# REVIEW AND ANALYSIS ON TOWARDS EMOTION ARTIFICIAL AND MACHINE LEARNING APPLICATIONS TO NEXT GENERATION HEALTHCARE AND EDUCATION

**1 Mounika Nalluri, 2 Aruna Sri Rongali, 3 Chinna babu Mupparaju, 4 Govind Prasad Buddha**
1 Senior Software Engineer, Information Technology(Masters in Computer Information Systems), Murray State University, USA, mounikanalluri89@gmail.com
2 Senior Software engineer, Graduate Doctoral Information Technology/Graduate (Information Technology Emphasis/Information Technology, Ph.D.), University of the Cumberlands, St.Louis, MO, arongali34683@ucumberlands.edu
3 Software Engineer, Information Technology(Masters in Computer Science), University of Central Missouri, USA, chinnababumupparaju@gmail.com
4 PHD Scholor, Liutebm University, govindbprasad1@gmail.com.

**ABSTRACT**
In order to interact socially appropriately, humans rely on our capacity to accurately infer the intentions and emotions of other people. Conversely, a human-machine collaboration environment is born out of AIEd, or the use of AI in education. This, in turn, modifies the manner in which individuals interact with one another and may have an effect on them. This research was conducted with the intention of determining whether or not being exposed to AIEd had an impact on the emotional perception of adolescents. It is becoming increasingly plausible that artificial intelligence (AI) will be included into clinical treatment on a daily basis in the not too distant future. This is due to the growing body of evidence demonstrating AI's ability to enhance several facets of healthcare delivery. As a result of this potential, governmental bodies and technical firms are placing a greater emphasis on and expanding their investments in artificial intelligence medical applications. Concern, on the other hand, has been voiced over the ethical and regulatory implications of implementing AI in the medical field. Furthermore, AI could be biased, some algorithms aren't very open about their inner workings, data used to train AI models could be private, and there are safety and liability problems with using AI in healthcare settings. All of these difficulties are related to artificial intelligence. While much has been said about the ethical considerations of AI in healthcare, very little has been said on how to really address these issues in the industry. This article's goals are twofold: first, to foster additional conversation about how to regulate AI in healthcare by outlining a governance model that attempts to handle the ethical and regulatory challenges that emerge from implementing AI in healthcare.

## 1. INTRODUCTION

A recent breakthrough in the realm of educational innovation and development is the implementation of artificial intelligence technology in educational settings, often known as AIEd. The sector of education is currently making major use of artificial intelligence (AI), which is currently being deployed in substantial amounts. Massive online instruction has become an important litmus test for the efficacy of artificial intelligence in the realm of education in the wake of the 2020 COVID-19 pandemic. Considering 2020 is quickly approaching, this is more important than ever. Despite a lack of information, the potential implications of AIEd are little known, especially in reference to the intellectual and physical growth of educated people. (R. Manikyam. 2019) Specifically, the research conducted by Chiang et al. in the year 2020 indicates that adolescents are the primary recipients of AIEd. It's possible that this is due to the fact that adolescents are in a crucial stage in their lives, during which they are very susceptible to the influence of their surroundings.

Research into the possible consequences of AIEd must be prioritized in order to minimize the likelihood of negative outcomes. (Ramya Manikyam 2016) A major concern in the area of AIEd for a long time has been the lack of research on emotions and the factors that influence them (Chen and Zhang, 2019). Conversely, there has been scant empirical research on the topic, and most of what is available is theoretical work that has examined the effects of AIEd on teenagers. Considering this, it is crucial to closely monitor how AIEd impacts the emotional and physical well-being of teenagers.

