

A Review paper on Automation development in India

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Abstract — Automation has been growing rapidly from industrial automation systems to household appliances in India. It is made the biggest impact to industrial revolution in India. With the Introduction of Artificial Intelligence (AI) technology provided Faster Handling capability, increase in production process, and accessibility to our system worldwide. Automation has changed low skilled cheap human resource to faster process automation which helped in overall cost reduction. Process Automation has removed the human error upto large extent in the execution. It also improved speed and accuracy to the existing manufacturing process.

Keywords — Industrial automation, Robotics, Process automation, cost reduction.

I. INTRODUCTION

Industrial automation is a set of technologies that uses control systems and devices, such as computer software and robotics, to enable automatic operation of industrial processes and machinery without the need for human operators. Industrial automation eliminates the possibility of human error, reduces costs, saves time, and achieves higher performance.

Automation is basically the delegation of human control Function to technical equipment for

- Increasing Productivity
- Increasing Quality
- Reducing Cost
- Increasing Safety in working conditions

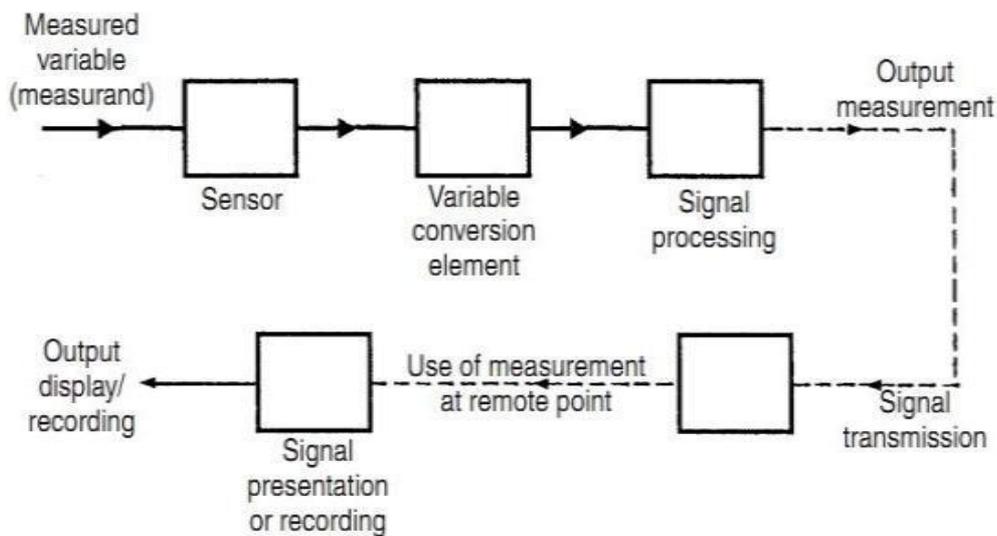


Fig 1.1 Process of Automation

Simplification of engineering and precise control of manufacturing process can result in significant cost savings. The most cost-effective way, which can pay big dividends in the long run, is flexible automation; a planned approach towards integrated control systems. It requires a conscious effort on the part of plant managers to identify areas where automation can result in better deployment/utilization of human resources and savings in man-hours, down time. Automation need not be high ended and too sophisticated; it is the phased, step-by-step effort to automate, employing control systems tailored to one's specific requirements that achieves the most attractive results Industrial Automation involves significant amount of hardware technologies, related to Instrumentation and Sensing, Actuation and Drives, Electronics for Signal Conditioning, Communication and Display, Embedded as well as Stand-alone Computing Systems etc.

Every industrial production process consists of a series of simple or complicated machines that, through the combination of raw materials, undergo a sequential transformation and integration in order to produce a final product. The term "machine" denotes every kind of electromechanical device on the industrial floor, e.g., from a simple motor (such as a drilling or a cutting machine) up to complicated chemical machine (a chemical combustion machine).

The whole set of machines, which are being integrated and combined in an industrial production process, will be referred to as an "integrated machine". To control the operation of an integrated machine, a set of specific operation control devices needs to be incorporated in the overall automation, like a simple push button, a rotational selector switch, etc.

In the case that the operation of the integrated machine is set in the “manual” mode, the operator is utilizing the operation devices for turning on the desired motors or the actuators and in the proper sequence. In the case that the integrated machine is set in the “auto” mode, the operator is again utilizing the operation devices, either for initiating the operation mode, or for instructing the integrating machine to change the operational state. In most cases, the automation system of an integrated machine provides both the functionalities of an automatic or manual mode of operation, especially for dealing with the emergency fault situations, where direct manual control of all the provided automatic functionalities of the integrated machine is needed.

Robots have many usages in industry but fast and exact defect tracking system of industrial robots in case of incidents is one of the industrial problems which stops the production. As the robot is an electro-mechanical device it needs a periodic maintenance, a system is brought in front which detects the errors in the robot by using a program which is written in both prolog and oracle but prolog has more advantages such as it is logical and declarative language .and provides a simple environment so that is user friendly and it can be easily installed and executed in the computer and does not need any additional hardware.

The system presents the code of the appeared error on the display then the program finds the created defect and presenting proposal to remove defect. Each code represents a specific error and the cause and description of the error and the program also suggests the necessary action for the certain error, by this industrial revolution is accomplished, which better economic and social results. The program can recognize all kinds of robot error which occurs during production, preventing from long stop in production the program increases the ease of defect tracking of robots by labours.

