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Impact of Automation

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ABSTRACT

Industrial automation significantly impacts industries and employees, with both positive and negative effects. On the positive side, automation enhances efficiency, accuracy, and productivity, streamlining operations and enabling tasks to be completed faster and more precisely than manual methods. It simplifies complex processes, reducing the potential for human error and minimizing the risk of workplace injuries or fatalities, thereby contributing to a safer work environment. However, the downside of automation is its potential to displace human workers, reducing their significance in the workplace. This displacement can lead to job loss, creating economic insecurity and a sense of redundancy among employees. Additionally, the increased reliance on machines and technology can contribute to feelings of depression, anxiety, and stress among workers, as they may struggle to adapt to new roles or face concerns about their job security. These emotional and psychological impacts pose risks to employees' overall well-being and safety. Therefore, it is crucial to understand the multifaceted effects of automation and to strike a careful balance between human labor and machine use. Maintaining this balance is essential to fostering a healthy and sustainable work environment where technology enhances rather than diminishes the value of human contribution. Consequently, conducting comprehensive studies on the impacts of automation and strategies for achieving an optimal balance between human and machine involvement is vital for the future of work.

Keywords: Industrial automation, industries and employees, work environment.

Introduction

Automation offers significant benefits, especially to highly skilled and educated employees, by enabling them to complete tasks within management's set deadlines and taking over high-risk operations such as heavy lifting, critical work, and complex assembly processes. In today’s global and highly competitive business environment, automation plays a key role in boosting efficiency and productivity,

allowing companies to meet market demands quickly and maintain a competitive edge. By streamlining workflows, automation reduces the amount of time and energy needed for repetitive and dangerous tasks, thereby freeing up human workers to concentrate on more strategic, creative, and complex activities that require critical thinking and problem-solving skills.

Nevertheless, not all industries or geographical areas benefit equally from automation. While well-designed automation systems can drive significant productivity improvements, their benefits are more pronounced in fields where the need for highly skilled workers is paramount. In contrast, regions or industries with a high concentration of lower-skill jobs may face more challenges, as automation can disproportionately impact these roles, potentially leading to job displacement and economic disruptions.

The overall impact of automation varies depending on several factors, including the character of the work, the specific industry, the geographic location, and the skill level of the workforce. In sectors where manual labor or routine tasks are prevalent, automation may replace significant portions of the workforce, while in high-skill industries, it can serve as a tool to enhance human capabilities rather than replace them.

For employers, leveraging automation effectively means being able to achieve expected goals more efficiently, overcoming the various challenges posed by the competitive market. This requires a strategic approach that not only integrates automation technology but also invests in upskilling workers to adjust to new roles, ensuring a balanced and sustainable integration of human and machine labor in the workplace.

Meaning of Automation:

Automation refers to the use of advanced technology and machinery to perform tasks and processes with minimal or no human intervention. This concept involves utilizing computer systems, software applications, and robotics to carry out specific functions that were traditionally handled by human workers. In the context of software development and testing, automation is employed as a method to execute time-consuming and repetitive chores, such as testing software programs, with increased speed, precision, and consistency. Fiveable. (n.d.).

Specifically, software testing utilizing specialized tools is part of automation. tools and automated scripts to perform a series of predefined actions that simulate user interactions, assess the performance of software applications, and verify that they function as expected. These automated programs are designed to execute test case suites, which are comprehensive collections of test cases that evaluate various features of the program, like functionality, performance, security, and compatibility. By automating these processes, companies can greatly lessen the manual effort required for testing, increase the accuracy of test results, and accelerate the software development lifecycle.

Moreover, automation in testing enables Continuous deployment and integration (CI/CD) practices, allowing for more frequent and reliable updates to software applications. This reduces the possibility of human error, enhances the efficiency of testing procedures, and ensures that high-quality software products are delivered to market faster. In addition to software testing, automation is widely used throughout a range of sectors, such as manufacturing, healthcare, finance, and customer service, to optimize operations, improve productivity, and achieve greater precision and control over complex processes.

As technology continues to evolve, the scope and capabilities of automation are expected to expand, further transforming the way tasks and operations are conducted across all sectors.