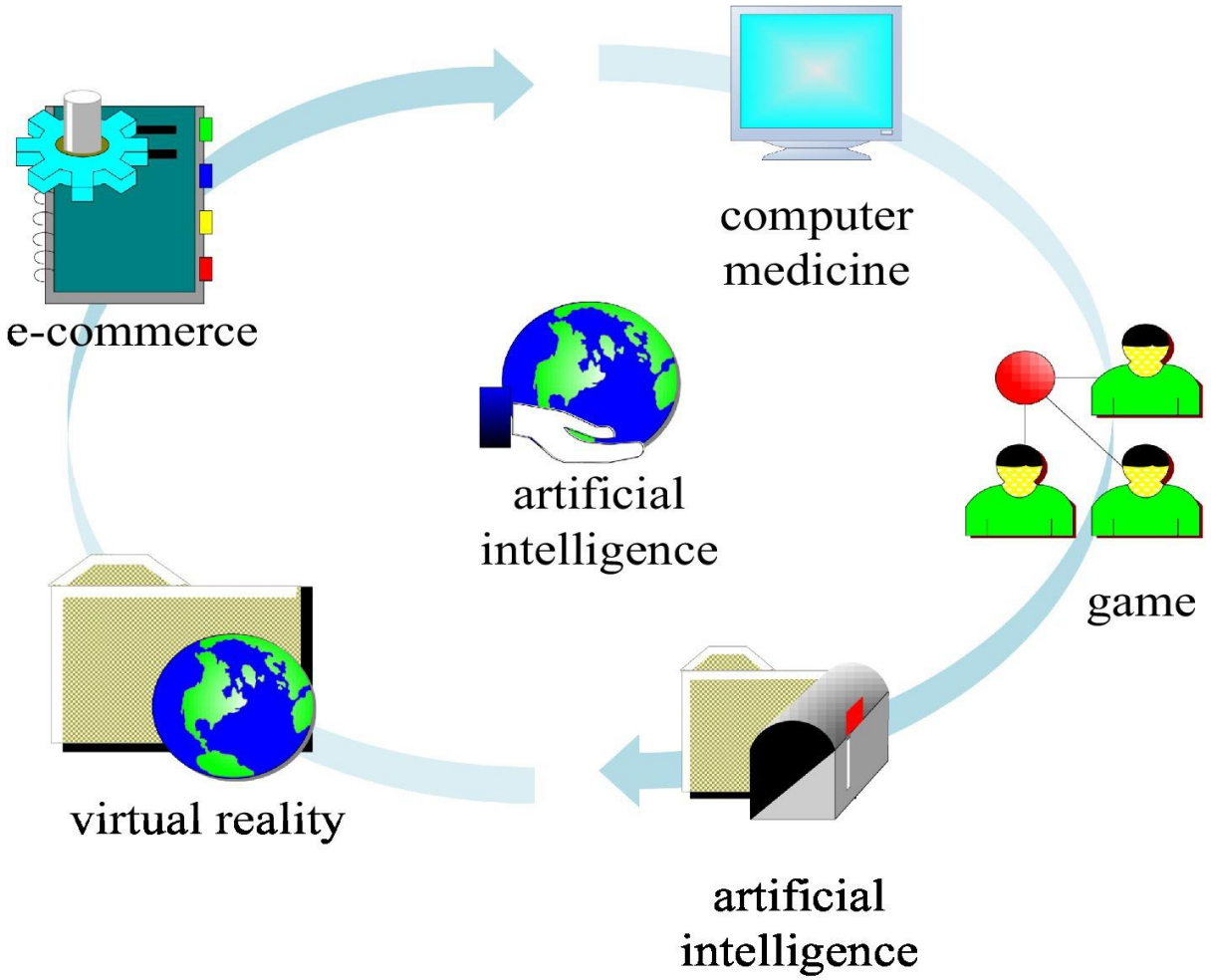


FIGURE 1. Artificial intelligence applications and their respective fields.

Artificial intelligence (AI) is regarded as one of the three most advanced technologies in the 21st century. This cutting-edge field is thought to be one of the three most revolutionary technologies, and it lies at the crossroads of the social and scientific sciences. It is an extremely significant topic in computer science, say Liang et al. (2021). Multiple AI-enabled computer systems have been developed in recent years across the globe. The primary objective in developing these computer systems was to facilitate the control of spaceships and undersea robotics. A lot of people utilize programs that teach computers to reason and think for themselves. By doing so, one can achieve the degree of human genius that allows them to adapt to their surroundings, learn on their own, and make cognitively-based decisions without human intervention. This encompasses the capacity for autonomous learning. A variety of artificial intelligence systems have been gradually built, and the degree of intelligence of people from all walks of life in China has continued to develop, thanks to the rapid expansion of the domestic economy and the progressive implementation of the informatization plan. This is due to the fact that China has been steadily implementing the informatization strategy. Artificial intelligence systems have reportedly made their way into every sector of society as well as every aspect of people's lives, as stated by Zl et al. (2021). Systems that fit this description include online marketplaces, medical and mechanical engineering software, video games, and virtual simulation programs. A field that is associated with artificial intelligence is depicted in Figure 1.

