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Internet of Things & Artificial Intelligence in Modern Society

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Abstract

The world today is mainly being controlled by technology. Technological evolution has taken place over the last couple of decades. New ways of doing things have been invented, making work more comfortable and improving things' efficiency. It is in recent years that Artificial Intelligence and the Internet of Things technologies have emerged. These technologies have affected the way business is being done, the way the previous tasks that relied on humans are being done through technological devices. Tasks are being done more efficiently using these devices, reducing the human errors that were an issue when these technologies were not there.

Artificial Intelligence and IoT technologies are making previously difficult tasks to do much more manageable and doable—for instance, controlling traffic and knowing whether a patient has taken medicine while at home. It was not easy to reduce traffic jams, but it is not easier to minimize traffic with sensors that sense road conditions. Doctors in their working space cannot tell whether a patient has taken medicine or not. But with sensors, IoT, doctors or caregivers can now tell when a patient needs medical help or when they have not taken prescriptions. Just a device sensing the body changes and sending signals is what has made all these possible.

Cities are now inventing ways of reducing the work done while at the same time increasing the efficiency and quality of the job done. Artificial Intelligence and the Internet of Things have eased performance in the health industry, transportation industry, and farming industry. To add to this, Wearable devices, which are computer devices that humans can wear, for example, a wrist watchable to sense and send signals, are being used to enable the Internet of Things. The following information majors on Artificial Intelligence and Internet of Things technologies. The discussion looks at how they have improved lives in modern society and how these technologies can help America.

Keywords: Artificial Intelligence, IoT, Security

Introduction

Artificial intelligence involves computer devices learning human ways and trying to function as humans. These computer devices go through a series of processes to attain a level where they serve as humans. They are taught, learning process, reasoning, making inferences from data, and coming up with solutions. Artificial intelligence involves devices being subjected or introduced to specific data and being shown what the data means. They are given new data to determine what the information means based on the preference of developing the Artificially Intelligent device. Artificial Intelligence is being used in many fields (Bughin, Hazan, Ramaswamy, Chui, Allas, Dahlstrom, & Trench, 2017).

An example of commonly used artificial intelligence technology is biometric recognition. People are now using parts of the body that are unique for everyone, such as the eye retina, cornea, and fingerprints. The artificially intelligent device takes in the biometric data, and when they learn the specific data, they use it to base their responses when subjected to similar data. They can tell whether it is the original data that was used or it is new data. Artificial Intelligence is being used to secure data, performing tasks that cannot be done by humans like in space exploration, in agriculture, healthcare, by the government, banking and finance, and gaming, among others.

Internet of Things involves connecting objects that are used daily to the internet. These devices are made with sensors which assess the surrounding and under certain conditions send signals to another device no matter how far apart the machines are. However, some devices have limited signal detection, for example, Internet of Things devices that rely on Bluetooth signals. For instance, walkie-talkies might go for a specific distance before disconnecting. Internet of Things had come to perform functions that required a lot of human effort before the technology came—for instance, detecting when a chronic patient is in danger or detecting a disease like cancer before cancer grows. It is now possible to notice certain things before they happen.

The Internet of Things is mainly based on sensors where sensors are specified to sense certain things like motion or change in temperature. Once they detect the specifications, they send signals to computer devices where the action is then taken based on the message. For instance, a doctor can see when a patient is in danger. When a patient is wearing a wearable device that can determine pressure or heart rate, a doctor can know when a patient has a heart attack, and they can check on the patient and treat them if necessary. Before the Internet of Things technology, such problems were detected when the patient had an attack.

Literature Review

2016: the year AI came of age by Alex Hern

Artificial Intelligence was merely a talk of what it is supposed to look like or how it will do things. But during this particular year, things changed. The concept of AI was brought to life at an alarming speed where artificially intelligent devices came to life. People began grasping the concept through real-life situations where AI was being used. However, this does not mean that this was the year that AI started. In 2011, Apple introduced Siri, a virtual assistant, which was the first time this was introduced to the world. The technology is based on artificial neural networks learning to come up with inferences and solutions to problems. As Alex says in his article, AI technology is not stopping, but it will keep progressing with new developments and inventions.

From the article, Alex shows how Google and Apple have advanced AI technology through image recognition. He looks at the fact that machine vision technology is the basis of artificial intelligence, which gave birth to self-driving cars and the ancient Go board game. 2014 became the year where artificial intelligence mimicked human players in the Go board game. Being a success, this game acted as a motivating factor for the London research lab. Google also started advancing the technology through translation services. Through neural-based learning, Google has made efforts to enable speech synthesis. Also, Google made the smart home device which is AI-powered which was the beginning of most AI voice technologies.

