3 Layer IoT Architecture

- Application Program Interface → Application Layer
- Network Layer → Communication Protocols → WiFi Communication
- Communication Protocols → Zigbee Technology
- Communication Protocols → LoRa Communication
- Perception Layer → Sensors
- Actuators
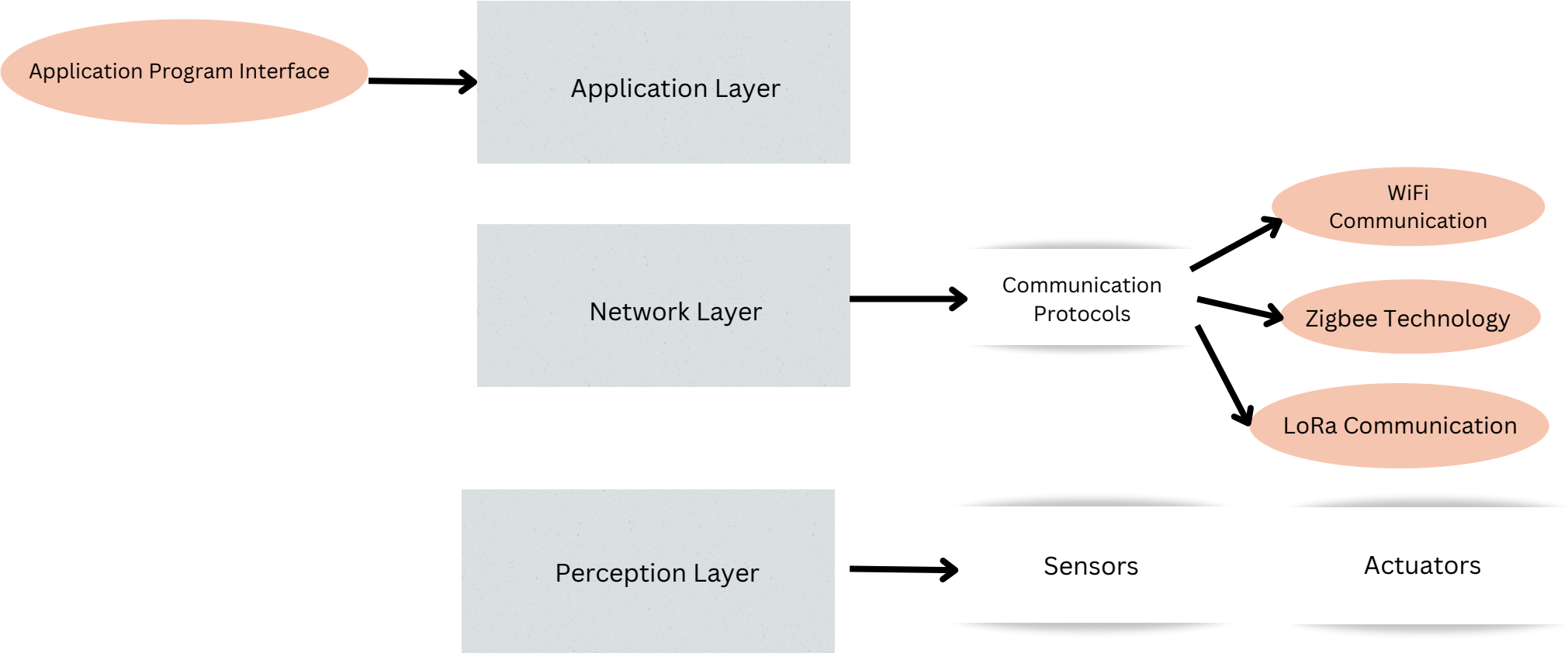
Intelligent Wetland Monitoring System

```
┌─────────────────────────────┐
│   Wetland Monitoring System │
│            (App)            │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐        LoRaWAN pH          DHT11 Sensor
│                             │────────▶  Sensor
│   Environment Monitoring    │
│         Equipment           │        ╭──────────────╮   ╭──────────────╮
│                             │───────▶│ Total Organic│   │ Dissolved Oxygen│
│                             │        │ Carbon Sensor│   │    Sensor     │
│                             │        ╰──────────────╯   ╰──────────────╯
│                             │────────╮
└─────────────────────────────┘        ╰▶╭──────────────╮   ╭──────────────╮
              │                          │Turbidity Sensor│  │  Conductivity │
              ▼                          ╰──────────────╯   │    Sensor     │