II. LITERATURE SURVEY

In most of the industries in India the almost 90% of work are being done by human hands which makes a lot of mistakes wastage and increase production cost The major cause behinds this is the very small use of the automation and robotics in industrial processing. The various reason behind the adoption of technologies is budget constraint's and the higher cost of the automation equipment's such as PLC, SCADA, and various other equipment's.

India has been emerging as biggest consumer of the automation products such as electrical drives but the challenging in this regard is lack of the domestic Automation equipments, relevant circuit breakers, electrical infrastructure, that meet the global standards to attract other companies in India.

There has been strategic and logical developments in India in regard to improve the automation standards in India. Various software companies in India are collaborating with the world leaders of automation solution provider.

Various changes in economic reforms policy initiatives have made India one of the fastest-growing economies in the world today. The manufacturing sector contributed to great extent in growth of the Indian economy, it contributes nearly 15 percent to the GDP from the past many years. The recently announced National business Policy announced targets at raising

the manufacturing share in GDP to 25 and to attract the foreign investments in india. The increase in demand and profit issues led the industry managers to get the latest technology to achieve the public demand with good quality standards. This led to implementation of Programmable logic controllers human machine interface (PLC-HMI), supervisory control and data acquisition (SCADA), distributed control system (DCS), and electrical drives (AC, DC and servo drives) to our industrial process. The labor cost is major factor in total industrial operating cost, it includes generally 60%-65% of the total cost. There are basically 2 types of working staff in an organisation. Direct staff is responsible for executing the procedure while the indirect staff is for the back-end support for immediate staff.

The presence of both direct and indirect staff coupled along with department managers, presents an important cost in operating a warehouse. The automation is the effective way to tackle the rising wages of workforce. This has resulted in the industrial operators to rely upon the robotics to provide a convenient and efficient way of reducing the operational costs while simultaneously maintaining the productivity at optimum levels.

Now the need it is the move out of the high initial cost of the robotics of the implementation which further enables to make good profit. Robotics and automation of basic machines has become necessary to bring down the production cost down to improve the profit margins. Robots in long run may return an investment on them in a short period of time. In a long run robots prove to be a value addition product by giving more advantages than a human labour. This might take time in India as the market is developing in India the solution providers are bringing their units to India which might reduce implementation cost in the recent time.

III. RESULTS AND ANALYSIS

The Automation system helps to maintain the various stocking and handling production being in knowledge of our production capabilities. The output can be managed, and stock can be bring with intern reduce the over investments in the non-usable or rarely usable products in stocks.

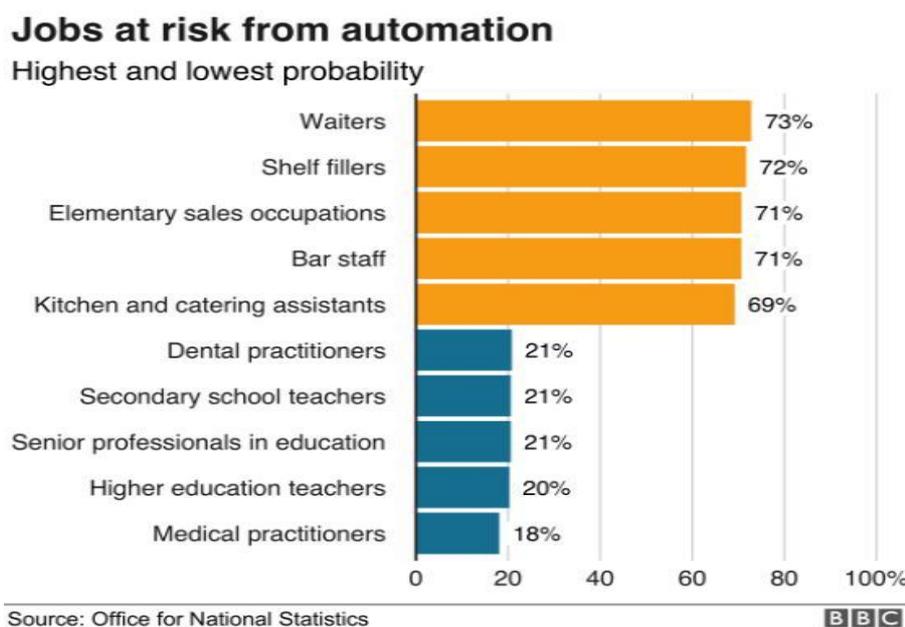


Fig1.2 Jobs at Risk due to Automation

Automation technology reduces labor costs in the design, production and maintenance stages as well as in the supervision and Inspection of the manufactured components or products. Although labor costs currently constitute 8 to 12% of total production costs. This might have impact on the employment of the labour as india is a densely populated country having more than 60 percent people working as labour who earn money and run their family on daily wages this might disturb their life.so in India there are various factors which has to betaken care for the continuous development which meets the requirement of both the organisations as well as the labour.

As Automation technology offers the potential to reduce labour costs in the design, production and maintenance stages as well as in supervision and Inspection of the components. But the capital investment in these resources can be recovered and can be effective in long run.

IV. CONCLUSION

Productivity Improvements through the increased use of machinery was only possible through further standardization of products which led to a substantial decline in unit production costs and earn more profits with the best quality of output and can reach the large market cover with alternative method. Given the emphasis of lowering the unit costs of standardized products to expand the total target market size, productivity was perfectly relevant to measure economic performance in the system of mass production.

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