Artificial Intelligence in Automation

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1. Introduction

Artificial Intelligence (AI) is the science [1] that enables the computers and the machines to learn, judge and use own reasons. As the technologies are becoming more complex, the demand of Artificial Intelligence is growing because of its ability to solve complex problems with limited human resources and expertise and within a limited time. AI adopts the abilities to equip the technical expertise and can amplify expertise to learn and deploy new methods and applications. There is a big breakthrough in the field of image recognition using machine learning along with the [2] advances in big data and GPU (Graphic processing units) which evidently helped Artificial Intelligence grow faster. Artificial Intelligence (AI) system consists of an agent and its environment. An agent such as human or a robot identifies the environment through sensors and effectors. It uses a method called search and pattern matching where the computer is instructed to search its knowledgebase based on the match found and if specific conditions are met to solve a problem.

Now a days, Artificial Intelligence is widely used in various industries and business domain, starting from healthcare, finance, manufacturing to law, education, etc. With the help of machine learning, doctors can diagnose diseases faster than before. Applications such as chatbots is helping customers to schedule appointments and support patients through the billing process. In education, AI can provide auto grading, help students with learning by providing support to their need and help them to stay on track. In the law industry, AI has made it easier for the lawyers to go through thousands of large legal documents effectively and accurately which is a real tedious work in general. Industrial robots have made the manufacturing way easy and efficient than it used to be a few years back.

2. Concept of Automation

The use of automation began [3] to increase in the last decade with an aim to reduce manpower and time. Automation has introduced a system of computer and machines and replaced a system that was built by combining man and machine. Highly intense and repetitive tasks have become efficient and the product quality has also increased with the use of automation in various industries. There are various types of automation, some of the popular ones are as follows-

2.1 Numerical Control
Drills, 3D printing, glass cutting, etc. fall in this category where machines are programmed to execute repetitive tasks.

2.2 Computer-aided manufacturing (CAM)
Computer software are used for this automation example of which are like Computer-aided design (CAD), Computer -aided design and drafting etc.

2.3 Flexible manufacturing systems (FMS)
It is a sophisticated automation system where robots and other advanced automation tools are used to provide flexibility and customization to the users.

2.4 Industrial robot:
Robots are being used for welding, assembly and handling materials etc. where robots can be programmed and manipulated in three or more axes.

3. Differences between Artificial Intelligence (AI) and Automation

Before diving into artificial intelligence in automation, it's important to acknowledge that both these terms are used interchangeably in daily life. They are associated with physical or software robots along with other machines which allow us to work more effectively and efficiently. This can be either mechanical tasks like piecing together something like a car or sending off a follow up mail just the day after you find that your customer hasn’t yet completed her/his order. But what people fail to realize is that there are also big differences between these two. These differences correspond to the complexity level if both systems. Here’s what those differences are:

- Terms of Difference: Automation,[9] basically means making a software or hardware which is capable of automatically doing things and that too without any form of human intervention. Artificial intelligence on the other hand is a science as well as engineering which is involved in making machines which are intelligent. AI is about attempting to make machines mimic or even try to supersede human intelligence and behavior.
• Data: Automation may or may not be based on artificial intelligence. The whole practice of [4] automation has evolved into its current form between the first and third industrial revolution. It involves production using automatic testing, mechanical labor, control systems, computers and operating equipment's. All the types of automation which has manifested all around us are bound using explicit programming and rules. To ensure that the same thing becomes an AI, [10] all that is needed is done is to power it up using data. Huge quantities of data, like using neural networks, graphs and deep machine learning must be put in the software. Your coding levels will certainly decide just how much you will be able to make your system stimulate like a human. But most likely, you will be teaching the system all that you already know. In case of automatic, you will be able to easily know the output using sensor readings. But in case of AI there is always a little bit of uncertainty, just like it's there with the human brain.

• Purpose: Automation can execute repetitive tasks. This frees up valuable time [5] for people to take up more important task which require rational judgment and thought. This makes the whole thing more efficient and cost effective. Artificial Intelligence is designed to not just seek patterns but also to learn from experience so that they can self-select the appropriate responses according to situations.

4. Can the Two Work Together?

The use of software to reduce human effort isn't new news for the business community. Artificial Intelligence [6] on top of it has opened a whole new possibility. Automation provided for a very limited range of reducing human work. But by combining artificial intelligence with automation, one will be able to reduce not just human effort but also totally remove the need for such intervention altogether. This kind of combination in artificial intelligence in automation is known as automation continuum (or intelligence Robotic Process Automation)

5. What Are the Major Components of AI in Automation?

An automation system functions using the three components of artificial intelligence. So, depending on the need, they can be either combined or even used separately to allow for a fully automated response:

• Machine Vision: This refers to the potential [7] of any program to understand what the visual input is. The machine makes use of the training data (images) as a type of foundation for the identification or classification mechanism. For example, face recognition system of iPhone X uses machine vision technology.

• Natural Language Processing: Machine language word on the visuals, Natural Language Processing (NLP) does the same to understand human voice and text inputs. It's now possible for machines to understand what the context behind the communication is being carried out and then take actions based on the kind of prebuilt data and contextual variables which are at play. Some examples of this are Apple's Siri, Amazon Alexa and such.

• Machine Learning: It refers to the ability of a machine to learn using the data fed to it. This involves the outcomes of environment variables and decisions to improve itself. Using machine learning we will be able to improve the total efficiency of current solutions. Let's take an example to understand it better: if an issue comes under an intelligent automation system and to resolve it human intervention has needed then the next time, the system will very automatically follow the set of procedures which was used by a human. So over time, the human effort will be reduced ad the system efficiency will improve.

