



Monthly

e-Newsletter

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Never stop learning, Because life never stop Teaching

“The strength of an organisation can be judged by how well it can ride calamities. ”

:- Vikram Sarabhai

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READER'S CENTER

1. INNOVATION IN THE FIELD OF TELECOMMUNICATION
2. TECHNOLOGY INNOVATIONS OF COMPUTER EDUCATION
3. ACKNOWLEDGMENT



INNOVATION IN THE FIELD OF TELECOMMUNICATION

One of telecommunication innovation is IoT devices and sensors which influence most of the industries in the technology economy. As such, this technology improves people's quality of life and allows businesses to increase their profits, alongside improving management.

An IoT device is a physical object with sensors/actuators, processors, software and common communication ability that allows it to send and exchange information with other IoT devices, forming a collective network of smart systems. These can then be used to set routines, reminders, and alerts and be used to completely automate current workflows effectively.

IoT devices can encompass many functions and features and can be broadly divided into based on what type of device it is - whether it is a

- 1 Sensor device - like temperature, humidity, pressure, light, distance
- 2 Actuator device - fans, blinds, motors, pumps, valves
- 3 Communication device - hubs for Zigbee, Z-wave, Matter, WiFi router, etc

We will now be focusing on Sensor devices and different types of sensors in IoT

WHAT ARE SENSORS ?

Sensors are devices that provide an output signal based on measuring an environmental phenomenon such as measuring temperature, humidity, pressure, altitude, ambient light, distance etc. These devices are used to give quantitative and qualitative measurements of an environmental factor for the purposes of monitoring data to either record or take action. For example, a temperature sensor can be used to monitor the ambient temperature. Based on the temperature sensor's measurement and output, heating or cooling can be enabled to bring the ambient temperature of the room to the optimal temperature



Different type of Sensors shown above

Sensors have been around for decades being used in many different applications. But recently, with the advent of IoT sensors, today must encompass the ability to process its data, communicate with other sensors and platforms, forming a crucial part in the entire IoT ecosystem

CLASSIFICATION OF SENSORS

Due to the sheer number of sensors available, for simplification sensors are divided into 5 core classifications depending on how they work

- 1 Active and Passive Sensors
- 2 Contact and Non-Contact Sensors
- 3 Absolute and relative sensors
- 4 Analog and Digital Sensors
- 5 Miscellaneous Sensors

1. ACTIVE AND PASSIVE SENSORS

Active Sensors are sensors that require a dedicated external power supply in order to function. Examples include GPS and ultrasonic sensors.

Passive sensors on the other hand do not require any external supply and can receive enough electrical signal from the environment to function. Examples include thermal sensors, NFC tags, etc.

2 CONTACT AND NON-CONTACT SENSORS

Contact sensors are sensors that require physical contact with the environmental stimulus the sensor is measuring. Examples include touch sensors, temperature sensors, strain gauges, etc

Non-contact sensors are sensors that do not require direct contact with the environmental stimulus it measures. Examples include optical sensors, magnetic sensors, infrared thermometers, etc

3 ABSOLUTE AND RELATIVE SENSORS

Absolute sensors, as its name suggests, provide an absolute reading of the stimulus. For example, thermistors always give out the absolute temperature readings

Relative sensors provide measurements relative to something that is either fixed or variable. Thermocouple is an example of a relative sensor, where the temperature difference is measured as opposed to direct measurement

4 ANALOG AND DIGITAL SENSORS

Analog sensors produce a continuous output signal proportional to the measurement. Examples include thermometers, LDR, pressure sensors etc

Digital sensors are sensors that convert the measurement into a digital signal. Examples include Inertial Measurement Units, ultrasonic sensors, etc