## 2. APPLICATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGY IN EDUCATION

Over the past few years, the application of artificial intelligence technology in educational settings, commonly referred to as AIEd, has been a subject that has garnered a substantial amount of interest. This category encompasses all of these other forms of education, such as machine learning, e-learning, Massive Open Online Courses (MOOCs), and other programs that are comparable to these. It has been suggested by Wu et al. (2017) that artificial intelligence education (AIEd) might be understood as the process of integrating artificial intelligence (AI) technology into the educational process. There are a number of key technologies that are based on artificial intelligence that are progressively being implemented in educational settings in the present day. Machine learning, knowledge mapping, and natural language processing are a few examples of the technologies that fall under this category. There are five common applications of AIEd, and they are as follows: an intelligent education

environment, intelligent learning process support, intelligent educational evaluation, intelligent teacher assistance, and intelligent educational management and services. Each of these applications is described in more detail below. In general, there are five distinct ways that AIEd can be utilized in the majority of various scenarios. The year 2021 will see Lu and his colleagues.

As used in this study, "AIEd" refers to the extensive use of AI in classrooms. This suggests that new technology can be used to expand teaching time-space environments, improve teaching administration, and enhance teaching services, in addition to improving teaching techniques and learning efficiency. Virtual reality (VR) instructors, online educators, flat panel instructors, and many more names can be used to describe these people. Research conducted thus far indicates that three primary forms of alternative and integrated education (AIEd) are now being implemented at Guangzhou's Artificial Intelligence Curriculum Reform Experimental Schools. Programs in information technology, general technology, intelligent reading, flat panel instruction, and similar ones are among these. Another factor is the curriculum that is being taught. You also have the choice to enroll in classes that are of interest to you, such as classes on programming, classes on building robots, and so on. This is the second option. The third category is comprised of elements that are associated with mass organization. Some examples of these elements include instructional boxes, 3D printing, and Leo plug-ins.

## 3. IMPACT OF THE APPLICATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGY IN EDUCATION ON INDIVIDUAL

Artificial intelligence (AI) technology has been shown in previous research to have many positive effects on human growth and development. According to Ali et al.'s research from 2020, researchers found that children who participated in activities using robots had a high level of inventiveness. In addition, the utilization of wearable machines has the potential to enhance the capacity of teenagers who are diagnosed with autism spectrum disorder to communicate their thoughts and feelings.

On the other hand, a number of studies have shown that the utilization of technology that makes use of artificial intelligence is potentially harmful to the growth and development of persons. One example is that the use of intelligent electronic gadgets on a regular basis has a detrimental effect on the interpersonal connections and social adaptation of adolescents. Additionally, according to Thibault et al. (2019), elderly people who are cared for by robot partners experience increased feelings of loneliness and emotional indifference.

Artificial intelligence education (AIEd) is a method of incorporating AI into classroom instruction that relies on online tools to facilitate student-teacher and teacher-student collaboration. Various technological or intelligent devices serve as the intermediate between students and professors in this environment. As a result, the social contact that takes place between the two groups is transformed from "two-dimensional" to "three-dimensional." They see more opportunities than risks presented by AIEd because it outperforms traditional learning tools and environments and has a positive impact on students' academic achievement and performance (Hwang et al., 2020). Students' academic performance and accomplishments are positively impacted by AIEd.This is because AIEd is more effective than traditional learning environments and tools. For instance, it has been discovered that teaching students using virtual reality (VR), which is a kind of education that is based on artificial intelligence technology, has a good impact on greatly boosting students' performance (Li et al., 2019).

