

Robots in Pharma Industry

Navin Dhinnesh ADC^{1,*}, Neethidevan V², Akilan S S³

^{*1,2,3}Assistant Professor, Department of Computer Applications
^{*}navindhinneshadc@mepcoeng.ac.in, ²neethidevan, ³akilan@mepcoeng.ac.in

Abstract

Robots play a vital role in the field of Pharmaceuticals. Initially they were mainly used in the research and development for improving the speed in production department and for quick packing. With the deployment of robots in this area, safety of workers is very much better now. The quality of the product has also been improved. Accuracy and the speed of delivering the drugs is an important task in Pharmacy field. Few devices are manufactured with the assistance of Robotics. This paper explains how robots are used in few applications in pharma industry. Also few advantages and disadvantages are explained. In future the robots will be incorporated with Internet of Things and will do many works in the pharma industry

Keywords: Pharma, Robots, Robotics, Pharmaceutical, hazards

1. Introduction

Robots are the best alternate for humans in any field. Robots are used in places where the situations are unsafe for humans. Pharma filed has started deploying more number of robots in their manufacturing sector. Precision and effectiveness is very important when producing medicinal parts [1]. Customer expectations and competition among global market players are increasing at a faster rate. To survive in the market, manufactures must produce medical products which are of high quality. Not only they must concentrate on production, but they also need to deliver the products to the customer at a short interval of time. For achieving the above, they must efficiently use their assets. Robotics plays a major role in the pharmacy industry for achieving precision and efficiency. Most probably robots are used in chemistry labs [2]. Mainly robots are used to move the chemical samples from one place to another for testing [3] [4]. The laboratory procedures can be made fully automated using the robots, since the procedure will be a repetitive one. The main purpose of automating the labs is cost cutting one [5]. Only certain procedure can be automated in the laboratory, such as handling of all liquid items can be automated. This helps in a particular person to concentrate more on theoretical aspects [6].

Robots can perform certain tasks which humans cannot do. Mainly robots are used in place where potential hazards happen [7]. The purpose of automating the pharma industry is to improve efficiency, and also to cut down the operational costs. This will also allow the employees to concentrate more in improving the relationship with the customers [8]. In the pharmacy manufacturing errors must be totally avoided. Even though “To err is human”, this doesn’t suit for pharma industry. Now a day people have started implementing their pharma industry with robotics system, the cost is coming down drastically. The cost of replacing a outdated equipment with a robotic system is cheaper now. By using robots in pharmaceutical manufacturing industry, the manufacturing cost has been minimized to a greater extent. These robots are as fast as humans [at some times faster by 4 times] and are capable of working in 3 shifts [9].

The pharma industry is very much complex in nature for managing it. Their main job is to serve millions of patient’s healthy needs. Since they need to serve health related issues they have to follow strict rules and regulations and standards. If they commit anything wrong, then the whole event will be affected. They don’t want to take any risk with health

related issues [10]. For this purpose, the manufactures slowly started to automate their industry. One such move is bringing robots into their industry for helping them and reduces human time. Today lots of pharma manufactures are using robots for manufacturing certain drugs. Pharma automation is quietly changing the field of pharma industry. Automation not only fulfills pharma manufacturing companies need, but also they do that at low cost. There are also few benefits with the involvement of automation in pharma company such as: i) reduced amount of wastage, ii) better safety, and iii) less cost.

2. Robots Classification

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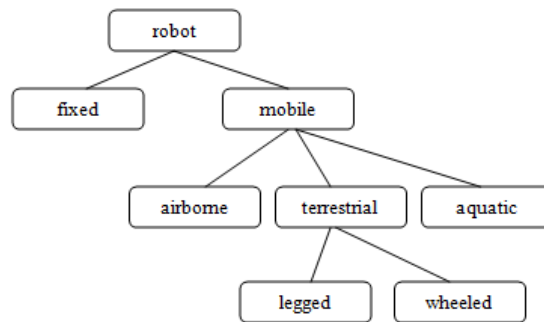


Figure 1. Classification of robot

3. History

In 1920, a Czech novelist coined the word robot. In Czech language it means worker or servant [12]. In 1954 George Devol designed the first robot for industrial purpose. It is called as UNIMATE. In 1962 a company was started for making robots and they named it as Unimation. In 1980 lot of courses regarding robotics was introduced in various engineering colleges. 1995 several small companies started deploying robots in their company. In 2003, they launched a Robot for in search of water on Mars.