5 MISCELLANEOUS SENSORS

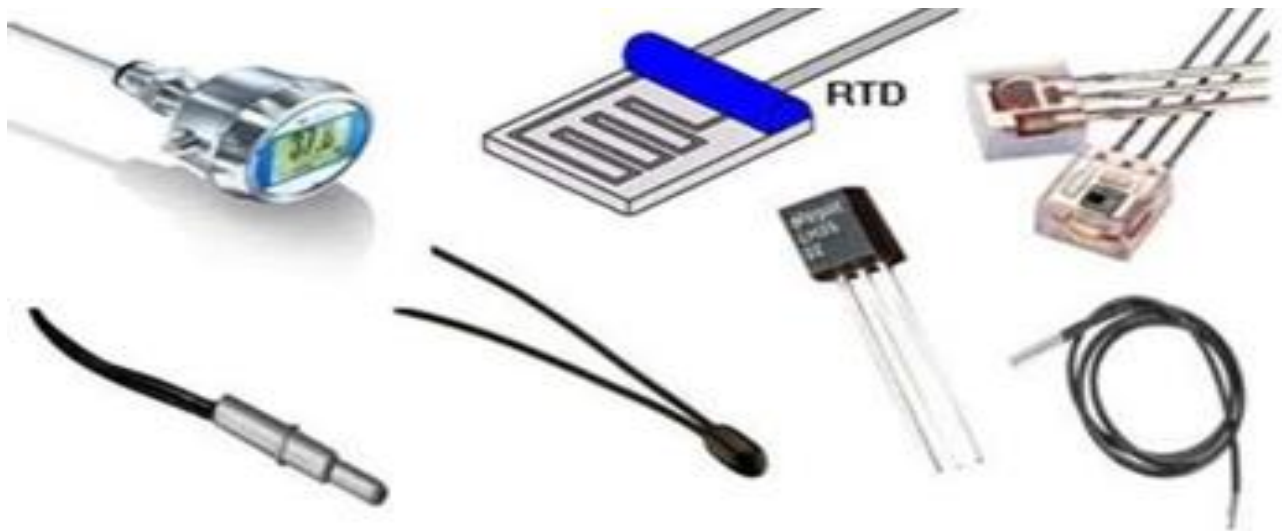
There are many more types of sensors that may not necessarily fit into the above categories. Those sensors will be classified as miscellaneous sensors and these include biological, chemical, radioactive sensors, etc.

DIFFERENT TYPE OF SENSORS IN IoT

1. TEMPERATURE SENSORS

Temperature sensors are used to measure the temperature of the ambient room. Temperature sensors come in different variants each working on different principles ideal for each use case, depending on the placement (indoor or outdoor), expected temperature range, temperature variations, size, etc

Examples: Thermistors, thermocouples, RTD, mercury thermometers, pyrometers, etc



2. DISTANCE SENSORS

Distance sensors are sensors that measure the distance between the sensor and any objects. These sensors can also work on many different principles and the type of sensor

is chosen based on range, accuracy, durability, etc. Examples: Infrared, Radar, Ultrasonic, Lidar, etc

3. LIGHT SENSORS

Light sensors are sensors used to measure the intensity of ambient light. Different types of

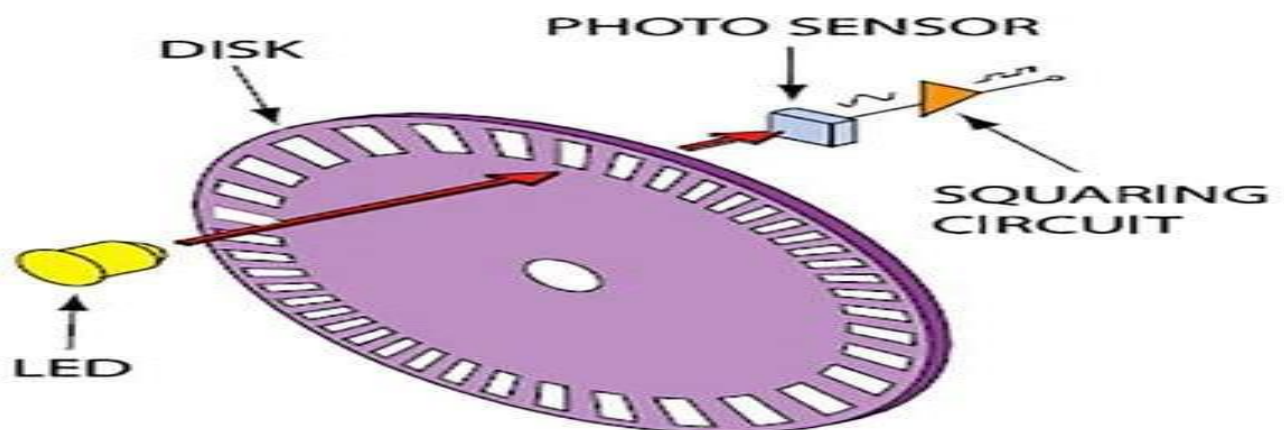


light sensors are used based on the variations of light intensity it is required to measure. Examples: LDR (light dependent resistors), photodiode, OPT3001

