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Applying Artificial Intelligence in Networks Automation—Theoretical Analysis and Future Research Areas

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Abstract

Recently, the automation of computer networks and Artificial Intelligence (AI) are already changing the business surroundings. The growth of research and development in the different emerging fields such as cloud computing, evolutionary computing, mobile computing, data analytics, and machine intelligence are transferring hastily. To attain new heights of effectiveness and perfection, recently, companies have been specializing in using present-day synthetic intelligence in conjunction with automation in most real-world applications. This research aims to demonstrate how network automation and AI relate to the target audience, how they could collectively be extra powerful, and how to offer businesses a competitive component. These emerging fields can replace human labor, which has initially worried era professionals. A surge of pledges to lessen their terrible consequences came as a form of correction. The recent AI and machine learning application trends in future internet automation are analyzed in this research.

Keywords

Artificial intelligence, network automation, machine learning, AI systems, future internet

1. Introduction

Computers and other machines can use AI to analyze, examine, and appoint their good judgment. Because AI as a synthetic intelligence can manage complicated troubles fast, with a restrained quantity of human sources and understanding, and as technology turns into a greater state-of-the-art, its demand is growing [1-2]. AI may augment technical knowledge to study and use new strategies and packages by adopting talents to equip technical competence. Along with developments in massive information and Graphical Processing Units (GPU), there was considerable development in photograph identification using gadget mastering, which undoubtedly has aided AI in increasing extra quickly. The environment and the agent make up a synthetic intelligence device. Through sensors and effectors, an agent, such as a human or a robotic, can pick out the surroundings by applying pattern matching. The laptop is told to look up statistics in its information base relying on the health it reveals and the presence of sure criteria. In this line, automation and AI are performing to be an increasing number of promising drivers of the productivity increase that the United States so desperately wishes to make particularly higher-first-rate financial growth. The network's automation may additionally, therefore, increase the US's economic system in the years to come and boost prosperity at a time of uncertainty. For instance, it says plenty that the considerable adoption of automation of future networks using standard digitalization in the 1980s did not bring about a significant growth in unemployment but rather a minor increase in the variety of jobs to be had. If they have been to occur once more, such blessings could serve as a potent weapon against immoderate worry. In that regard, the evaluation that follows may not inspire worry.

Still, it does demand thought to motion and the self-belief that automation has the potential to be advantageous even because it maintains motive disruption.

2. Related Works

Networks automation is essential to understand that both synthetic intelligence and automation are terms that might be from time to time used interchangeably earlier than continuing with this discussion. They relate to bodily or software program robots and different tools that help us paint more productively and successfully. When you find out that your client hasn't finished placing their order, you may either take mechanical movements like setting something mechanical, like a car, together or ship a follow-up electronic mail the next day. But what people miss is that those additionally differ substantially from each other. The intricacy of each structure is reflected in those disparities. These differences are as follows [3, 4]: Differences in terms: Making software or hardware that can carry out duties routinely and without human entry is usually known as automation. On the other hand, synthetic intelligence is the technological know-how and engineering field that develops intelligent machines. AI aims to expand machines that resemble or aspire to surpass human intelligence and conduct. Information: AI may additionally or won't be utilized in automation. The entire automation practice advanced into its current kingdom between the first and third industrial revolutions. It entails manufacturing utilizing mechanical labor, computerized trying out and managing structures, computer systems, and working devices. All of the one-of-a-kind sorts of automation that have appeared all around us are confined through explicit rules and programming. To that, the equal item will become an AI. All that must be executed is to price it up using facts. The software program should incorporate large quantities of statistics, such as those from neural networks, graphs, and deep machines getting to know. However, it's in all likelihood that you may be presenting to the gadget all you know. If automatic, sensor readings will permit you to speedy determine the output. However, similar to human brains, AI always has a few diplomas of ambiguity. The goal of automation: The goal of automation is to carry out repeated operations. Automation gives people more time to work on tasks requiring logical judgment and cognition, increasing the system's effectiveness and efficiency. AI looks for patterns and helps choose the best reaction for any circumstance.

3. Factors of Networks Automation

The factors affecting the automation of future internet or networks are as follows [5-7]:

- Technological growth.
- Advances in transformative technology.
- Expansion in certifications and learning styles.