6. What Are the Important Applications of Artificial Intelligence in Automation?

Artificial Intelligence can be used [8] in various ways in Automation. From drones to self-driving cars, all are making use of intelligent automation. Here are some of the major ways in which a business will be able to benefit from a combo of AI and automation:

• Preventing Fraud: It will be able to link the theft directly to the face of the perpetrator. There will be a camera that will be attached to the POS system and it will record all the types of transactions and then link them directly to the face with the details that are already present in the system. Say, for example, someone commits credit card fraud them it will become much easier to put them behind bars. Moreover, an intelligent system will also be able to prevent cyber-attacks by swiftly identifying abnormal behavior from the user. In such situations, the system automatically stops taking any requests and fires off an alert right to the administrator.

• Brand Management: The work of brand management can be made a lot easier with the help of automation. Brand Marketers struggle to fully understand the consumer's opinion about their own brand. So, with the help of automation, they will be able to automate the analysis of all the present content across the internet. This can be carried out daily and will be helpful in identifying critical issues. A good example of such an automation is the Watson Analytics for Social Media. Here, the user defines a set of focus words and context and understand what online users are describing in a moment.

• Customer Service: A great example of this is chat bots. They have become a lot popular and that too in a very short period. It began with Apple's Siri but have been adopted by most brands now. Chat bots are programs which can understand the user's input on a contextual basis and then respond to the queries accordingly. These are used for automating customer service, sales and marketing messages. These bots create friction during app download process in the case of popular platforms like Facebook, messenger and such. They feel human too and can reduce the burden that falls on customer help desks.

• Software Testing and Development: Automation in software testing is a very rapidly evolving field. So, with a whole range of tools which are made available, it is
very possible that the work involved in is fully automated in the future. Some examples of popular testing tools are ReTest, Applitools, SauceLabs and more. With the help of these tools, developers can focus on doing core testing and leave out the worries of bug fixing in the intelligent systems. Development automation is a long way to go for sure but there are tools which can relieve developers from being engaged in menial tasks.

- **Human Resource Management:** Recruiters struggle a lot in sorting through the CVs which get submitted with them. With the help of automation, they will be able to identify the potential candidates and manage old data. Most of the CVs are already received using some automated applicant tracking system. These solutions upload the job application materials straight to their database when the users apply for a role.

- **Reduces Cost:** As one can imagine, the cost of training a human in any routine task will recurring. You will have to deal with employee turnover, give time for gradual experience and skill development as well as incur vocational costs. On the other hand, a machine must be trained only once and then it will improve over time and that too with absolutely no cost involved in repeat training.

- **Improved Efficiency:** People can be efficient at a job or they can surely grow to be so after some time but no matter how efficient people are, they will still make mistakes. But an Automation solution is way more foolproof and it will not indulge in many errors. With time it will also be able to learn from the outputs and so its efficiency will also improve.

### 7. How can AI Help in Improving the Human Condition?

- **Transparent AI leads to improve human trust:** Most companies do make use of AI whether for marketing, hiring or such. The issue which we are facing now is the absolute lack of consumer trust. If you are not already using AI within the company, then this might not be something which has been thought about. But this needs to be focused on as AI continues to grow rapidly. There are many companies which make use of AI and algorithms to make decisions for the customers. But they lead the customers believe that it's the human making the decisions. This isn't the best policy obviously because customers will want to know how their information is being used, the decisions are being made and if there is any bias in making those decisions. Along with this, in legal fields you could be asked to share the algorithms which helped determine in recidivism. Such steps will help put the power back in the hands of the consumers.

- **Convergence with Other Technologies:** 2019 is clearly the year when AI combined up with other technologies like that of ERP solution, analytics and such will be the secret for the success of enterprises. Convergence, by making use of data from various sensors will be able to give better data driven decisions which could improve the quality and performance.

- **Leadership Takes Ownership:** AI rollout to just one specific team won't really gain traction as you will have to involve all the segments of an organization. But more than that, tech rollout, especially ones which can change the entire dynamics of an enterprise needs to be properly led from the top. Along with this, leadership should make sure that making AI is a priority in the enterprise and offer retraining programs. Employees should learn the skills so that they can run the AI programs efficiently in the organization. So, an investment will have to be made in both the software and employees if the real reward is to be seen.

- **AI for Decision-Making:** As AI begins to make its way through the various business and organizations and we can see significant openness [12] to AI regarding automated decision making. For example- AI can make decisions about making a refund to a customer or accepting an applicant's mortgage application by evaluating all the conditions. So, the load of off employees and the robot instead will take up the task. But of course, it must be made clear to consumers what is the algorithm which the AI is making use of.

AI and automation are clearly the future and failing to incorporate that in your enterprise will simply mean sleeping your way through a miraculous digital transformation. Because of that happens then your company will lose the race and will surely go extinct.

### 8. Conclusion

Artificial intelligence in automation has contributed to the businesses by reducing operational cost and vocational costs. It has introduced a new level of accuracy and due to Artificial Intelligence’s learning ability, efficiency increases over time. Even though, there is a good advancement in the field of Automation and Artificial Intelligence, both Artificial Intelligence and machine learning are yet to be optimized. Companies have realized that the key to the business success is subjected to machine learning, artificial intelligence and automation. Soon, the companies will be fully equipped with these start systems and would completely change the traditional systems with by yielding significant benefits.

### References