4. Robots in Pharma

People now a day are becoming prone to many diseases because of the work culture and stress they face in the real life. So they depend on medicines for curing the stress, etc.. The demand for drugs is increasing day by day and the pharma companies are finding new techniques to increase their productivity and meet the customer demands. Thus they automate their industry by deploying robots. Initially when robots were used in pharma industry there surfaced a wrong perception that complicated machines like robots are involved. And the person operating it needs training in programming. But drastically things changed and company persons started using robots at ease. By using it the cost has come down and the overall efficiency is increased [13].

4.1. Efficiency and Accuracy

Mainly robots are used in pharma industry because of its speed. They can work 24x7 a day and they are so many times faster compared to humans. Thus they can manufacture great quantities of product at a short period of time. Even though they work faster the accuracy of the product manufactured is good. Maintenance of modern day robot is less compared to older day robots. A single robot can do a work faster than a human does. It can also be reprogrammed for different applications.

4.2. Robots in Lab

They play a vital role in laboratories where researches are being carried out. In research certain tasks are performed again and again and for doing these robots are the right options. In pharma several tests are carried out in the lab with the help of test tubes. To do repeated experiments with the test tubes and certain liquids and chemicals, these robots are deployed. So the researchers can spend their time in research while these robots do the repeated tasks.



Source [14]

Figure 2. Robot in Pharma Lab

4.3. Fake medicines

Robots are used to find out the fake medicines that are manufactured falsely. Drugs are not only sold by retail shops. Customers have started buying drugs from Online too. The originality of the medicine must be checked before dispensing them to customers. For this robots are used. Before dispatching it to customers, the barcode must be checked and the

drug specifications used for manufacturing must also be confirmed properly. If at some point any fault occurs, then that particular drug must be removed from that place. All the above are handled by robots.

4.4. Sustainability

Apart from pharma industry many industries are using robots and have maintained their sustainability in their respective field. Pharma industry is also trying to improve its sustainability with regard to its operation with the help of robots. Initially robots were used in industry for producing mass products. But now industry people have started using robots for producing small products too. By using robots lot of wastages can be reduced while manufacturing a drug. At the same time, one can preserve energy to a greater extent when robots are used. Reliability of a product is also improved and there by waste is reduced.

5. Pros and Cons of Pharmaceutical Robots

The following tables I and II give some brief explanation about the pros and cons of robots in pharma industry. There are lots of advantages regarding the robots deployment in the industry. The paper here explains only a few cons regarding the same.

Table I. Cons of Pharmaceutical Robots [15]

S No	Features	Functions of robots
1	Accuracy	Compared to humans, robots are reliable and accurate.
2	Tirelessness	96 hrs of human work can be completed in 10hrs by robots, with good quality output.
3	Reliability	They can work 24x7, without getting tired.
4	Speed	They don't waste time. Hence there will be increase in throughput
5	Safety	Hazardous works are carried out by them, so humans are safe now.

Table II. Cons of Pharmaceutical Robots

S No	Features	Functions of robots
1	Expense	Investment cost is high
2	Danger	With their intelligence it may destroy humans
3	Expertise	To operate them employees need proper training
4	Return of Investment (ROI)	Proper planning is essential when deploying robots for achieving ROI
5	Limited capabilities	They do what they are programmed to do and they can't handle any unexpected situations

6. Conclusion and Future

Due to high competition and to provide drugs to customers at a less cost, pharmaceutical industry is looking for automation. Robotics will play an important role in the field of Pharmacy. Initially they were found in only laboratories. But now they are not only used in

packaging purpose, they are being used in manufacturing side also. In future they will also be used for various other applications in the pharma industry. Robots will bring in tremendous changes in the field of pharmaceutical industry such as: speed, reliability, efficiency, precision, etc. In future robots will use Internet of Things are will be engaged in pharma industry.

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