

A Survey Paper on "AI and IoT works in Tandem"

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Abstract- Artificial intelligence (AI) and Internet of Things (IoT) are both useful and important to understand. These two important trends are working together to benefit researchers and the layman person alike. AI can control and potentially increase the functionality of IoT.

IOT connected devices often generate huge amount of data which are required to train machine learning models. Among the companies, IOT have more workflows already in production than AI. This is because IOT along with edge computing foundation are the previous requisites for industries to create a machine learning model in the first place.

This extraordinary harmonious relationship is generating hundreds of billions or trillions of dollars in value globally over the next five to 10 years. Thousands of well-developed usage scenarios have been delivering concrete improvements in productivity and efficiency for years.

In this paper, permanence is looked into how well Artificial Intelligence get along with Internet of Things.

Key Words: Artificial Intelligence, IOT, Analyze

I. INTRODUCTION

The Internet of Things deals with sensors embedded into different kinds of devices that provide streams of data via internet connectivity to one or more central locations. The purposes for transmitting sensor data is a great job, but the assumption is that data can then be analyzed and acted upon in some way that is beneficial to the user. In short, this means that all IOT-related services follow these five basic steps though they are so different in nature.

Firstly a hardware has to sense the data, transmit it and store it in a database. Secondly, data is analyzed and action is taken accordingly. So the required steps are:

- Sense
- Transmit
- Store
- Analyze
- Act

The essential set of hardware, software, and connectivity are usually small, cheap and efficient. These are used to perform the above steps and are now available widespread.

An IOT application is worth buying (or making) which can evaluate the measure in the last step of above sequence, the "Act". "Act" can be assumed as an infinite number of things, ranging from a profound physical action (e.g. deploying an ambulance to the site of an auto accident) to provide basic information to a relevant consumer (e.g. sending a text message to alert a driver that their car needs an oil change). But no matter what the ultimate step of "Act" actually is, it's worth is entirely dependent on the eventual analysis.

It is here, at the "Analyze" step, that the actual measure of any IOT service is determined, and this is where artificial intelligence (or the subset of AI called "Machine Learning") will play an important role.

Machine learning is a form of programming that enhances a software ability to detect patterns in the data presented to it and thus learn from these patterns in order to adjust the ways through which it can analyze the particular data.

When machine learning is applied to the "Analyze" step, it can adequately change what is (or is not) done at the next "Act" step, which in turn reveals whether the action has high, low, or no value to the consumer.

Artificial Intelligence (AI) is used for automation of creating reels and establishing analyzed AI algorithm.

Artificial Intelligence is a way of describing human's intelligence within machine. It is rather called machine intelligence which produce human-like intelligent agents to perform the tasks.

Gartner has evaluated that the business value created by AI will reach \$3.9T in 2022.

IDC estimates worldwide expenditure on cognitive and Artificial Intelligence systems will reach \$77.6B in 2022.

Similarly IoT has also captured mankind and drive them thinking towards the future concepts like IoT-driven households (e.g. smart homes), and many other industry-specific scenario.

IoT connections are calculated to have growth up to 140% that will hit 50 billion by 2022.

Therefore growth of both the technologies, IoT and Artificial Intelligence will influence the majority of the transactions, behaviors, and structures. These technologies will change the perspective of industry with an automated, intelligent, and efficient build up.

II. TECHNOLOGY CHALLENGES IN IOT

In spite of the fact that IoT has a future with the Internet, there are challenges to IoT since human has never deal with such a huge number devices as well as data as before. A few technology challenges are given below:

1. Device management:

The number of devices will be extremely huge and communication with each other and servers over large geographical areas is a big issue. These devices may not be all connected with each other and several data linking issues has to be managed efficiently. For example, a command is transmitted through the light in front of the door in order to open a front door remotely. All devices are ensured that they can be managed in elastic topology and the communication between them is conducted smoothly.

2. Device diversity and interoperability:

There are so many companies who have introduced their products and services in a single domain. Considering an example of smart grid, there are many kinds of sensors that measures the power consumptions from different sources of different standard. It is a big challenge to keep those devices work together.

3. Integration of data from various sources:

An IoT application can be categorized based on abundant relative data gathered from different sources such as sensors, contextual data, mobile device and social network information and many more. Data can generate huge values by building up connection between those applications.

4. Scale, data volume, and performance:

Organizations need to plan to manage the range, data size, and speed of IoT applications. It has to be a real-time function to handle and analyze the data generated by the IoT devices in use.

5. Flexibility and evolution of applications:

Sensors and devices are evolving with new capabilities and improved functions. This leads to creation of upcoming use

cases and latest business models. So there is a need to quickly develop products with minimal effort in certain structure to gear up the pace of techniques. There is sufficient need of ecosystems and platforms to support the users to maintain the evolution of applications.