On the other side, the implementation of AIEd, which brought about a change in the manner in which individuals interact with one another in the field of education, may potentially have a negative impact. Reason being, it has the potential to destroy interpersonal bonds and lead to social interactional isolation (Li & Wang, 2018). It can also diminish the sensation of social presence between educated and instructors. Research has shown that 82% of the information conveyed in the classroom is done so through nonverbal communication, which includes nonverbal interpersonal actions like smiling, approaching students, making eye contact and communicating, speaking at a regular rhythm, and maintaining a positive posture. These are the foundational elements of effective teaching. When pupils are exposed to a greater number of nonverbal intimate behaviors, the impact on their emotional learning is enhanced. The nonverbal intimate behaviors that occur between teachers and students are diminished as a result of the implementation of AIEd, which in turn leads to a diminished sense of social presence and interpersonal engagement.

There are a lot of researchers who are of the opinion that the development of AIEd is a feasible. For instance, students may have felt more immersed in the VR classroom, which increased their sense of presence, but this could have the unintended consequence of decreasing their opportunity for face-to-face communication. Concerns about data leaking could arise as a result of using intelligent technology to gather information about students' learning (Potgieter, 2020). This is because pupils' mental health might be affected when they are "labeled" as having learning disabilities or problem students. This is because students may be assigned a label that will influence their psychology. A number of scholars are even concerned that the bias of those responsible for designing and implementing AIEd could cause it to diverge from its intended aim of education and become a cause of significant educational risk.

Researchers in the field of computer science have, in more recent times, contemplated the possibility of detecting emotional states in e-learning systems through the use of a variety of techniques, including voice and facial recognition. For instance, Megahed and Mohammed (2020) utilized two intelligent systems, which are referred to as hybrid intelligent systems. An technique, which they called a loosely linked integration between a convolutional neural network (CNN) and a fuzzy system, was proposed by them. The CNN was developed to identify the facial expressions of a learner, and it performed better than previous CNN models when tested against the same training benchmark. With the help of the fuzzy system, the next learning level was determined by taking into account the facial expression states that were retrieved from the CNN as well as many response elements provided by the learner.

## 4. MAJOR KEY AREAS OF ARTIFICIAL INTELLIGENCE TECHNOLOGY

However, artificial intelligence will in certain ways experience a large breakthrough. The examination of artificial intelligence in its totality has only recently begun, and we are still a long way from attaining our goal. Despite this, artificial intelligence will experience a substantial breakthrough.

There are a variety of fields that make use of machine learning technology. This category includes a wide variety of technological domains, such as statistics, algorithmic complexity theory, convex analysis, probability theory, and approximation theory. In the year 2020, Zhu and colleagues have provided a description of a technology that is interdisciplinary in nature. The essential way for computers to have intelligence and the foundation of the technology that underpins artificial intelligence is the reorganization of existing knowledge structures, which continues to improve performance. This is the foundation of the technology that enables artificial intelligence. Nevertheless, people continue to have hope that artificial intelligence will continue to grow down this route as a consequence of the joint efforts of numerous scientists. This is the case despite the fact that some of the reinforcement learning algorithms that are currently accessible are not very useful.

According to Jain and Mahanti (2020), natural language processing is a promising area of research in the realm of computer science and artificial intelligence. The natural language processing of computers is a subject that is currently being actively researched by researchers and scientific research institutions in a number of different nations. Numerous hypotheses and applications, like Apple's Siri, have emerged from this field of study because to the scientific community's dedication. The two fields of study, natural language processing and the study of language generally, are distinct. One is not the same as the other. Computer systems, and software systems in particular, that can effectively actualize communication in natural language are the result of natural language processing. "Naturally occurring language processing" describes this. Following the realization of natural language by artificial intelligence, it will go through additional development in detail, which will result in a significant improvement when it comes to the "intelligence" of artificial intelligence.

