

# SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore - 641 107

AN AUTONOMOUS INSTITUTION



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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## IOT APPLICATIONS

### AGRICULTURE

Smart farms use IoT to check the quality of soil, produce healthy crops, and remove weeds. IoT sensors help collect significant data related to soil moisture content, nutrients present, acid levels, and temperature. With this information, it is possible to properly manage irrigation and fertilization. IoT also helps farmers select the best time to sow seeds, detect plant diseases, and choose the best kind of fertilizer to use.

- **Crop Monitoring**

Sensors placed along the farms monitor the crops for changes in light, humidity, temperature, shape, and size. Any anomaly detected by the sensors is analyzed and the farmer is notified. Thus remote sensing can help prevent the spread of diseases and keep an eye on the growth of crops.

- **Weather conditions**

The data collected by sensors in terms of humidity, temperature, moisture precipitation, and dew detection helps in determining the weather pattern in farms so that cultivation is done for suitable crops.

- **Soil quality**

Soil health analysis helps in determining the nutrient value and drier areas of farms, soil drainage capacity, or acidity, which allows for adjustment of the amount of water needed for irrigation and opting for the most beneficial type of cultivation. The soil health data can also help leverage regenerative agriculture by providing insights into how and when to increase organic matter and therefore achieve a better soil structure and eventually pave a path for climate-smart agriculture.

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## HEALTH CARE

Internet of Things (IoT)-enabled devices have made remote monitoring in the healthcare sector possible, unleashing the potential to keep patients safe and healthy, and empowering physicians to deliver superlative care. It has also increased patient engagement and satisfaction as interactions with doctors have become easier and more efficient.

**IoT for Patients** - Devices in the form of wearables like fitness bands and other wirelessly connected devices like blood pressure and heart rate monitoring cuffs, glucometer etc. give patients access to personalized attention. These devices can be tuned to remind calorie count, exercise check, appointments, blood pressure variations and much more.

IoT has changed people’s lives, especially elderly patients, by enabling constant tracking of health conditions. This has a major impact on people living alone and their families. On any disturbance or changes in the routine activities of a person, alert mechanism sends signals to family members and concerned health providers.

**IoT for Physicians** - By using wearables and other home monitoring equipment embedded with IoT, physicians can keep track of patients’ health more effectively. They can track patients’ adherence to treatment plans or any need for immediate medical attention. IoT enables healthcare professionals to be more watchful and connect with the patients proactively. Data collected from IoT devices can help physicians identify the best treatment process for patients and reach the expected outcomes.

**IoT for Hospitals** - Apart from monitoring patients’ health, there are many other areas where IoT devices are very useful in hospitals. IoT devices tagged with sensors are used for tracking real time location of medical equipment like wheelchairs, defibrillators, nebulizers, oxygen pumps and other monitoring equipment. Deployment of medical staff at different locations can also be analyzed real time.

The spread of infections is a major concern for patients in hospitals. IoT-enabled hygiene monitoring devices help in preventing patients from getting infected. IoT devices also help in asset management like pharmacy inventory control, and environmental monitoring, for instance, checking refrigerator temperature, and humidity and temperature control.

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Doctors monitor patients with the help of wearables or sensors. Vital metrics can be monitored continuously using IoT systems. Additionally, wait time for hospital beds can be minimized by installing smart beds. Medical device breakdown, repair, and maintenance can also be managed using IoT sensors. Comfort in geriatric healthcare is also possible with the inclusion of IoT systems. The real-time monitoring of patients using IoT sensors helps in determining whether the patient’s condition is deteriorating or stabilized.

## INDUSTRY

### IoT Applications in Manufacturing Industry

IoT connects consumers, manufacturers and products. This leads to a new era with a more connected environment that enfants collectively. The internet of things is a global technology that is transforming the industry and manufacturing sector. Let us see some of the applications of IoT in manufacturing industry.

### Benefits of IoT in manufacturing

- IoT recognize manufacturing delays and helps to identify the underlying causes
- Production units benefit majorly with automation of various processes in the manufacturing industry. This allows the maximum utilization of raw material and manufacturing components.
- IoT leads to better allocation of resources. It allows users to shift their focus on clients and profits rather than worrying about tedious and time consuming tasks.

### IoT Applications in Manufacturing Industry

Below are a few of the useful application of IoT in the manufacturing sector:

#### 1. Intelligent product enhancements

similar to the other applications of IoT, IoT in manufacturing also enhances production quality. Previously, the creation of products would require a heavy market research and customer suggestions, with IoT, owners have access to large amounts of data and information. IoT acts as a reliable source of information about any product and hence ensures better profits.

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## 2. Dynamic response to market demands

Supplying to market demands depends on a number of factors such as taste and preferences, income of the population, consumer expectations, country capital and so on. Keeping up with demands requires constant research and present supply could cause heavy losses to business and future decisions.

IoT stores and retrieves information continuously and does not require much human intervention. It controls supply chains because the information IoT gathers is accurate to a large extent

## 3. Improved facility service

IoT improves the conditions of workplaces and offers safety and security to any typical facility. Safety managers communicate through applications and access real-time information regarding threats and safety events. This allows organizations to monitor events, enhance communication and increase production.

## 4. Product safety

Despite a complicated set of operations ensuring customer safety, hazards and dangers still find their way into the market. Unknown reasons may cause serious incidents.

IoT deploys sensibility, control and management techniques to track such incidents and raise alerts in case of potential threats.

## 5. Lower costs, optimized resource use and waste reduction

IoT replaces manual labour in various domains. It reduces the dependency on humans to perform background checks for products. Maintenance checks and tests usually require manual labour costs and are time consuming. With IoT, one can monitor the status of their organization remotely, through sensors and security webcams.

IoT offers ways to manage and optimize the usage of resources such as humans and minerals. It offers cost effective and feasible methods to complicated problems.

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## 6. Quality control

IoT proposes real-time monitoring of appliances and products in the industry. Manufacturers can predict the breakdown of certain machinery parts and offer solutions instead of waiting for the machine to collapse. IoT benefits systems by monitoring the status of engines, machinery and their mechanism. The automation of certain processes reduces the dependency on manual labour.

Industrial IoT is part of what inspired the fourth wave of the industrial revolution. IoT-enabled sensors have the ability to extend the shelf life of machines used in factories. An increased level of availability and reliability can be ensured with industrial IoT. Factories are moving towards computerized maintenance management systems and enterprise asset management to include IoT applications in maintenance and resource management.

Industry IoT applications establish optimal machine health through predictive care. The cost saved by introducing condition-based maintenance in industries is another advantage of IoT applications.

## IOT DEVICE MANAGEMENT

IoT device management refers to the processes involving the provisioning and authenticating, configuring, maintaining, monitoring and diagnosing connected devices operating as part of an IoT environment to provide and support the whole spectrum of their functional capabilities. It is therefore quite clear that a reliable and effective device management solution is critical in keeping the smart assets connected, up-to-date and secure.

IoT device management is the ability to remotely access, diagnose and manage the functionality of your deployed IoT devices. There are several key factors that illustrate why this capability is critical.

These factors include the size of your network, whether the devices are physically accessible and how widely dispersed your devices are, geographically. Regardless of their number or location, you will need to check on those devices and periodically update their capabilities and intelligence with firmware updates, or download security patches to make sure they are up-to-date, secure and in compliance.

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