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Impact of IoT (Internet of Things) on Today's Education System

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Abstract: *The Internet of Things (IoT) has been beneficial to education. It is equally applicable in the field of education as it is in other fields. Aside from traditional classroom technology-based teaching methods, internet technology-based teaching methods continue to supplant pencils, paper, and chalkboards as instructional approaches. It is expanding educational opportunities by replacing traditional teaching and learning techniques. IoT can improve things that contribute to a better educational environment. It provides security through the use of smart cameras, and climate control is accomplished through the use of smart air conditioning units. Smart lighting systems are large and effective at providing better, more energy-efficient lighting. IoT in the classroom means a more polite connection and a more collaborative future for education. IoT devices give students better access to everything from learning materials to communication channels. At the same time it give teachers the ability to measure student learning progress in real-time. As one education professional said of the IoT, "It is not about the technology; it's about sharing knowledge and information, communicating efficiently, building learning communities and creating a culture of professionalism in schools. These are the key responsibilities of all educational leaders."*

Keywords: IoT, Education System, Schools, Teaching and Learning Techniques

I. INTRODUCTION

The Internet of Things (IoT) refers to a network of interconnected computing devices. Mechanical machines, digital equipment, objects, and humans are all included. These are all assigned unique identifiers (UIDs). The ability to transfer data across a network without the need for human-to-human or human-to-computer interaction. The Internet of Things is essentially a network of various devices. This is linked to various software, electronic devices and systems, and network connectivity of various orientations. These are intended for the exchange, transfer, and compilation of various types of information. Many industries, including finance, travel, education, and telecommunications, have successfully implemented IoT. Focusing on the education sector, the main reason is that IoT improves education while also adding advanced value to structures and the environment. In this paper we will look at the various IoT applications in the education sector.

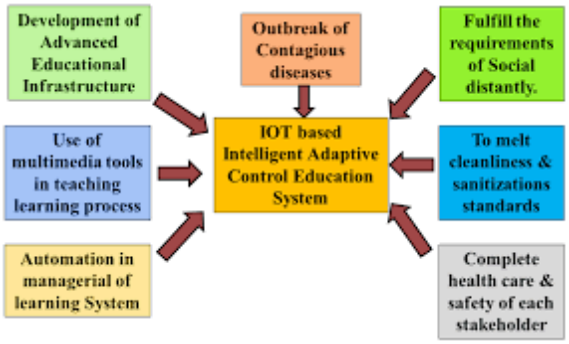

Fig. 1 IOT based Intelligent Adaptive Control Education System

The above applications demonstrate that IoT has a promising future in the education sector. A smart school (a school that uses IoT) gives personalized training with excellence. The smart devices used for this process is WiFi network for receiving instructions and sending data. A computational IoT nervous system for educational institutions helps to keep track of major resources, create smarter lesson plans, design secure campuses, and enhance information access and

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much more. With its designated application of advanced internet tools, IoT can be regarded as a new method of classroom management.

II. IoT Applications in Education

Following are some smart features of IoT in education system.

1. **Interactive Learning:** Present pattern of learning is not limited only to the combination of images and texts. There is more interactive than images and texts. Many textbooks are joined to web-based sites. These books incorporate additional videos, materials, animations, assessments, and extra materials to aid the learning process. This provides a broader perspective to the students in gaining knowledge on new things. This is achieved with a better understanding and interaction with their friends, parents and teachers. The real-world problems are discussed and interacted in classroom by the educational professionals and students. System is made effective to find the answers for these problems more accurately and within time.
2. **Security:** Present classrooms of educational institutes are having many students. Monitoring the whereabouts and activities of each and every student is a typical task. Students in an educational institution require smart security when compared with the population at any other places of work. IoT is effective for value addition in terms of enhancing the security of schools, colleges, and any other learning centers. With the help of technologies like 3D positioning, students can be monitored 24/7. His presence and activity can be reported at any given point of time. For monitoring the student behavior, intelligent camera vision can be used in the campus. Recently, computer vision technologies have improved a lot and can monitor any signature movements. This activity helps us automatically to stop any unexpected incidents from taking place.
3. **Educational Apps:** The educational apps leveraging IoT are powerful creative tools. These are transforming the way in which teaching and learning is done. This tool helps the teachers and students to create 3D graphics textbooks. This textbook feature videos and provide the capability to take notes. These kinds of apps can be considered as game changers as they provide a large number of educational games. These games provide number of combinations that offer interesting possibilities in teaching and learning. This makes education more appealing than ever before.
4. **Increasing Efficiency:** In most of the educational institutes lot of time is spent on activities that do not add any value to the core aim of their very existence. For example attendance of the students needs to be taken several times a day. This data has to be sent to the central office for different purposes. The IoT can give smart solution to this inefficient system. With the help of IoT end-devices, this data can be collected and sent to the central office server automatically. It eliminates the need for any human intervention. Due to this revolutionary shift towards the IoT, the tedious task of teachers and students can be minimized.