┌─────────────────────────────┐                            ╰──────────────╯
│                             │
│   Data Acquisition System   │───────▶  Collect data from the
│                             │          sensors and uses LoRa
└─────────────────────────────┘          WAN comm protocol to
              │                           transmit
              ▼
┌─────────────────────────────┐
│                             │
│   Data Processing System    │───────▶  Analyzes the data
│                             │          from the sensors
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│                             │
│        Alert System         │
│                             │
└─────────────────────────────┘
```
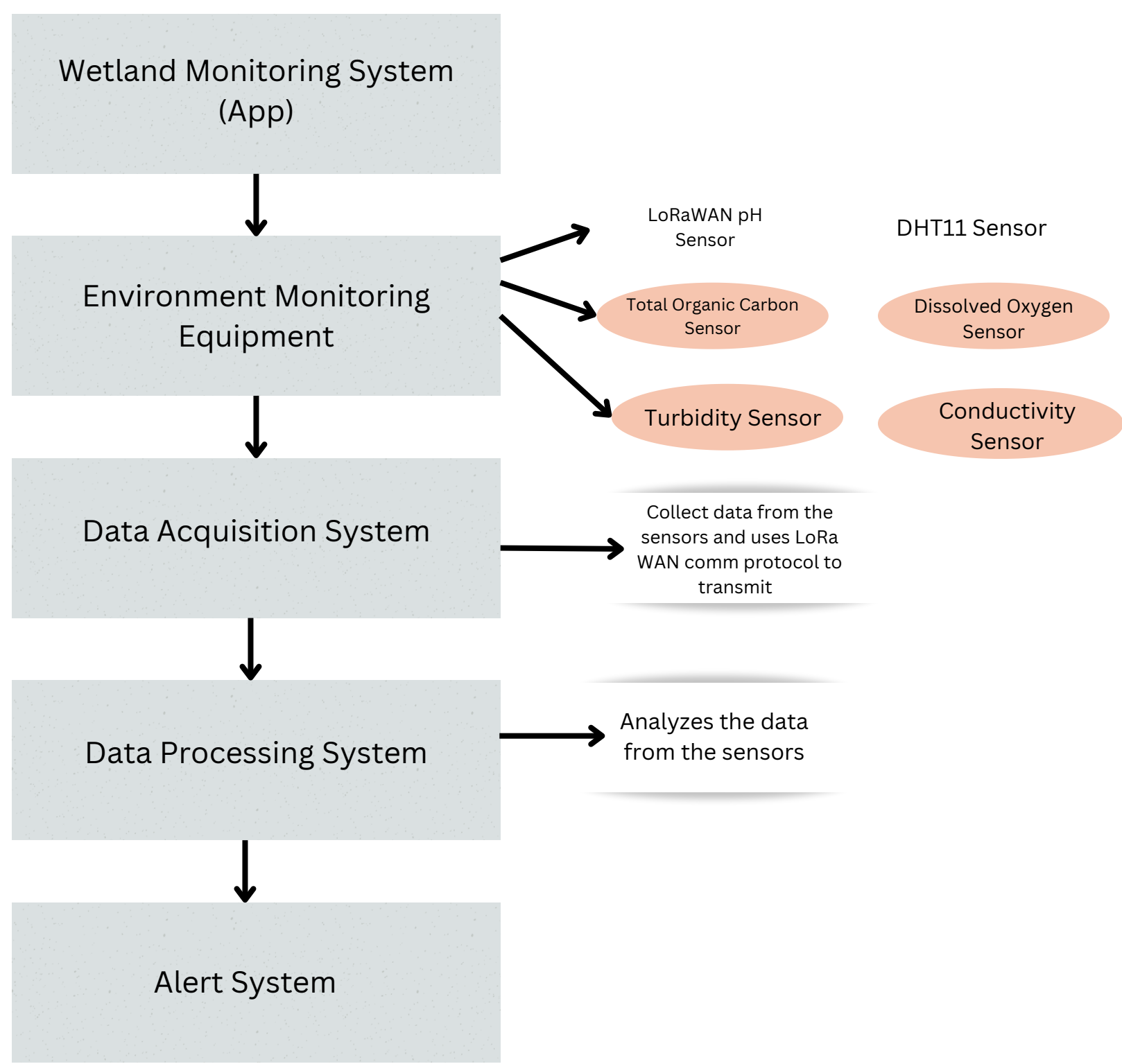
○ LoRa WAN pH sensor is commonly used sensor in the wetland environments and can be used for long distance communication. It also sends alert to the concerned authority when the pH level falls outside the desired range.

○ DHT11 is a digital Temperature and Humidity Sensor that provides data in real time. The temperature range of the sensor varies from 0-50 degree Celcius.

○ The Total Organic Carbon Sensor can be a good indicator of pollution in wetlands