### 4.1 IoT Technology

1999 was the year that the Internet of Things (IoT) idea was first presented (Bui et al., 2017). Put simply, the Internet of Things is made possible by the use of a variety of devices that transmit information, including GPS, infrared sensors, laser scanners, and radio frequency identification technologies. The internet of things refers to objects that can be connected to one another through the use of a particular network protocol. Its primary function is to facilitate the flow of information and the establishment of communication networks for the purpose of intelligent identification, location, tracking, monitoring, and organizational management.

Assuming that it is based on the technology that is available through the Internet of Things, medical equipment has the ability to evolve in a manner that is both intelligent and imaginative. In comparison to traditional medical devices, intelligent medical equipment possesses a variety of characteristics that are considered to be very intelligent. Among the characteristics that come under this umbrella are the following: the capacity to process data, recognize information in real-time, and make decisions about actions. Modern intelligent products, when coupled with technology that is linked to the Internet of Things, are expected to offer enhanced services for human health in the future when medical equipment is no longer dependent on conventional methods of diagnosis and treatment.

Figure 2 shows that the Internet of Things has also contributed significantly to advancements and uses in contemporary healthcare, security, logistics, and retail supply chain management.These are all areas that have been affected by the Internet of Things. This is accomplished through the implementation of cutting-edge technological applications with the goal of elevating the level of living across the board. Internet of Things (IoT) in healthcare has, especially in the last several years, created a solid and efficient industrial platform where the general public may focus on health issues. This has resulted in the medical system getting more perfect, which is a direct result of the medical system becoming more perfect. In addition to administering treatments for diseases, it also provides services in the field of medicine that are of an exceptionally high standard.