So data is most valuable, when it can trigger an action. It means that data should be collected and analyzed immediately to maintain a continuous flow of information. Basically, it is one of the main process that leads the IoT revolution.

III. WHAT CAN AI (ARTIFICIAL INTELLIGENCE) DO?

AI, on the other hand, enable analytics and decision making process from the data collected by IoT. In other words, IoT collects the data and AI processes this data in order to make some sense out of it.

AI can support three important business needs: automation of business processes, gaining insight through data analysis, and engaging with customers and employees.

A. Process automation.

The most common type of automation of digital and physical tasks which includes back-office administrative and financial activities are commonly using robotic process automation technologies. Robotic Process Automation (RPA) is more advanced than any other business-process automation tools, because the “robots” act like a human inputting and consuming information from various data sources

RPA is the least expensive and easiest to implement the cognitive technologies and typically brings a quick and high return on investment. It is particularly well suited to work across several back-end systems.

B. Cognitive insight.

The second most common type of projects use algorithms to detect patterns in huge volumes of data and interpret their meaning. Artificial intelligence term it as “analytics on steroids.”

These machine-learning applications are used to provide Cognitive insights that differ from traditional analytics.

They are data-intensive and detailed i.e. the models are trained on a small portion of the data set, and they get better and better. It means that their ability to use new data to make predictions or put things into categories improves over time.

C. Cognitive engagement.

Projects that engage employees and customers are using natural language processing, chat bots, intelligent agents, and machine learning. These categories include several applications such as

- Intelligent agents offer 24/7 customer service addressing a broad and growing array of issues from password requests to technical support questions—included within customer's natural language;
- Internal sites for answering employee questions on topics including IT, employee benefits, and HR policy;
- Product and service recommendation systems for retailers that increase personalization, engagement, and sales and
- Health treatment recommendation systems that help providers to create customized care plans that take into account individual patients' health status and previous treatments.

So eventually customers are allowed to engage with the cognitive agent directly, rather than with the human customer-service agents.

Can AI-Enabled IoT Make Your Life Easier?

There are real-world problems and limitations that can lessen the power of AI or IoT. There are technical constraints, cultural obstacles, lack of proper implementation, unclear scopes of technologies, organizational barriers, the inability of machines to solve several problems, and other philosophical questions related to the model of these technologies.

IV. WHY ONLY IOT WON'T WORK?

The data volume and their complexity are growing eventually and Artificial Intelligence needs to play an important role in managing these volumes of data. AI potentially can boost IoT-driven initiatives because of its ability to pick insights from the huge amount of data.

AI provides recommendations, insights, predictions, and solution. AI can generate meaningful results by analyzing huge chunks of data in minutes. AI can also enable real-time processing and response when connected with IoT devices to decide future course-of-action

V. HOW CAN BUSINESSES LEVERAGE THE COMBINATION OF AI AND IOT?

Here are some points to consider:

- AI and IoT can generate more adaptive learning and analytical systems which is suited for businesses to develop insights
- It facilitates synchronization, communication, and integration in a better way
- It informs businesses about proactive actions needed to be taken in order to keep up with the changes
- The AI-enabled IoT systems are intelligent, self-learning, and capable of establishing highly cognitive enterprises
- It automates the processes across the organization and setup highly-collaborative atmosphere
- AI and IoT together boost the productivity, performance, and maintenance activities

Organizations are accepting this synergy to take their businesses to a higher level. Additionally, AI will have an intense impact on how people are hired at work according to the skills they possess so that they yield a better result in this machine-driven automated work environment. Thus AI becomes essential for IoT as human being cannot do anything with machine-generated data only. An operation procedure is much needed for analyzing, collecting, manipulating, and generating insights from these enormous amount of data at a high speed.

VI. Conclusion

Therefore AI and IoT must be equally considered in order to activate a new set of capabilities and functions in the organization that can lead them to secret of success. This paper provides imperative insights that really can uplift business to the next level when provided with effective implementation of the digital ecosystem.

Within a period of time, the internet of things will become the biggest source of data on the planet. And the IoT revolution will enable the machines to find out the opportunities for human beings.

Identification process of how information technologies drive the transformation from old-style systems to highly intelligent applications and services is yet to happen. To identify any old or new patterns immediately, it is necessary to provide real-time data collection. However, finding the ways to perform analytics with the data and information that all these devices create is a complex task.

Artificial intelligence has reached the point now where it can provide invaluable assistance in speeding up tasks that are performed by people. But when computers can fully control a human brain, it will cause an “intelligence explosion” that will change civilization extremely.

REFERENCES

- 1) www.analytixlabs.co.in
- 2) www.researchgate.net
- 3) www.allerin.com
- 4) www.itu.int
- 5) www.dzone.com