As the years' progress, more companies will be embracing this technology, which will require more data to ensure that the algorithms made give the best outcomes. However, this technology is beneficial to some fields, while in some, the possibility of it being used is almost null. Alex's article focuses on how Artificial Intelligence technology will be heading in the future. As Alex states in his article, the technology is likely to keep its upward advancements with more fields joining the world of artificial intelligence technology.

The Internet of Things: Are you ready for what's coming? By Ted Saarikko, Ulrika H. Westergren, Tomas Blomquist

With the introduction of IoT, the technology took some time before coming to reality. After the technology took off, different objects have been connected to the internet where they have completed the Internet of Things connections to the internet. The advancement of this technology has been rampant, and as a result, the wireless infrastructure has significantly grown. Improvements on network types have improved due to the ability to create interfaces between middleware which have enabled accommodation of standards, seamless connectivity, and formats. This article focuses on the journey that the internet of things technology is making over the next couple of years and how it has been in the previous years.

Internet of things involves the connection of sensors to objects, or things and these sensors are connected to other computer devices where they can send signals based on how they have been programmed (Wu, Lu, Ling, Sun, & Du, 2010). It is no surprise that this technology can have every object connected to the internet. As the article argues, if a whole city can connect to the internet through different things connecting to the internet, how hard will it be for other day-to-day objects to be connected to the internet? The connection of numerous objects to the internet is possible.

Internet of things is helping in the digitization of business models. Products manufactured in businesses can be supplemented with sensors. These sensors can then be used to make communications on different conditions and the environment where these products are. This has helped these products, for instance, cars with sensors and make alerts in times of danger, to gain a competitive advantage over other similar products. For instance, people will opt for the products with the sensors compared to those that don't because they are much safer. Therefore, the incorporation of sensors in the products is helping in the digitization of business models.

According to the article, the internet of things is creating value for products that attract more customers. Products lose value with time, for instance, as a result of wear and tear. With time, these products lose value, and customer interest in the products reduces with time. However, for a market to improve the value of products, they are using the new technology, the internet of things, to ensure that they have attracted many people to the products. Adding motion sensors, for instance, in street lights, has attracted several customers. For security light and conservation of energy, people don't have to keep the lights outside, but when motion sensors detect movement, they light up during the night. These products have gained preference since they are economical as well as helpful. They are results of value creation to the street lights that were used before.

The Internet of things comes with several other services, such as business digitization, value creation of products, and service orientation. These have taken the central position in the internet of things technology. However, for one to have a successful internet of things technology in their businesses, they have to keep in mind a few things related to the internet of things in business application. Although applying IoT in businesses might be a significant success, it can also be a fail if care is not taken. One has to understand the best models to use and the best way to use the technology. For example, one has to decide on whether to automate or information.

As technology is advancing, big data issues have arisen, which has necessitated the need for data analysis techniques that are accurate and fast enough to go through the numerous data. Therefore, the internet of things can be used with artificial intelligence to create more and better systems that make work easier in a different field where these technologies can be applied. The article concludes with the fact that the internet of things is here to help in a different field, but the right choices should be made to ensure the best models and strategies in businesses are used (Saarikko, Westergren, & Blomquist, 2017).

CONTENT

Internet of Things and how it has Changed Lives in the Modern Society

Internet of Things involves the connection of things to the internet and sensors that sense the environment and act accordingly. For instance, devices with sensors can sense a patient's blood pressure and know whether the patient is in danger, then send signals to a care provider notifying them that the patient is in danger. Internet of Things has changed lives in modern society through smart cities, smart agriculture, ensuring patient safety through wearable devices, fighting breast cancer, and reducing food wastage (Prathibha, Hongal,

& Jyothi, 2017). In some cases, cities have implemented Internet of Things technology in the whole cities where transportation is monitored through the Internet of Things. Monitoring of the traffic has ensured convenience and faster transportation systems (Wortmann & Flüchter, 2015).

Smart cities are cities that have incorporated IoT technology in daily city life. With most people moving to cities, serious implications such as sudden weather changes and climate changes as the rise in sea levels prove this. However, smart cities have been able to reduce this by ensuring that most activities use the information of things technology to perform daily tasks. For instance, IoT helps in monitoring traffic in these smart cities. This has significantly helped in reducing air pollution in the cities.