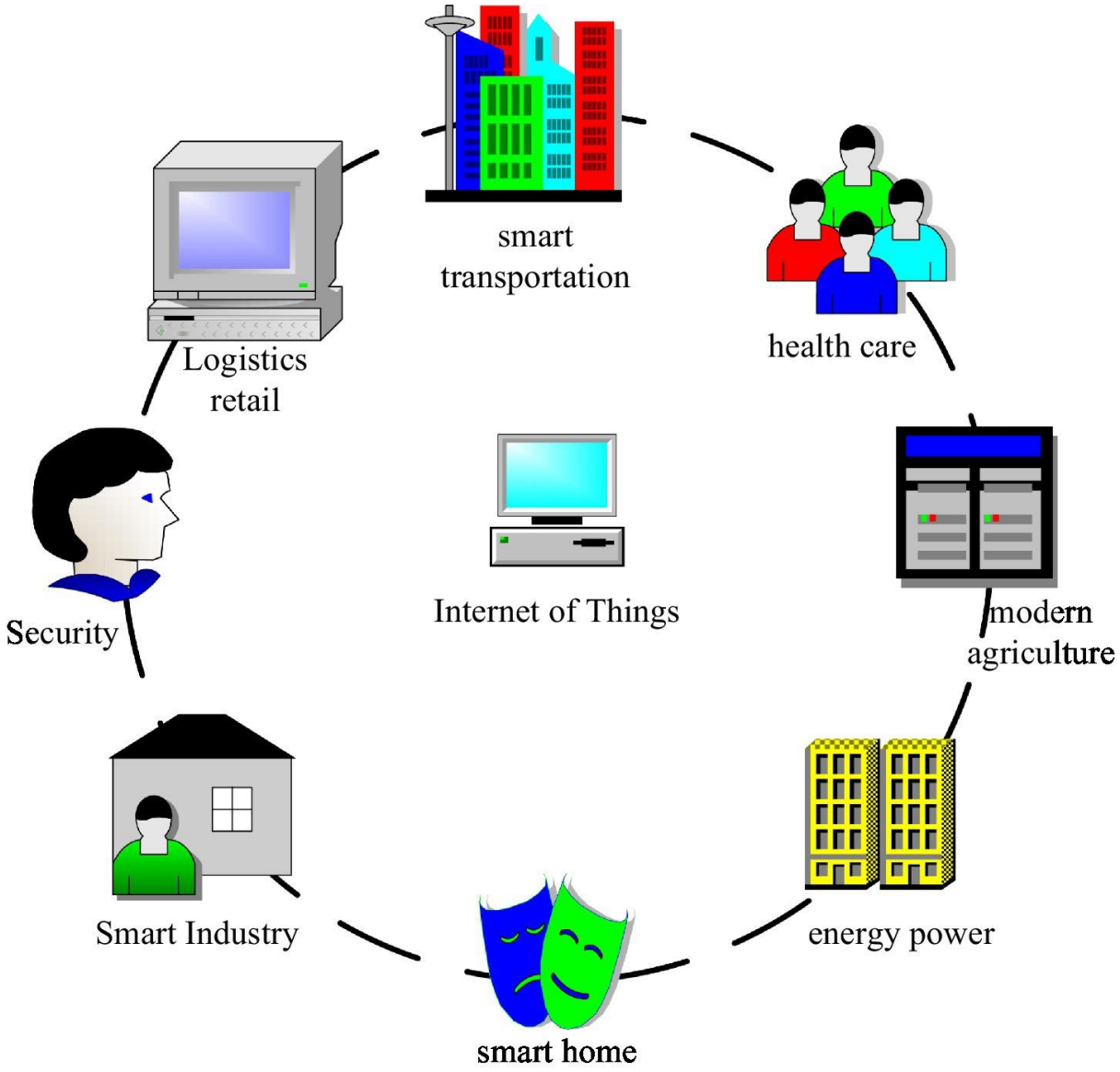


FIGURE 2. IoT application areas.

**4.2 ZigBee Technology**

According to Wu et al. (2017), the honeybee is the origin of ZigBee, and the action principle of ZigBee is comparable to that of the honeybee. It is necessary for a bee to transmit its location to other bees by shouting out to them and utilizing its own body movement to relay information when it spots another bee. This is the same method that is utilized by ZigBee technology in order to transmit this information. After the terminal node has completed the process of signal collection, it will then communicate its own node address to the coordinator or router. After that, it will spread that address to the other terminal nodes in the network. ZigBee is capable of functioning on all three of the operational frequency bands that it includes, and it offers three frequency bands that are operational. 2.4 GHz is the frequency band that is utilized all over the world, while 868 MHz is the frequency band that is utilized in Europe, and 915 MHz is the frequency band that is utilized in the United States. It is the most noticeable feature of this technology that it consumes very little power, and ZigBee has a transmission distance that can range anywhere from ten to seventy-five meters. ZigBee has seen widespread adoption as a consequence of the numerous benefits made available by the system. These benefits include an extension of the power exchange time, an enhancement of the system's stability, and the preservation of both human and financial resources.

In addition to being extremely dependable, the ZigBee technology is a wireless communication technology that requires only a small amount of power to be output. The ZigBee technology's architecture is comprised of four levels: three levels of abstraction: the physical (PHY), media access control (MAC), network/security, and application framework. Every one of these levels is in charge of a specific part of the technology. Figure 3 depicts the distribution, so you can see how the layers are distributed.

