

# GENERALIZED EDUCATIONAL MODEL BASED ON INTERNET OF THINGS FOR EDUCATIONAL INSTITUTES

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## ABSTRACT

Now a days Internet of Things are gaining very importance in day to day life. It is the new era of technology where everything is connected to the Internet. It is the new way of connectivity which is going beyond laptops and smartphone. Despite the proliferation of technology in the form of mobile phones and gadgets, educational institutes yet to incorporate actively into teaching and learning process. This paper recommends generalized Internet of Things (IoT) based framework which gives different ways in which educational system can be transformed which will in turn enhance the quality of educational system.

## I Introduction

Internet of Things is the technology which is changing the way people connect to each other. In the ear of technology, Internet of Things (IoT) is the new buzz word about which people are talking everywhere from newspaper to tech blogs. The wave of connectivity had extended beyond the phones, laptops, and tablets and is permeating into our daily lives. With an explosion of connected devices in the market and a healthy adoption rate, we can safely assume that we are taking confident strides into the 'connected life' made possible by the IoT.

A report by Gartner suggests that by the year 2020, the number of connected devices across technologies will touch 2.6 billion. As we move towards an increasingly automated world, this technology will be used to improve the productivity and quality of life and industries alike. The IoT is poised to grow from a technological phenomenon to one with a more global and social impact...and the cogs are already turning in that direction.

In a nutshell, the Internet of Things is the concept of connecting any device (so long as it has an on/off switch) to the Internet and to other connected devices. The IoT is a giant network of connected things and people – all of which collect

and share data about the way they are used and about the environment around them.

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IoT can be used in many applications such as manufacturing, Airlines, Retail Management, Water management, Connected Energy, Lightning Control, Connected healthcare, Agriculture and Education.

Educational Institutes are making use of technology for teaching and learning process such as online tutorials, presentations, cloud storage, visualization etc. These technologies are helping teachers and students to improve the standard of educational system. Despite the use of all these technologies, educational institutes are not going beyond laptops and smartphones. Yet there is a need to adopt the technology which will help educational institutions to transform the educational system and will improve the real-time connectivity to the outside world. Internet of Things is the technology which will help educational System to connect to the outside world in real-time situations. There is a need to use IoT in educational System.

The paper is organized as follows: In Section II, we present some related work. Section III describes the recommendations to the Educational Institutes how to use Internet of Things to improve the quality of teaching and learning process. Conclusion and Future work is presented in Section IV.

## II Literature Survey

In the paper [2] authors have discussed about the Internet of Things and what are the different applications of it. Also it gives brief idea about what is the future of IoT. The survey of Internet of

Things in educational System is gives in the paper [3]. The paper also gives idea about the research work, impact and future of IoT in the educational system. In the paper [4] authors presented some practical scenarios about how IoT can be implemented for a better classroom experience and how teachers can focus on student's skills and it will save the time of both students and teachers. The paper [5] has designed and developed anInternet of Things (IoT) educational mobile learning tool forprimary school students in rural underprivileged areas ofnorthern Thailand.

In [6] Cisco presentsa paper which explains how IoT and Ubiquitous connectedness can help transform pedagogy. It also explains what the current situation in the field of education is and what is the potential uses of IoT which can change the current situation. In the paper [7] gives a model of smart learning using IoT and gamification technique of e-learning. The paper also emphasizes on how IoT can be used to enhance the e-learning. The paper [8] based on the recent IoT projects in education. This paper has categorizes the use of IoT in different groups. The paper also investigate and analyze how IoT platform has changes the educational business model and added new values to it.

The paper [9] describes how IoT are promoting changes in higher education, such as education and teaching, learning, management changes, experiment and training changes, school changes and so on. It states that IoT care causing higher education revolution.The paper [10] describes how high level architecture of Internet of Things in clubbed with two other emerging technologies, Cloud Computing and Big Data Analytics. The paper also discusses various challenges associated with IoT and the applications of it in day to day life in the context of an educational system. In the paper [11] authors have discussed about how academic learning can be made reachable and motivating for the students using ICT and IoT, besides introducing them, it also discusses about smart learning. It also explains how ICT and IoT promises a wide range of applications and devices for learning environment, connected devices and making them smart and self-controllable.