It's not new to automate the networks. Since dawn, humanity has continuously created new, better equipment and technology to generate greater economic output with fewer human sources. Some of those developments have had a modern effect on several financial areas. Considering developments like the electric-powered power grid, the steam engine, and facts technology, other advancements had been extra specialized, along with automated teller machines, business robots, or robot weaving looms. Using this method, challenging and repetitious jobs have become more powerful, and the great of the last output has also stepped forward and many industries are computerized.

Internet automation comes in lots of forms, some of the maximum well-known ones being as follows:

- Mathematical Control – Machines programmed to carry out repetitive operations, including drills, 3D printers, glass cutters, etc.
- Computer-aided production – Examples of the computer software used for this automation include CAD, drafting, etc.
- Modular production techniques – Complex automation system that gives users flexibility and customization by employing robots and other cutting-edge automation tools.

Industrial robots – Robots are employed in industries where three or more axes of manipulation and programming are possible, such as welding, assembling, and material handling.

3.1 Networks Automation vs. AI

This section explores the application areas of network automation versus AI [5-8]. The rule-based and pattern-based AI is differentiated in Table 1. The significance of network automation vs. AI is sketched in Figure 1, and the network automation stages are shown in Figure 2.

Table 1. Rule-based and pattern-based AI

Rule-Based AI	*Pattern-Based AI*
Its purpose is to mimic human actions using flowchart-like reasoning.	Its purpose is to mimic human thinking using statistical modeling.
Best used for input and logic that are digital, standardized, and consistent.	Best used for inputs and logic that are changing and require complex reasoning.

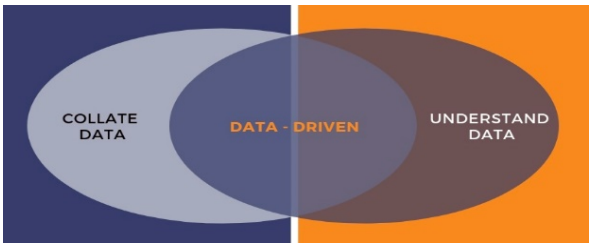

Figure 1. Data – Networks Automation vs. AI.

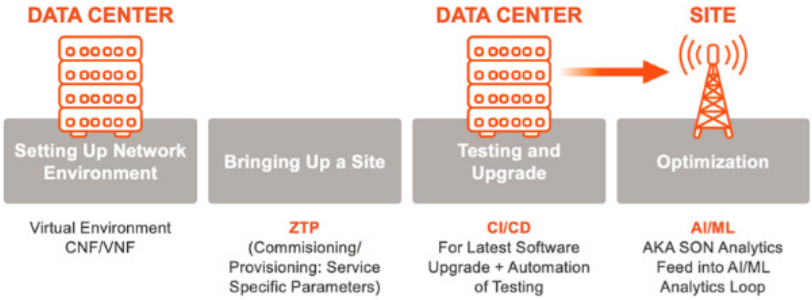

Figure 2. Networks automation stages.

3.2 Are Networks Automation and AI Able to Cooperate?

It is not brand-new information for the company community to employ software programs to reduce human labor. A new potential has emerged way to AI. Only a tiny percentage of human paintings is probably eliminated through automation. However, by fusing automation with AI, one could ultimately cast off the requirement for such intervention to permit one to reduce human effort while doing so. The period "automation continuum" (additionally referred to as "clever robot procedure automation") refers to this form of synthetic intelligence-based automation mixture.

3.3 Key AI Elements in Network Automation

The network's automation system uses the three elements of AI to operate. To enable a fully automatic response, they can, therefore, either be combined or even employed independently depending on the need: **Machine vision:** The ability of any programmer to comprehend the visual input is referred to as "machine vision." The machine builds its identification or classification mechanism on the training data (pictures). For instance, machine vision technology is used in the iPhone X's face recognition system. **Natural Language Processing (NLP):** Similar to how machine language processes images, NLP translates text and voice from humans into a language that computer programmers can understand. Computers can now understand the context of communication and behave based on the type of prebuilt data and contextual variables in play. Siri from Apple, Alexa from Amazon, and others are examples. **Machine Learning:** A system's potential to examine utilizing the statistics supplied to it is referred to as a system getting to know. The outcomes of environmental elements and self-improvement decisions are included in this. We'll be capable of boosting the overall effectiveness of the solutions we've now with the aid of device mastering. To better apprehend this, take a look at an example: If a problem is treated by a wise automation device and human interaction is needed to restore it the next time, the device will follow the prescribed set of steps taken with a human's aid. As a result, the gadget's efficiency will grow while human attempts will decrease over time.