Literature Review:

Impact of industrial automation on workers is positive and negative also, they stated that due to the robotization/Automation in industry workers with lower skill and education have to survive for employment the job may get affected due to automation in industry for manufacturing. Henrik Schwabe, & Fulvio Castellacci. (2020)

Nowadays Automation and robotics in the industrial sector has started to have an impact on human employment and their survival. According to Arntz, M., Gregory, T., Zierahn, U(2016), an average of the jobs is automated along with human monitoring. Which leads to impact on employment salary and compensation.

Automation is all about changing vision of what is needed as well as what is most valuable for us. He also mentioned that the impact of automation affects the laborers' mental health that reduces the self-esteem for handling new technology, and also affects human capability because of automation most of the people are dependent, without automation humans confidence is a little bit loose. Hisham O. Khogali, Samir Mekid (2023)

Methodology:

This paper tries to highlight issues, need, help and also impact of automation on different components by expressive investigation plan utilizing auxiliary information, which have been highlighted by different analysts and specialists .Various papers have been reviewed for research contribution on automation impact on the job market.

The Positive Impact of Automation

1. **Increased productivity:**

   In many industries, automation might boost productivity and efficiency, empowering businesses to employ more people to generate more goods and services. Automation can help businesses cut costs, which they may later pass forward to their clients in the manner of lower prices.

2. **New Job Opportunities:**

   Additionally, automation could lead to a generation of new jobs in programming, robotics, and IT technology. The need for skilled workers to design, program, and maintain automation software and hardware increases as these tools and systems become more sophisticated. Rai, A. (2023, July 25)

3. **Improve Quality:**

   The quality of the product can be improved by adopting automation. Automation can lower the number of flaws and mistakes generated throughout the production process by eliminating the human factor.

4. **Improved Working Conditions:**

   Because automation eliminates the need for humans, which can be physically taxing and occasionally challenging to manage, working conditions can also be improved.

And use automation to finish the job in the time frame provided, presenting an excellent service to the market.

5. **Better Decision-making:**

   Automation can enable more rapid and precise data analysis, enabling staff members to make wiser decisions. This may result in increased productivity, efficiency, and overall business performance.

6. **Improved Customer Service:**

   Additionally, automation can improve customer service by responding to inquiries more quickly and accurately, which can raise customer satisfaction and address pressing issues.

Challenges During automation

1. **High initial cost:**

   Based on the complexity of the system, the cost of automation tools differs. Even if the basic cost of purchasing these tools are high it is more expensive to integrate and educate the worker as compared to manpower.

2. **Automation complexity:**

   The complexity of automation depends on the factors like type of tools and framework needed, organization's levels and size, existing systems and difficulty in
   organizing and implementation of automated systems along with maintenance.

3. **Limitation of flexibility:**

   Automation systems provide limited flexibility because the framework gets frequently changed according to specific functions that may be unable to support new requirements or changes.

4. **Cyber security risks:**

   Some of the specific cyber security risks that can arise during automation are Unauthorized access. The future of cyber security is not choosing between humans and automation, both things are totally different. They are unable to compare each other. Because humans expert in decision making skill and automation in accuracy, completed tasks in a decided timeline. Sometimes facing some loop-wholes, only using automation all possible cases are not covered. So, for Cyber Security reasons, human involvement is the most important part. So without manpower only using automation it's not the correct way manpower and automation working together and received as expected great result.

Conclusion:

Automation has a significant impact on the labour market, both positively and negatively. An automation system is a group of sensors, controls, and actuators that are intended to perform a function without human intervention. Because automation jobs are becoming less common, the majority of work is now completed using automation within a time limit, eliminating the need for human labour. Similarly, Automation has created new job opportunities in fields such as information technology, programming, and robotics. It has resulted in the formation of new industries and businesses.Agarwal, M. (2022, November 16). For automation sometimes may be to purchase some tools which are used for executed test cases or use

some free of cost tool which is open source. But only automation is not sufficient for maintaining a quality work manpower and automation both are most important. Only using automation all possible scenarios are not covered.

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