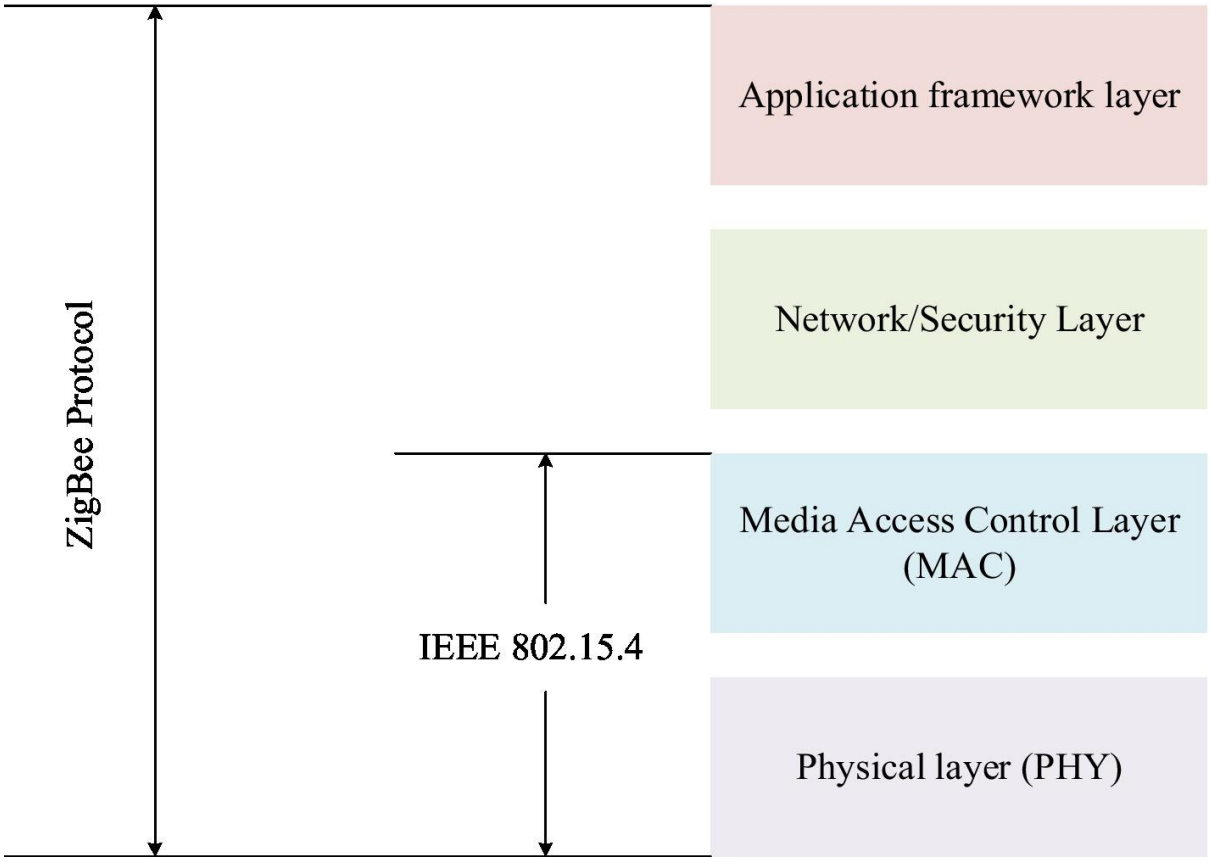


FIGURE 3. A schematic of the ZigBee architecture.

**4.3 Physical Layer**

Interfacing between the media access control (MAC) layer and the physical wireless channel, the physical layer is connected to both. This is accomplished through the utilization of RF software and RF hardware. Furthermore, it is accountable for delivering interface services across the entirety of the network. Data service access points and management entity access points make up the physical layer. These two parts serve as hubs for access. Both parts are accountable for providing data services and management services at the physical layer. Management commands can be sent between the MME and the PLME using the physical layer's management service. Yet, two peer MAC layer entities are able to send MAC protocol data units thanks to the physical layer's data service. Both of these services are provided by the physical layer infrastructure.

**4.4 Media Intervention Control Layer**

Each and every wireless communication that takes place at the physical layer is managed by this sublayer, which is responsible for such management. A number of functions are the responsibility of the Media Access Control (MAC) sublayer. Among these tasks are making sure all devices and nodes in the network are in sync with the coordinator-generated beacons, connecting and disconnecting LANs, using the operator multi-access mechanism, avoiding device and node conflicts, and establishing trustworthy communication links between peer entities.

**4.5 Network/Security Layer**

The media intervention layer is responsible for ensuring that the network layer is operating normally, and the network layer is also responsible for providing interface services to the application layer. Some examples of functional entities located at the network layer include the data service entity and the management service entity. The data service entity is mainly in charge of the access point's data transmission service, whereas the management service entity is mainly in charge of the network administration service. The access point is responsible for delivering both of these functions.

**4.6 Application Frame Layer**

There are three parts that make up the application layer: the ASP sublayer, the ZDO device object, and the application object. Any one of these three parts can be considered an application layer. An ASP data entity and an ASP management entity make up the ASP sublayer. One of these components is the ASP data entity.

A ZigBee node mainly consists of the following modules: perception, data processing, wireless communication, and power supply. Other examples of these modules include the power supply module. Figure 4 provides a graphical representation of the hardware model diagram that is associated with the ZigBee module.