3.4 Significant Applications of AI in Network Automation

Numerous applications of network automation can make use of AI. Everything uses intelligent automation, from drones to self-driving cars. A firm will be able to gain from an AI and automation combination in several significant ways, which are listed below: **Preventing fraud:** Fraud may be averted since the theft can be retraced to the offender's face. The POS machine might be equipped with a digital camera that statistics every type of transaction and links it at once to the client's face using facts stored in the device. It may be a lot less challenging to lock a person up if, for example, they use credit cards fraudulently. Additionally, a clever device might be capable of stopping cyberattacks by fast spotting user anomalies. The device, without delay, halts processing requests in those instances and sends an alert to the administrator. **Human Resource Management:** When reviewing the CVs provided to them, recruiters often encounter difficulties. They may be capable of discovering suitable candidates and dealing with outdated statistics with valuable automation resources. A computerized applicant monitoring machine has already obtained the majority of the CVs. When customers put up their resumes for a function, these systems upload the documents to their database without delay. **Cost Savings:** As one might expect, training a person to perform a typical duty will be an ongoing expense. You'll need to manage staff turnover, allow time for gradual experience and skill development, and pay for vocational expenses. On the other side, a machine has to be trained once, after which it will continue to improve without incurring any further costs from additional training. **Enhanced Efficiency:** No matter how effective a person is at a task, they can still make mistakes. However, over time, they can develop into efficient workers. An automation system, however, is much more error-free and will not make as many mistakes. As it gains experience, it can also draw lessons from the results, increasing its effectiveness. **Customer Service:** Chatbots are a remarkable example of this in customer service. In an entirely brief time, they've received a variety of popularity. The majority of brands now use it after starting with Apple's Siri. Chatbots are PC programmers who can contextually realize user entries and solutions to personal inquiries. These are employed to automate communications for sales, advertising and marketing, and patron care. In the case of well-known structures like Facebook, Messenger, and comparable ones, those bots cause a problem at some point in the app's download method. They have an extra human experience and might lighten the load on customer support facilities.

4. Results & Discussion

However, the IT age is progressively giving way to AI technology, which is dominated by utilizing more potent digital technology like AI, which asks the query: How will network automation and jobs engage in the coming years? The upcoming findings on national, local, and social-group tendencies use the information at the modern-day tasks content material of projections and occupations of administrative center susceptibility to internet automation in the coming years to get a feel of which jobs, locations, network domains, software industries, and demographic corporations can be maximum disruption in the coming years. The internet automation software sector hit predictions are shown in Figure 3. The future internet automation strategies and percentage of respondents' comparison are sketched in Figure 4. The future internet automation of the Network Services Orchestrator (NSO) is sketched in Figure 5.

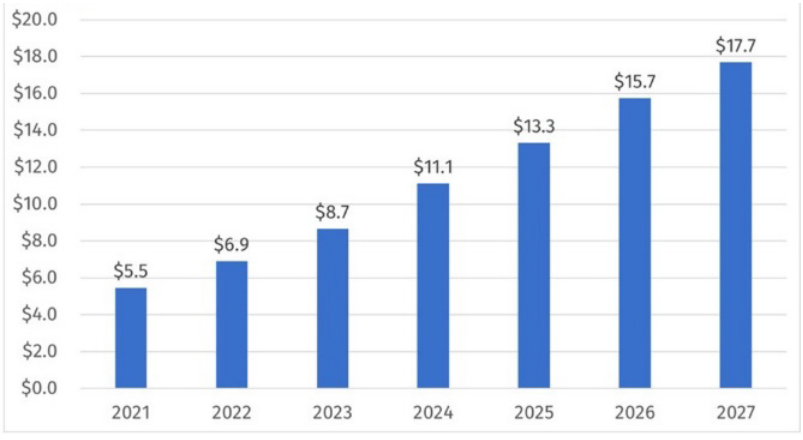

Figure 3. Internet automation software sector hit predictions.

