

IoT in Integration with Decision Support System

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ABSTRACT - IoT has played a significant role in education in connecting and educating the students. The use of IoT devices for teaching and learning purposes is a hot trend among institutions which provides a new and innovative approach to teaching and learning environment. This paper discusses the usefulness and applications of IoT in the field of education. Moreover, it tries to present the recent research works, challenges and impact of IoT in future education. In this paper, we address the significance of IoT technology in the field of education in improving the efficiency of teaching and learning. Using IOT technology with Cloud Computing Technology would help in managing Big Data.

KEYWORDS - IOT, WSN, Education, SaaS, PaaS, IaaS, RFID

1. INTRODUCTION

Use of IoT in academics brings a new wave of changes It already has brought new opportunities for the improvement of both teaching-learning process and educational institutions infrastructure. The massive transformation is also expected in the field of education due to IoT [1].

The education sector is considered as a strong candidate for the application of IoT systems. IoT technology has an important impact on education field. IoT has not only changed the traditional teaching practices but has also brought changes in the infrastructure of educational institutions [2,3].

The nature of IoT technology is described as being pervasive because it touches various present computing topics such as communication networks, embedded systems client-server architecture, cloud computing, service-oriented architecture based systems and human-computer interaction. IOT play a very important role in the field of education. IoT is predicted to have a significant impact on today's major industrial applications. Hence, it is imperative that students learn to analyze, develop and maintain such systems in ethical and secure ways by getting exposure to new knowledge areas [2].

IOT uses the concept of connected devices or things, those given a bright rise of the Internet. It can connect anything, anywhere using Internet. After having connection, devices can communicate and share information with each other. These devices gather useful information with a variety of sensors and data collection technology then transmits it to other processing devices for interpretation and decision-making [1]. This way it can help in taking further decision. All real world objects could communicate as "things" using Internet. IP is the

protocol which enables to make it possible with the help of wired or wireless Technologies. These things are capable of sensing the environment and act accordingly.

IoT provides smart campus for smart E-learning applications, smart Classrooms, smart Lab Rooms etc. This smart feature provides smart parking, smart inventory, smart lighting etc for processing smart data [2].

2. CURRENT STATUS

Recently, as the technology of IoT matures, communication capabilities become more accessible and versatile. This increases the availability of interconnectivity of different devices [1]. Decreasing size and cost of sensor technology provides improved connectivity and technologies. These give rise to the development of IOT in future.

Some applications where IOT shows its capability-

- a) Measurement of energy consumption, temperature, humidity level etc.
- b) Remote Monitoring of patients, diagnosis, blood sugar level, body temperature, cholesterol level etc can be monitored by IOT. Many wearable gadgets are also available to maintain different levels of a patients.
- c) Using IOT services patients could know dosage, expiry date etc. As well as they can know the authenticity of the medication.
- d) The implementation of IOT in retail sector, provides better and easier maintenance of stock, replenishment of goods, detection of shoplifting, effective check-outs, customized shopping etc
- e) IOT helps in safety and security issues too, like surveillance of natural disasters, monitoring of water leaks, gases, vibrations, fire, unauthorized entry etc.

f) IOT can help in environment monitoring using its techniques with Wireless Sensor Networks (WSN). For example- earthquake detection, forest fire etc.

g) Green Marketing and Green Education would be another aspect of IOT. Interactive advertising includes an element of feedback to its target audience thus allowing products or services to be more effectively customized. Green attitude will surely leave a high impact on consumers' purchasing intentions.

h) Smart Classroom Management- The use of IoT devices for teaching and learning purposes is a hot trend among institutions which provides a new and innovative approach to teaching and learning environment. Smart classroom management includes automatic attendance system, in which RFID tags are attached to each student's ID card, it reads the ID card in every class and inputs the attendance in every period.

i) Real Time Feedback- In this student's feedback automatically taken by the system. It automatically monitors and observes student's behavior and stores the feedback of any lecture.

j) Smart Lab- Online virtual laboratories can also contribute to providing a qualitative and competitive edge to any education system. Using IOT devices smart lab could be designed and improves the practice and understanding of programming skills [2, 3].

3. IOT AND DISTANCE EDUCATION

IOT helps in construction of distance education classroom. ZigBee/GPRS wireless technology, sensor networks, embedded systems along with web distributed software as well as database systems are basic components involved in it. Afterwards, a dedicated teaching server is made to communicate with ETG via the GPRS network. Now, a student client and teacher client systems can communicate with the teaching server either by a wired or a GPRS based wireless network. This Distance Education has some advantages-

1. Visual learning improves grading of the students as it provides high level of understanding.
2. This way of teaching also increases the efficiency of teachers, as now they can show more data analyzing to the students and make them understand easily.

4. IOT AND COMPUTER SCIENCE EDUCATION

The nature of IoT technology is described as being pervasive because it touches various present computing topics such as communication networks,

embedded systems client-server architecture, cloud computing, service-oriented architecture based systems and human-computer interaction. IOT play a very important role in the field of education. Hence, nowadays students are essentially need to have knowledge of analyzing, developing and maintaining systems to give exposure of new knowledge areas.