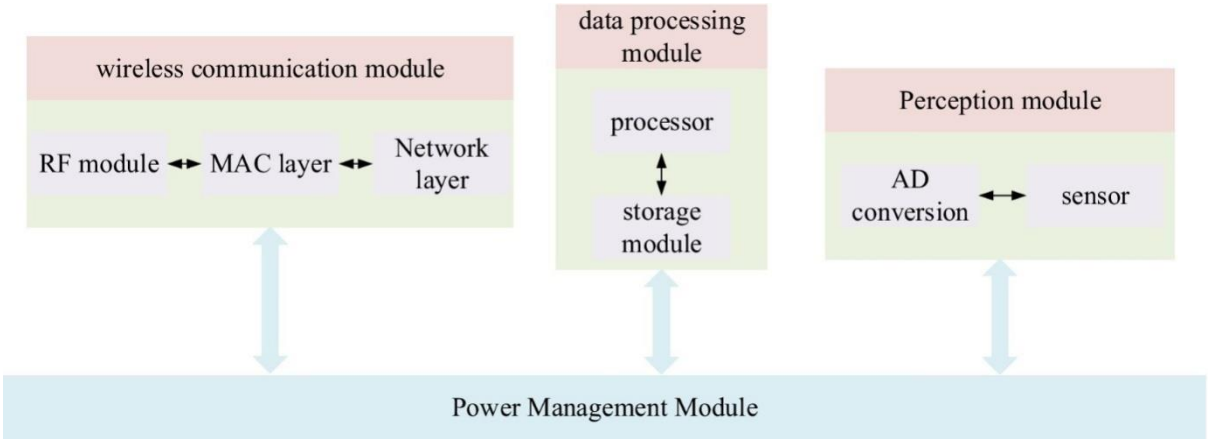


FIGURE 4. The ZigBee node's hardware block diagram.

According to the diagram that can be found above, the perception module is comprised of two different components: modules for sensors and analog-to-digital conversion. The figure shows these two modules. Once environmental data acquisition is complete, the sensor module is responsible for communicating the data in an analog amount. After the analog amount is acquired, it is transformed into a digital quantity that the system can effectively recognize by the AD conversion module. At long last, the performance of the data processing operation is brought to a successful finish by the data processing module.

## CONCLUSIONS AND FUTURE WORK

This research is being done with the intention of disclosing the findings of a systematic review study that was carried out in order to analyze the existing literature that is linked with the utilization of AI-based technologies in digital education. The most significant contribution that this study made was to identify the subjects and concepts that are centered on artificial intelligence (AI), as well as the models that are most typically utilized in digital education that are based on machine learning or deep learning. In addition, another key contribution is to carefully adhere to the rules for systematic revision in order to methodically investigate the existing body of literature through the application of thematic analysis. The majority of the research that were found in this study were experimental, which is an interesting fact to take into consideration. The researchers may be interested in evaluating the outcomes of various algorithms that make use of digital education data, such as student dropout or performance prediction. This could be one of the reasons why they are conducting this activity. In addition, the data from the yearly publication about machine learning or deep learning in relation to digital education reveals that there has been an increase in interest in the field of research beginning in the year 2018. Researchers have been investigating the ways in which machine learning and deep learning can be utilized across all different kinds of different fields. Furthermore, the exploitation of machine learning and deep learning in the field of digital education is recognized as a developing pattern in this research. This information is derived from the findings of the research. This study also investigates the creation of a public service system for family health education that is based on artificial intelligence. This is another topic that is studied in this study. Consequently, the properties of artificial intelligence as well as the technologies that are associated with it are the primary emphasis of this research. Additionally, the ZigBee and RFID technologies, which are both components of the Internet of Things, are combined to create an AI-powered public service system for family health education. Finally, this work describes a system that securely functions by encrypting the data key, which ensures data security. In order to administer a survey regarding students' family education, this article lays out the groundwork for the database design and major body analytic experiment in the field of family education advice. To administer the survey is the main objective of this piece. Immediately after the completion of the questionnaire, the results of the questionnaire are analyzed in order to determine the focus of this paper through the process of analysis.

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