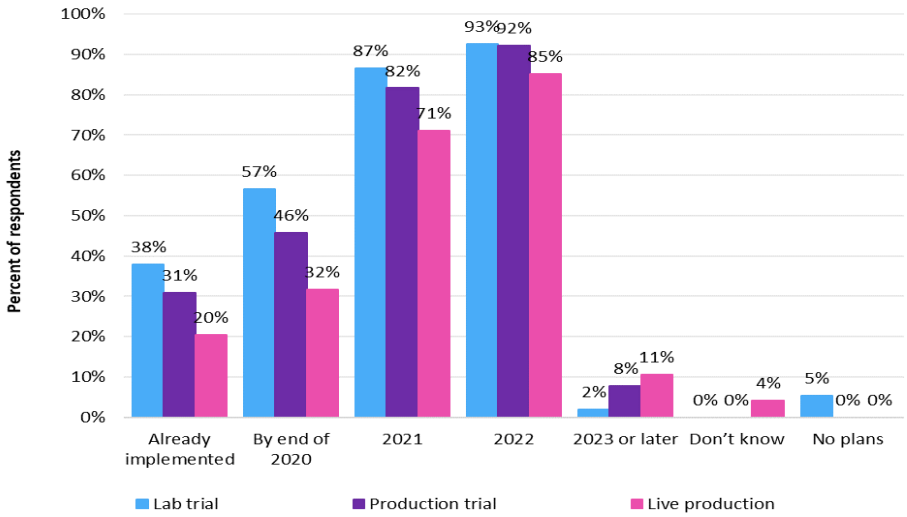

Figure 4. Future internet automation strategies vs. percent of respondents.

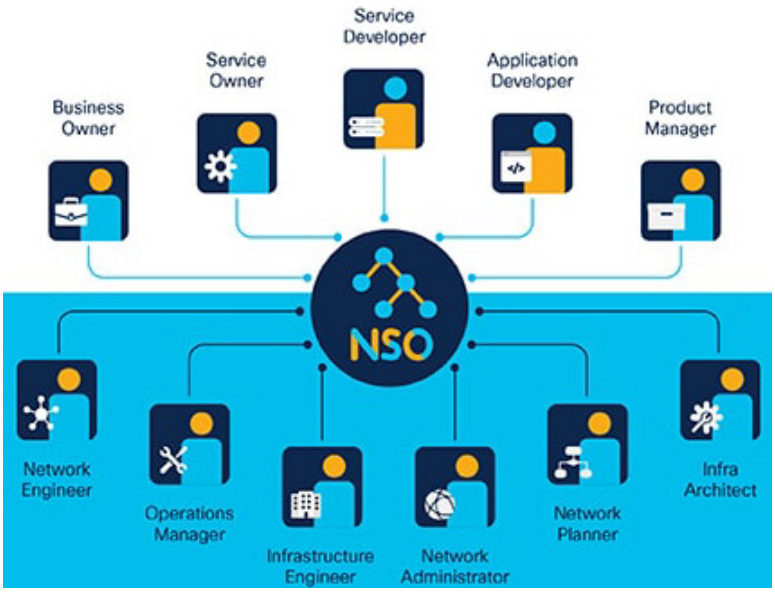

Figure 5. Future Internet Automation - Network Services Orchestrator (NSO).

5. Conclusions

Network automation applies the synthetic and ML that helps organizations reduce labor and working costs. A new diploma of accuracy has been hooked up, and due to the fact synthetic intelligence is capable of mastering, efficiency has grown through the years. Network automation and synthetic intelligence fields have made tremendous progress, but each AI and system gaining knowledge nonetheless needs to be delicate. Businesses have realized that automation, synthetic intelligence, and system studying are vital to their achievement. In the future, other soft computing strategies will also applied in future internet automation in different domains. Then the agencies will be outfitted with this new future system, so they will replace the antique ones while bringing approximately significant advantages.

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