2. OPTICAL SENSORS: -



Optical Sensors are sensors designed to measure a particular attribute by making use of a light source and light sensor. Optical sensors are used in encoders to measure rotational speed by calculating the number of times the light source has been blocked and unblocked by the slits present on the wheel.



5. INERTIAL MEASUREMENT UNITS

Inertial Measurement Units usually consist of two or more sensors designed to detect and record motion and orientation. These include an accelerometer and gyroscope, the former being able to measure the acceleration (and hence orientation based on Earth's gravity) and the latter measuring angular position. It is common to see a Magnetometer and pressure sensor also couple with IMU to further measure the direction like a compass and measure altitude respectively.

6. ENVIRONMENTAL SENSORS

These sensors include pressure, temperature, humidity, moisture, gas sensors, sound sensors etc all designed exclusively to measure a particular physical attribute in the surrounding environment.



CONCLUSION: -

In conclusion, many types of sensors are available on the market designed to accurately measure and report various environmental stimuli. These sensors can be combined with a processor and a standard communication protocol to turn the device into a smart telecommunication device or IoT product, turning into a collective, intelligent node in a wider network of smart devices.

By Asi/T Nitish Kumar

TECHNOLOGY INNOVATIONS OF COMPUTER EDUCATION

Technology is causing massive changes in all sectors. These changes have been felt in the defence/para military ,health sector, financial world, entertainment, and even government. The good news is that these changes will make the world a better place! One of the key sectors that has been affected by this disruption is education. These innovations are giving classrooms a new look and have changed the ways in which lessons are conducted. Here are the top six technology innovations that are causing major changes in education.

1. Virtual Reality (VR) in Computer Education

Virtual Reality technology is already the hottest thing in the tech world. Big companies are gearing up for a brutal war over this technology. One of the areas of application of VR technology is education. With VR, students can learn via interacting with a 3D world. Google has been on the forefront of introducing experiential learning in schools/training institutions through VR technology.

2. Artificial Intelligence and Machine Learning (AI)

Artificial intelligence is being applied in all levels of technology, from the lowest to the most advanced levels. AI is used in schools/ training institutions to automate key activities such as grading of subjects and providing feedback on areas that need improvement. It is also used to enhance personalized learning among students, especially those with special needs. Through machine learning, adaptive programs have been developed that care for the individual needs of students.

3. Cloud Computing for Education

Educational resources can be accessed from any part of the world thanks to cloud computing technology. Vital resources such as written lessons, audio lessons, videos, and video assignments can be stored on a institutuon's cloud terminal. Students can access these resources from the comfort of their homes and complete and submit the assignments back to their tutors. Cloud computing will eliminate the hassle of carrying tons of books or practically living at your local library. This technology also allows students to chat live with their tutor.

4. 3D Printing

3D printers are already causing ripples in the education sector and students are loving them. Content that was previously taught via text books can now be expressed through 3D models. Through this printing technique, students can have a better understanding of something that

was thought to be complex. In higher educational institutions, 3D printing is used to develop prototypes to be used in the development of final systems. 3D printing takes concepts and makes them real.

5. Social Media in Educational Institutions

Educational institutions have not been left behind in capitalizing on the impact of social media. In fact, most of these social networking sites were developed on campuses. Universities and colleges can connect with each other through social networking sites even if they are several continents apart. Through these sites, they are able to organize contests, meetings, and parties. Students from different schools use social media to exchange ideas which can change lives.

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Acknowledgement

We are highly thankful for reading out this compilation and hope it will be useful for you in day to day professional and personal life. We would like to hear your interest areas, suggestions from you to make this newsletter more informative and interesting. Your views will definitely help us to create this newsletter as an effective medium to reach you with latest development in the fields of communication and technology.

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