Some challenges are faced by many authors while integrating IOT with Computer Science Education. The incorporation of IOT with the related technologies in computer science and the concept of hardware and software is a big issue.

5. INTERRELATION WITH DECISION SUPPORT SYSTEMS

When education with IOT commences, there will be a lot of data to manage. Bulk of data will occur because everything would be online i.e. attendance, lecture, syllabus, all subject's data related to teaching and learning. It will become mass very soon. There will be a trouble to manage those data and to analyze them. Storing and managing data would be a big trouble. Many troubles can be solved using Cloud Computing. It has the power of thousands of computer. IOT needs high performance computing services and tools. Cloud Computing offers different services like SaaS (Software as a Service), IaaS (Infrastructure as a Service), PaaS (Platform as a Service). Educational cloud computing is quickly taking the education community by storm as more platforms, applications and services are being developed for academic cloud computing [4]. The most important feature of IOT is Data Storage, if any data expires and stolen by someone- this can cause critical issues. If we have some smart monitoring then intelligent data should be stored [5]. Systematic and intelligent data could be used for data analytics and visualization that would be easy to understand for human being. As the organization grows with its data, they will surely need a decision support system for analysis and making big decisions [6].

6. CHALLENGES WITH INTEGRATION OF IOT IN EDUCATION

There are many challenges for a successful implementation of IOT in education system, while having many advantages in using IOT. Provider may have to face many difficulties.

1. Reliable Wi-Fi Connection is the main challenge which an organization faces because it needs continuous high speed wireless network for streaming audio/video lectures. The connection also needs a proper Network Bandwidth for without interruption in online classes [2,5].

2. Security and Privacy is another important challenge of using IOT based environment, because data is stored at an Internet-based network of connected devices, as data from students we collect, student's security and privacy would be at risk. Disclosing student's personal information would be easy, it may be of an individual's medical record, family financial background or any other private information [2, 5].

3. Using IOT demands to make available all the devices to the students, if any of the students could not receive device then they could not receive proper benefits of the IOT.

4. Trained Staff is another important feature which creates crucial challenge for any organization, because it is very difficult to find a well trained staff for teaching with this methodology, and if they couldn't get then the organization needs to give training to their staff, that is very expensive.

5. Cost of Implementation is also very high in aspect of IOT way of teaching and learning, because it includes highly expensive equipments, expensive staff members and expensive set ups. Even managing staff is also very expensive, who understands the overall process of working and provides uninterrupted setups [2, 5].

7. CONCLUSION

IOT has many advantages in teaching learning areas but still it has many challenges too. Having a IOT based education environment is very cost effective in itself. Still there are many education organizations are yet waiting to adopt in this technology.

The Internet of Things (IoT) has the potential to improve the human life in all sectors like for smart cities, smart environment, smart water, smart metering, security and emergency, retail, logistics, industrial control, agriculture, home automation, eHealth, education etc. In this paper, we have shown many advantages of using IOT in distance education and Computer Science and Technology. It also shows that integration of IOT with different fields of Computer Science would increase knowledge area and analyzing power. IOT would be a great role in Green Customer Education and Green Marketing. IOT would surely be increased the efficiency of teaching and learning. Using IOT in Education would increase the amount of Data. Integration of Cloud Computing with IOT could be handle Big Data in future.

8. REFERENCES

[1] Dosheela Devi Ramlowat and Binod Kumar Pattanayak, "Exploring the Internet of Things (IoT) in Education: A Review", © Springer Nature Singapore

Pte Ltd. 2019 S. C. Satapathy et al. (eds.), *Information Systems Design and Intelligent Applications, Advances in Intelligent Systems and Computing* 863, https://doi.org/10.1007/978-981-13-3338-5_23

- [2] Shahla Gul, Muhammad Asif, Shahbaz Ahmad, Muhammad Yasir, Muhammad Majid, M. Sheraz Arshad Malik, "A Survey on Role of Internet of Things in Education", *International Journal of Computer Science and Network Security*, VOL.17 No.5, May 2017
- [3] Ana-Maria SUDUC, Mihai BÎZOI, Gabriel GORGHIU, "A Survey on IoT in Education" "Revista Românească pentru Educație Multidimensional ISSN: 2066-7329 | e-ISSN: 2067-9270", 2018, Volume 10, Issue 3, pages: 103-111
- [4] Faisal A. Alshuwaier, Abdullah A. Alshwaier, Ali M. Areshey, "Applications of Cloud Computing in Education"
- [5] Shashi Bhushan, Dr. Pramodkumar, Bhimsingh Bohara and Vibhor Sharma, "A New Approach towards IOT by Using Health care- IOT and Food distribution IOT", 978-1-5090-3480-2/16/\$31.00 ©2016 IEEE
- [6] Vijay Pal Dhaka and Pooja Nahar, "Decision Support System: A Step towards Improved and Efficient Decision Making in Government Organization", *Special Conference Issue: National Conference on Cloud Computing & Big Data, 2015*