III. Applications of IoT in Education System

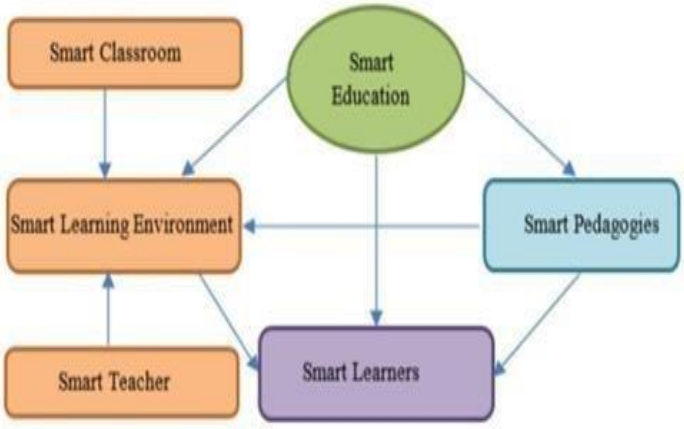

Fig. 2: Smart class application of IoT in Education System

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- **Strong Network:** The IoT facilitates global connection between students, mentors, educators and parents through connected devices. As bulletin boards transform into IoT-enabled "smart" boards and digital highlighters hit the market, students can easily interact with colleagues and teachers while sitting in the comfort of their home or their classroom. It is also possible to enhance the learning process with interactive whiteboards and virtual posters that allow users to easily receive, share and confirm information.Another benefit of IoT technology is that it can give any concept a broader perspective and make it easier for students to analyze and develop their creative solutions.
- **Learn Everywhere:** The IoT and advancements in technology have given students access to additional assignments and resources in addition to digital textbooks. Today's textbooks contain QR codes for easy downloading to smart devices. It offers the possibility to learn anywhere and anytime. The IoT also enables 24/7 communication between students and their mentors. Security and privacy are two other characteristics of IoT-based learning. Another advantage of learning "anywhere" is that students can get rid of stress and any kind of congestion.
- **Attendance Tracking:** The IoT can simplify both data collection and analysis. With an enhanced attendance gadget, manual attendance is not required. Teachers can add the required documents and school officials will email. parents regarding the student's attendance. Furthermore, the connected devices easily detect the presence of the student and send the information directly to the venue. In addition to attendance monitoring, the IoT data collection and analysis capability is useful for testing students' physical and mental status, nutritional needs, etc.In a way, IoT technology can serve all student attendance and health goals.
- **Interactive Devices:** One of the most effective techniques for making the learning process interesting is student-teacher collaboration. Interactive devices promote collaboration and communication. Even in a group project, students can easily share valuable data and collaborate better. Smartboards and smart devices make the learning process simple, effective and interactive. We can say goodbye to whiteboards and embrace smartboards that allow teachers to explain everything interactively using displays and videos.These interactive devices also allow teachers and students to share and edit videos and other interactive content.
- **Efficient Management:** Managing daily activities at school and universities is a monotonous task. Internet of Things solutions can simplify daily tasks and automate tasks. It saves a lot of time and effort for management and teachers. As a result, teachers can focus more on teaching and the management team can focus on other productive activities. For example, RFID technology is used to track assets such as lab equipment, projectors, etc. This saves time and allows management to hire staff to take care of resources. Additionally, educational institutions can get help from an IoT application development company to reduce energy costs.
- **Increased Security on Campus:** Visitors, staff and students can access it with digital badges and wristbands. Parents can track the location of their children on and off campus. Even the school buses are equipped with a GPS tracking system to inform both the school administration and the parents of the whereabouts of the students. Training areas, classrooms and other locations can be secured using emergency indicators, Wi-Fi clocks and other connected devices. In addition, IoT can strengthen the communication system, which can be useful in an emergency. In a way, the IoT provides campus security.

IV. ADVANTAGES OF IOT IN EDUCATION

1. Efficient school system management: IoT is assisting in reducing the time and cost of spending money on manual tasks such as paper work, managing funds, and tracking supplies.
2. Data collection in real time: IoT processes terabytes of data at the same time. This data forecasts and analyses student and staff activities in order to build an efficient and dependable school system.
3. Improvements in Resource Management: IoT is assisting in the management and rescue of water and electricity consumption. Because of IoT systems in education, the use of paper has been significantly reduced.
4. Global connections: Because IoT systems require the internet, it connects and exposes you to schools and universities all over the world. This provides you with a platform to interact with global systems and improve educational quality.
5. Safety Concerns: Many parents in rural areas are concerned about sending their children to school. Some may

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be unable to afford it, while others may simply lack the resources to fund a proper education. IoT is addressing these concerns and ensuring that children feel safe and secure while receiving quality education.

V. CONCLUSION

Now days the objects around us are becoming smarter due to the innovations in technology. The Internet of Things (IoT), the new technological paradigm is connecting various objects around us. But education sector is falling back in leveraging IoT. But slow change is observed in various educational institutions. These are now realizing the significance of introducing technology, especially IoT. Very soon, many schools and colleges will have IoT embedded into their day-to-day activities. IoT is becoming an integral part of the daily learning and teaching methodologies. The Internet of Things will be further integrated into the education pattern in the near future. Most of the schools may use it to prepare their students technically sound. It can be effectively use to harness data, save money, and for other specific needs. Our understanding of education must shift if we want to integrate IoT into the education. Therefore, the IoT can have a significant impact on education in the long run.

Future scope includes simulation testing smartphones functionality and ease of use, small clinic environment.

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