Uno).
- Analog and digital I/O pins.
- PWM (Pulse-Width Modulation) support.
- Beginner-friendly IDE.
- Wide range of shields for expansion.
- Extensive library support.



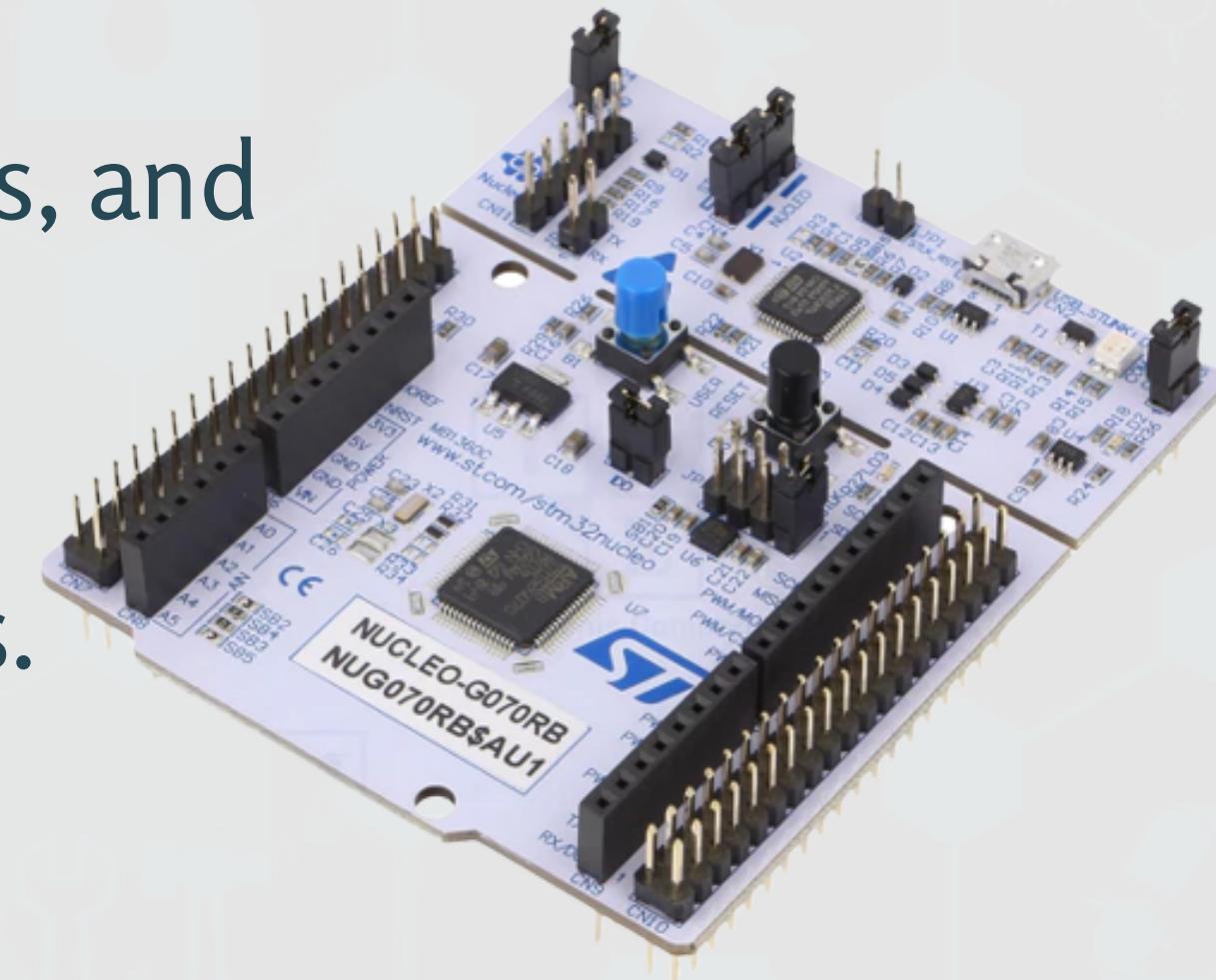
ESP8266 and ESP32 [by Espressif]

- Tensilica Xtensa LX6 dual-core 32-bit microprocessor
- 4 MB flash memory
- 520 KB SRAM
- Integrated Wi-Fi and Bluetooth
- 34 GPIO pins
- 12-bit ADC up to 18 channels
- 2 x 8-bit DAC
- Ultra-low power consumption



STM32 [by STMicroelectronics]

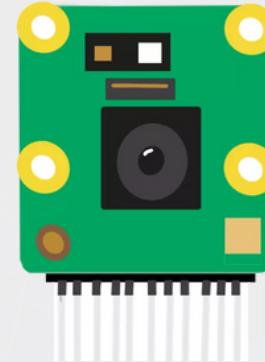
- Various models based on ARM Cortex-M0, M3, M4, and M7 cores.
- ARM Cortex-M cores for real-time performance.
- Extensive peripheral support, including ADC, timers, and communication interfaces.
- Robust development environment (STM32Cube).
- Suitable for a wide range of embedded applications.



