



APPLICATION OF ROBOTICS IN INDIAN INDUSTRY

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Abstract: Automation and robotics are the buzz words that are driving the tech industry today. Solution providers of innovative technology are deeply impacted by the advent of such technologies. This research paper provides an insight of how robotics impacts the Indian industry.

Keywords: Robotics, Indian industry, Robot density

1. Introduction

With two decades of the 21st century going to pass by, terms like Internet of Things (IoT), 3D, 4D printing, Artificial Intelligence (AI), Augmented Reality (AR) are becoming household familiar terms. Robotics, as the term suggests is the usage of technological appliances to eliminate involvement of humans in doing a particular work. It is an all-inclusive 'encompassing' terminology which includes those innovative technological solutions which replace human labor. Robot is the culminated output that results from a concoction of fields like mechanical engineering, computer science, electrical engineering and electronics to name a few. Unimate was the first robot to be used commercially in 1960's. Today the field value of robotics may be taken at US \$3 trillion when pegged to the global IT industry only! Its value may become priceless once linked

with every supply chain platform across the global level. With the advent of Industrial Revolution 4.0. Whether it is the outer space research or deep ocean expeditions, whether it is a research in quantum mechanics or working upon breeder nuclear reactors, robotic automation can be seen to be applied actively. Use of robots in defense, surveillance or even for entertainment purposes has been incessantly growing. Pharmaceutical industry and the FMCG sector are important sectors to be benefitted by the robots. Thus there arises a need to understand the concept of robotics and to identify how this concept affects the Indian industry.

2. Research objectives

The present research aims to evaluate the scope of robotics in the Indian industry.

3. Research methodology

The present research required in depth study of the concept of robotics and its applications. To achieve this objective, published and reputed material in the form of research papers, articles, thesis, dissertations, case studies etc. were carefully studied. A total of 86 study materials were studied and an inference was drawn. To evaluate the application of robotics in the Indian industry, empirical evidences were referred to. Finally, a careful synthesis was prepared in the form of the present report.

4. Research analysis

In order to understand the market sentiments towards extension of robotics it is imperative to understand how much willing are the nation states to exploit new avenues in this novice technology. Here the concept of 'Robot Density' comes quite handy. It suggests the number of robots for every ten thousand employees during a particular period. While other countries have been coping up slowly with this technology, it is China that is gathering a dominant role on the Eastern hemisphere. China's robotic density has grown by about 172% in just three years. While on the other hand the robot penetration in India has been prima facie sluggish. However deeper analysis reveals positive future prospect for robots in India.

The global economy has been immensely benefited with the inclusion of robots. For instance, the automotive industry is today deploying automation in its processes at unprecedented levels. Manufacturing hybrid vehicles or electric vehicles demands revolutionary ideas which itself brings on robotics to make them true. For instance, in 2013 Ford installed a robot with 'eyes' that itself assembles door panels, windshields, vendors with

the main car body with extreme precision. The 'eye' assists the robot to identify different car models and therefore does not require any major modifications whenever the company changes the car designs. Another milestone achievement is the deployment of collaborative robots or the cobots. Cobots interact with the human workers instead of operating autonomously. The Great Wall Motors (China) has installed 600 cobots working simultaneously at several workstations thereby automating entire product chain from part procurement to assemblage to finishing. Advanced cobots have also been arrayed at BMW which allows free style car painting giving dynamic color shades in few seconds. This further reduces the exposure of workers to toxic pigments while car painting and finishing. X-Ar Arm by Equipois, modeled as an exoskeleton is an extra arm that once worn by a worker allows him to lift upto 20 kg's without any effort. Hyundai plant at Sriperumbudur, Tamil Nadu has the capability to manufacture a car every thirty seconds. The deployment of 580 robots has reduced the defect ratio by 3%. Honda's two wheeler automotive factory at Narsapura, Karnataka has increased in the efficiency levels by 37%. The manufacturing of electronics and sub conductors has taken the second position in the utilization of robots in its supply chain. Robotics assorted with nanotechnology has ushered in 'PASS Formula (Precision, Accuracy, Sustenance, Speed)' in IT, quantum research, cellular and molecular biology.

Humanoid has become a buzz word today. Simply put, it is the most advanced robotic application which aims to imitate a human. That may be in terms of appearance, functions, programs but the most important is to emulate logical thinking process of a human brain. The robot 'Sophia' (by Hansen Robotics) has been winning numerous

awards at the international level. The new bots are also being skillfully mastered on Eliza Effect which can have unmatched extraordinary applications. Eliza Effect simply implies sending humanistic responses by robots in a manner that a recipient perceives it has been sent by a human and not by a bot. AI powered applications like Siri, Ok Google, Cortana, Alexa are bright examples of robots behaving like humans. Powerful supercomputers like Spiking Neural Network Architecture (SpiNNaker) functions just like biological neurons. This supercomputer is equipped with 10 crore transistors and is capable of executing 200 lakh crore processes per second. Newer technologies have started today turning plain machines into thinking machines which was thought back in 1950's as future's most potent devices. Consider the Turing Test of 1950, wherein Alan Turing posted 69 years back questioning can any machine think? Today we have the solution that 'Yes machines are thinking' explicitly implying that the future of robotics is here.

Robotics in applied sciences has not been alien to the Indian context. It will be correct to state that this field has been a major beneficiary under the 'Digital India' and 'Start Up India' Schemes of the Government of India. The employment levels in robotic industry has shot up by 191%. Around 17 Indian universities are today offering engineering courses with specialization in robotics. Robots have been commercially installed and are yielding economic gains. However, there are some threats too with a rapid spur of robots. With increasing automation, job availability may become highly skewed which may further push the unemployment levels and may have an adverse impact on the economic advancement. Centre for Monitoring Indian Economy (CMIE) reports that the unemployment level in India has already shot up and

the labor participation rate is falling. The Financial year ahead is perceived to have the lowest gross domestic product (GDP) growth rate of the last 5 years. Further one of the major demerits of employing robots is the requirement of continuous power supply. India being an energy deficient country, any major energy demand may lead to an overall energy crisis. Another aspect is the cost benefit analysis. Initial costs and maintenance costs of robots being extremely high, walks away the benefits associated with them. In reality robots have today replaced many low skill oriented jobs particularly in the emerging economies, while at the same time they have provided for productivity enhancement, increased efficiency and better supply of public services. Agreeing with the World Development Report released by the World Bank Group, it will be correct to state that robots today have been doing what was once thought to be undoable and their inclusion in the main frame shall only be complementary and not supplementary.

5. Conclusion

A robot is the perfect blend for cost optimization while maintaining quality with accuracy. When we compare the growth of scientific innovation in the form of robots with some of the basic problems associated with an economy, we see that future world is of robots. The economy is in its endeavor to accelerate the process of industrialization and requires efficient instrument in the name of robots. Robots are today being used in multiple industries as they have the ability to execute complex procedures swiftly and with accuracy. It ensures continual flow of work free of fatigue, human errors or work breaks. It also completely eradicates the clock of hiring and firing in an organization.

6. References

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