### III Proposed Framework

The IoT can use in the field of education in the following areas:

#### **i. Connecting to outside world**

Interactive boards and digital highlighters are the IoT related devices which can be used to connect all the world wide learners. These boards can help learners to understand the specific topic. It will also accelerate and simply the learning process, how to receive knowledge and also help learners to reciprocate it. These IoT devices also help to learners to even study the concepts on their smartphones. The use of these IoT devices will enable learners to interact with teachers, mentors and outside world just by sitting in the classroom.

#### **ii. Learning Process**

Learning process can be enhanced by the use of IoT devices. It also helps the special students in their learning. For example we can give IoT based cards which will enlarge the font size and will help students who have eye defect. In such situations, students don't need to call teachers for every difficulty. IoT based devices can access and evaluate QR code. Now days many online books has QR code and if students wants to access it, they need to scan QR code. With the help of IoT students will be able to scan QR codes of books and can access many online books.Students will learn faster using IoT.

#### **iii. Teaching Process**

IoT will help teachers to teach efficiently. It will help teachers in designing curriculum, teaching process, grading papers, and efficient communication with the parents etc. With the help of digital contents sharing of the data will be easier with the students and outside world. It will also help in collaboration with other educational institutes. Teachers will be also understand the facial expression of the students and accordingly will able to give focus on poor students. Online material is easily available to the students as well as teachers. IoT promotes the creativity. The efficient way of teaching will turn the learners into creator.

#### **iv. Administration**

IoT will also help educational system administrator in number of ways. With the aid of IoT, a various options are possible in term of environment and energy conservations. With the help of online learning and teaching process, paper work is reduce and in-turn it will save cost. IoT devices also monitor energy usage. With the help of this monitoring, administrator can keep an eye on energy wastage and will be able to take precautionary actions to save it. IoT sensors can

also track the movement of students and teachers and will be able to take disciplinary actions accordingly. It is also possible to take online feedback of students with the help of sensors devices and mark students and teachers attendance.

#### v. Safety and Security

The safety and security of the students is very important whether you are parent or educational authority, security officer or citizen. With the help of IoT based devices such as sensors, RFID, cameras, monitoring devices etc., it is possible to track student's location. These devices also provide alerts, real-time notifications, and configured actions which will significantly help in security and safety of students. We can also configured alarms based on real-time traffic which will help school bus driver to avoid traffic time.

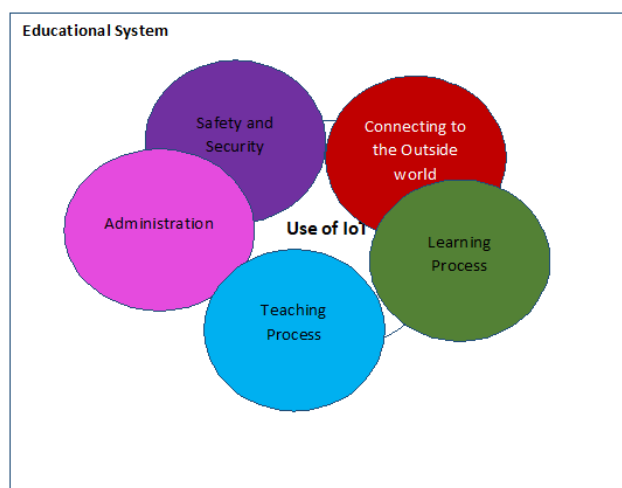


Figure 1: Generalized Educational Model based on IoT

#### IV Conclusion and Future Work

IoT can be used in various fields of our day-to-day life. It is the new way of connectivity which is going beyond laptops and smartphones. IoT, if applied in education system, is going to give lots of benefits to the all involved in the system. It gives us real-time, dynamic approach to solve the problem and way look towards the world. IoT can be used in teaching and learning process, administrative work, connecting to the outside world and safety and security purpose.

In the future work we can implement IoT in educational system as well as try to connect all these system together to enhance the educational system. To implement it we require various technologies, platform and languages such as

Arduino like platform, python or c and C++ languages etc.

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