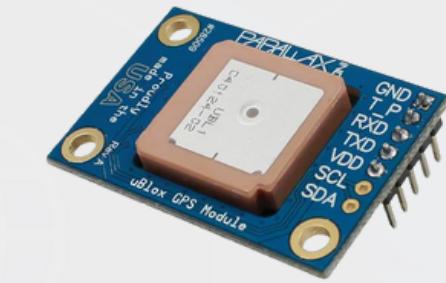
Sensors



LDR



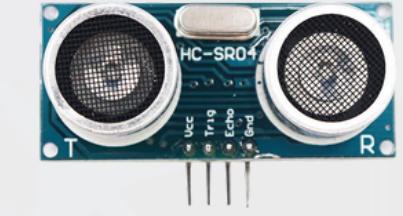
Camera



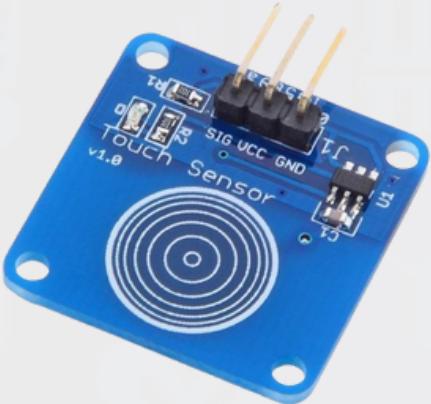
GPS



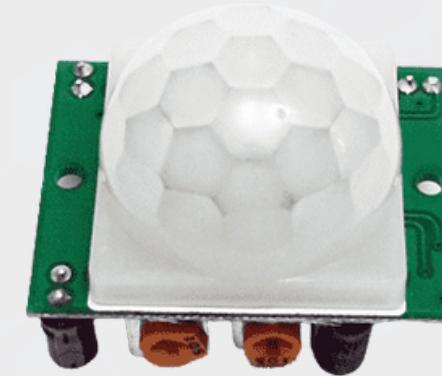
DHT₁₁ Temperature



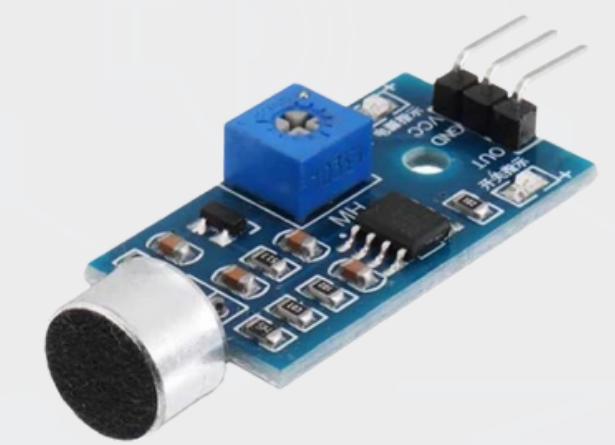
HC-SR04 Distance



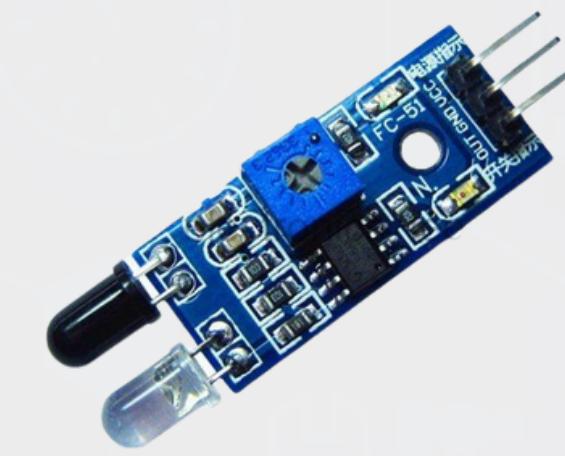
Touch



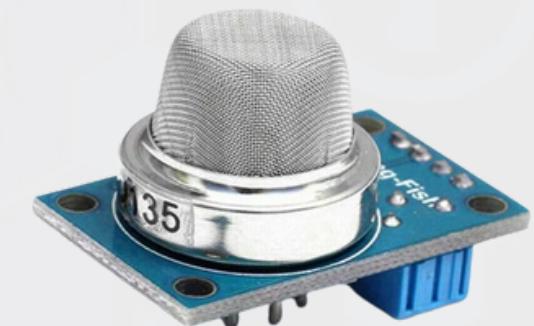
PIR Motion



MIC



IR

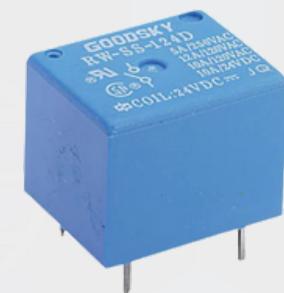


Gas

Actuators



Motor



Relay



Solenoid



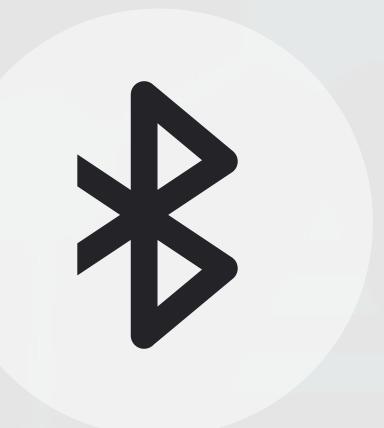
Peristaltic Pumps



Solenoid Door Lock

Communication

- Wi-Fi (Wireless Fidelity)
- Cellular Networks (3G, 4G, 5G)
- Bluetooth
- LoRa (Long-Range)
- NFC (Near Field Communication)



Development Platforms

- Arduino IDE
- PlatformIO
- STM32CubeIDE
- Google Cloud Platform
- Microsoft Azure
- Amazon Web Services (AWS)
- Arduino Cloud



Applications of IoT



INTERNET OF THINGS



Any Device



Anybody



Anywhere



Any Business



Any Network



Anytime

Open hardware

"Open hardware," or "open source hardware," refers to the design specifications of a physical object which are licensed in such a way that said object can be studied, modified, created, and distributed by anyone.



"Open hardware" is a set of design principles and legal practices, not a specific type of object.



**Let's dive into
demonstrations!**