Also, smart cities have a feature that uses light sensors where when the sun is up, street lights switch off, and when the sun is down, the lights light up. This has helped in conserving energy and has improved efficiency in the lighting up of the cities. Automated street lights have reduced several risks that would lead to dark streets. For instance, there is no need to worry if the one in charge of lighting the street lights does not show up because the lights will automatically switch themselves on and off whether they are being monitored or not: unless they have a technical issue. Other smart city features are smart water treatment, digital bus routes, and smart parking motors (Perera, Zaslavsky, Christen, & Georgakopoulos, 2014).

Examples of smart cities include the following. Chicago is using Array of Things which acts as the city's fitness tracker. That is, the city has sensors that ensure that the city is notified on issues related to traffic and changes in weather. Las Vegas also uses sensors to keep track of air conditions and traffic flow in the city. They notify the population of the air condition and when the quality of air is low. This ensures that the population takes caution in preventing being affected by air pollution. Another city is Seoul in South Korea, where the whole city is a single network that uses sensors or, in other words, Internet of Things infrastructure to manage the whole city. IoT in this city ensures that the city experiences efficient transport systems and quality building infrastructure.

IoT has also helped improve public health by improving air and water cleanliness (Boulos & Al-Shorbaji, 2014). Water and air pollution have caused the death of people, which is quite sad. Cities like Delhi and Beijing have been victims. These two cities are fighting poor air and water cleanliness by using sensors that detect when air conditions and water conditions are dangerous. They then use this information to inform the residents of the dangers until conditions are back to normal. Another city that is using sensors to detect air condition in London. The city uses sensors on bicycles, and when the air conditions are poor, the sensors send signals giving notification about the condition.

Another example of IoT in modern society is through smart agriculture (Dlodlo & Kalezhi, 2015). In the agriculture sector, IoT is helping improve the quality of farm produce. Sensors are being used to detect environments that are suitable for the growth of certain crops. Also, sensors are being used to check the weather conditions at a particular time to determine the perfect time to transport perishable products. For instance, when certain perishable goods are being transported, the humidity levels should be high, while some require low humidity to extend the life shell. IoT ensures that there is the detection of the weather, and from the information, farmers can determine when to transport their farm produce. This has been an advantage since it has helped reduce losses in cases where produces have gone bad due to the weather.

Internet of things is also being used to fight breast cancer. Usually, breast cancer is detected when it has already grown to a certain stage. However, IoT has enabled a way where the possibility of cancer is detected early enough and time taking action. It is easy to detect whether a person from a family that has a breast cancer history is developing cancer in modern society. Through bras with sensors, a doctor can note temperature changes and other unusual changes in the person and take necessary actions.

Lastly, in modern society, IoT has helped improve patient safety (Bui & Zorzi, 2011). The use of wearable devices has helped in detecting patient conditions and taking actions where necessary. Wearable devices are devices with IoT technology, and they are worn in the human body, for example, a watch with IoT technology. In modern society, a doctor can detect when a patient has not taken medication by tracking a patient's progress. Detection of a patient's progress can be done using sensors that detect temperature, heart

rate, and blood pressure. When they reach a certain point, either low or high, signals are sent by the sensors to the caregiver or the doctor. From there, action can be taken on whether to call the patient in or inquire about a thing like if they have taken medication (Ashton, 2009).

Artificial Intelligence and how it has Changed Lives in the Modern Society

Artificial intelligence involves integrating information, learning patterns in the data, analyzing information, and using the learned patterns to come up with better solutions. These patterns have been used in several fields to ensure that the correct predictions are made. AI involves robotics, deep learning, and machine learning (Garcia, Jimenez, De Santos, & Armada, 2007). Artificial intelligence depends on learning data patterns, and when new data is introduced to the machines, they can be able to determine the patterns and make predictions (Reitman, 1984). AI has changed lives in modern society in the following ways.

Prediction of diseases in patients. In this category, a dataset of many patients is recorded, and patterns are identified. Then, the best method of classifying the diseases is made. For a patient's disease to be predicted, that data is fed to the system or machine. From the data that has previously been fed to the system, the system determines the possibility of disease in the new patient data. Based on the patient's health records or the patient's condition, the system can predict which disease a patient has. Predicting patient disease is how AI is increasing efficiency in the healthcare department (Russell & Norvig, 2002).

AI has changed society through automated household electronics like DVR, automated thermostats, and television recording devices. These devices can be set to record certain shows and make predictions on what a user might enjoy watching based on data that has been previously collected from the users watching patterns. In line with this is energy conservation. AI has been used to determine a user's energy use pattern or when the owner is not around. Then the system reduced the power consumption in the house, which has helped conserve energy and reduce bills.

