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Smart Learning using IOT Technology

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Abstract: *Information and communication technologies (ICT) and the ongoing integration of new technologies into institutional learning have led to the development of smart education, which is now a common component in education. The goal of the smart classroom is to help students learn new skills, adapt to new situations, and use technology in a way that results in improved learning outcomes and big data. A new technology known as the internet of things (IoT) enables devices with sensors, actuators, and processors to connect with one another and carry out useful tasks. Designing under these circumstances might be challenging because of the quick evolution of technology. IoT application design is a difficult problem. The current standardisation efforts frequently duplicate IoT development. The reference architecture offers a remedy for superfluous design tasks in smart education. This chapter's goal is to examine the prerequisites and architectural frameworks for smart education. A scalable and adaptable IoT architecture for smart education (IoTASE) is being presented.*

Keywords: Internet of things (IOT), Technology, Smart Education, Development, Scalable, Adaptable

I. INTRODUCTION

The Internet of Things (IoT) is a game-changing notion that is changing how we live and interact with technology. It is a network of interconnected physical devices, automobiles, appliances, and other items that are equipped with sensors, software, and network connectivity to gather and share data. These "smart" gadgets may interact with one another as well as with humans, resulting in a massive ecosystem of interconnected devices.

The principle of IoT is to link items to the internet and allow them to interact and exchange data, allowing them to become more than just solitary entities. This connectivity opens up a universe of possibilities, allowing ordinary items to be monitored, controlled, and optimised in previously inconceivable ways. The enormous volume of data created by linked devices—often referred to as "big data"—is where the IoT's strength rests. This data may be analysed and processed to produce valuable insights that help people and organisations make better decisions and increase productivity.

IoT has the ability to completely change the educational landscape by converting conventional classrooms into modern, networked learning spaces. Here are a few significant IoT applications in smart education:

- **Smart Classrooms**: By supplying classrooms with linked hardware and sensors, IoT may improve the educational experience. IoT technology may be connected with smartboards, interactive displays, and digital projectors to deliver dynamic and captivating lectures. Students can use their own devices, such as tablets or smartphones, to interact with instructional content.
- **Personalized Learning**: IOT devices may gather information on a student's learning habits, preferences, and development. To personalise learning experiences and offer focused interventions, this data may be analysed. Based on the needs of each student, adaptive learning systems can change the speed and subject matter of classes.
- **Campus Safety and Security**: IoT sensors and surveillance systems may be utilised to guarantee the safety and security of faculty, employees, and students on campus. To monitor and react to possible threats or incidents in real-time, connected cameras, access control, and emergency warning systems can be used.
- **Asset tracking and management**: The Internet of Things (IoT) may be used to monitor and control educational resources including textbooks, tools, and supplies. Assets can be fitted with RFID tags and sensors, enabling effective inventory management and real-time monitoring.

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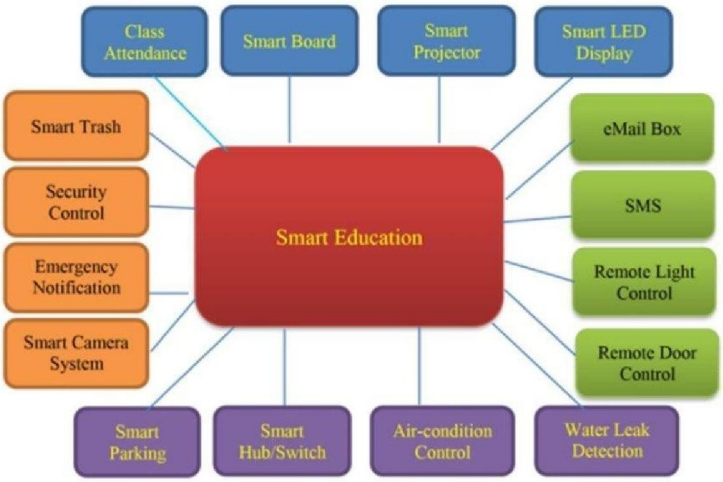
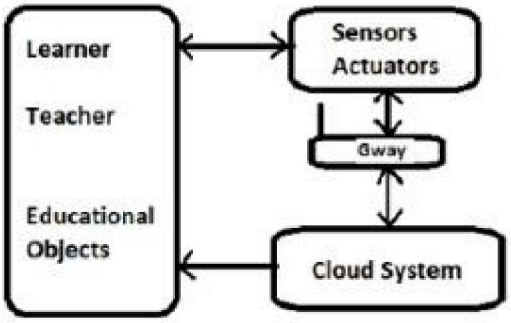
- **Energy Management**: IoT technology can aid in reducing the amount of energy used in educational facilities. Smart lighting systems with connected sensors can automatically change the lighting and temperature based on occupancy, saving money and energy.



II. BASIC IOT STRUCTURE



The learners may connect with the instructor by remotely completing all specified tasks, taking online tests, and receiving results in real-time mode by using the IOT application in the e-learning activities.
Teachers and students no longer devote their time to performing manual tasks.
Instead, they will focus on the educational activities that are the main factor in the students' learning capacity. They'll gather information on learner potential using web technologies like RFID, WSN, and cloud systems.
An education provider may have to deal with issues like network data measurement, dependable Wi-Fi association, net analytics, security, privacy and convenience of devices for students, teacher training, and cost of equipment, among others, in order to successfully integrate IOT devices in a classroom setting.
Some of the challenges are:

- **Security and Privacy**: As gadgets begin to monitor and collect data from kids, they put those students' security and privacy at danger since in an IOT-based environment, data is kept at an Internet-based network of connected devices. Any security lapse could result in the disclosure of a student's sensitive information, including their medical history, financial background, and other private details.
- **Reliable Wi-Fi Connection**: New educational technologies, such as high-speed wireless networks that offer the bandwidth for lesson audio and video streaming, are constantly needed.
- **Management**: The organization's capacity to create an IOT setup that is both dependable and accessible to all users may be hampered by the incompatibility of some devices and applications. An educational institution must ensure that both its IT infrastructure and instructional strategies enable the usage of IOT in the classroom for IOT implementation to be successful. Although technology comes with risks and potential obstacles, educational organisations may benefit from investigating and experimenting with IOT alternatives.

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- **Cost**: An IOT-based educational institution may be expensive to set up in its entirety. Consequently, the price of tools and equipment represents even another obstacle

III. CONCLUSION

We learned from this paper that IOT can modify the conventional educational system and contribute to making it smarter. Today's world benefits from smart classrooms, smart attendance systems, smart libraries, etc. thanks to an IOT-based educational system.

We attempted to learn more from this study about various IOT-based apps that are utilised to put in place a smart education system. This offers crucial applications and technologies needed to create a smart education system, and it will support researchers in their efforts to develop new IOT-based tools and applications.

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