AI has been used to improve and increase efficiency in the communication field. When a person makes a call, the voice signals have been recorded by the AI systems. Then the systems track the origin of the voice signals. This has helped understand where the person is coming from, which has enabled people in call centers to gather information about the person. This has helped increase efficiency by creating rapport between the caller in the communication center and the receiver. An example is when the police are tracking a person, and the person makes a call. The signals are detected, and once the system recognizes the voice, it becomes easier to trace the voice owner.

AI has been used in modern society to work in risky and dangerous places for humans to work. Although robots use cameras and sensors to perform their tasks, some environments put human health and safety in danger, making the robots working in these conditions better off compared to humans. For instance, in mines, people are at the risk of being buried by the earth or stones. In factories that use big machines, humans are at risk of being amputated or even killed. In tasks that require repetitive functions, humans working on these conditions might be subjected to muscle fatigue which is a case where robots are used; they are not subjected to fatigue.

Also, AI has come to ease tracking records in banking systems. Before AI technology came, it was difficult to determine whether a transaction has gone through fraud actions. With AI, it is easier to detect unusual activities or questionable activities and track the activities down. Besides this, the systems have been reducing banks' risks, that is, reduction of risks in the banking sector. It has also improved the marketing sector by making predictions (Siau & Yang, 2017).

How this Research is going to Help America

Based on the Internet of Things, this research is going to help with cases of pollution. As most people are living in the city, cases of air pollution, water pollution are frequent. As a result, air pollution has been an effect on the city people. Artificial Intelligence and the Internet of Things will reduce pollution and sudden weather and climate changes in America. Reducing traffic will help prevent pollution. Also, artificial intelligence and the internet of things will help increase public health since devices can sense and notify people when pollution levels are high, which will help the residents take caution (Bao & Chen, 2012).

In the health industry, these technologies will help America ensure that patients get quality services by increasing their safety (Bandyopadhyay & Sen, 2011). Their safety will be increased by ensuring that the caregivers or doctors are timely alerted when they are in danger or do not follow certain protocols. In turn, this will help reduce the number of sudden cases that go unnoticed. The internet of things will do for America is helping in the fight against breast cancer. The bras that have sensors can be used on people with breast cancer history in their family. The bras can help doctors identify signals that might be indicators of growing cancer. This will result in timely identification of growing cancer which can help in early treatment and prevention.

On the other hand, artificial intelligence will help solve problems that were not previously beyond human ability (Brunette, Flemmer, & Flemmer, 2009). For instance, AI can be used to predict certain disease types in a patient. This will help the American population since it will increase efficiency in the health care department. Prediction of patient diseases will be possible, which will encourage timely treatment or prevention of the disease. Also, this form of advancement will help in making recommendations on which doctor to see. For instance, when the system recognizes the disease, it can then recommend which doctor to see.

Another way AI will help the American population is through voice tracking. AI technology can be used to track voice signals. For instance, a lost person like a criminal can be tracked using their voice. Also, a lost person may happen to make a call, and the voice can be used to track the location where the signals are coming from and recognize the owner of the voice. Also, AI can help in making matches of a person and checking the person's data. For instance, a person might be caught on CCTV cameras, and the police might be interested in this person. They can use their database to run the picture, and the system can try to make matches until the person's information is found.

Another way that AI can help the American population is through robots doing difficult and risky jobs. Some jobs are risky for human health and safety. For instance, in large mines and some factories that use big machinery or dangerous gases, humans working in these conditions might be in great danger both in health matters and physically. Therefore, rather than sending humans to these dangerous places, robots can work in these harsh conditions. Although there are also risks involved, the robots are better working in these conditions rather than humans.

Another way this research can help in America is through banking systems where the AI systems can determine the people to loan and the ones not to loan (Bahrammirzaee, 2010). Based on customer details, the systems prioritize who to offer loans. Also, AI can monitor credit card transactions in cases where it is difficult for humans to keep track of the transactions and identify theft or fraud cases. In general, this research can help understand the concepts in the internet of things and artificial intelligence and how the two technologies can be applied in different fields to improve efficiency.

Conclusion

In general, as the years go by, technological advancements are being made with either introduction of new things or the enhancement of what already exists. Before the invention of artificial intelligence and the internet of things technologies, things were still done but not with the efficiency that these technologies have brought. With these technologies, it is possible to have more efficient cities, improved farming, efficiency and performance improvement in the health industry, transportation, and reduce climatic changes. It is easier to detect things on time and take necessary actions that were not easy before these technologies came to life.

These technologies have not only come to help with human activities but the environment as well (Schulte, P., & Liu, G. (2017).

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