Automated pharmacy

## Introduction :-

Centuries ago, and since the beginning of life on earth, this system is founded, even though not widespread. Ways to store eating and drinking are searched, when human needs and requirements are increased, many tools and machines are used, and large number of production and material are produced, development of this system is important to keep them as long as possible.

Storage is a word that uses in anywhere and anytime, if you go to supermarket, factory, company or any place, you can find that this system is needed very much, and can't do anything without it, this system can give the ability to any place to produce huge number of products without any damage.

Storage system is concerned many variables: motion, time and quantity.

**Motion** is concerned with moving a part or a product to its suitable place by the robot. **Time** is concerned with storage and retrieval products at specific time as quickly as possible. **Quality** is very important in this system, because it must have high accuracy to find the specific location to the product, and to do the process in the shortest possible time.

## What is the project ?

Automated storage and retrieval system; with various system types: mechanical, electrical and control systems.

This system consists of 3-axis motion (like CNC system motion), and contains electrical gripper to catches the packets of drugs, as well as contains a barcode reader scanner connected with Arduino microcontroller

An automatic pharmacy need special shelves Contains two holes, first in the top and hole in the bottom, use the slot upper for storage system where they are dropping from it, shelves contains inside it slope which helps pillbox to reach the end of the shelf properly and in the right way, and use bottom hole to take the medicine box when needed, by the gripper found on the robot, and contains external slope used to bring down the pillbox to arrive medicine to the nearest point of the pharmacist.

## What is the problems that the project solved

Many tasks accomplished by pharmacists, but not of their duties such as ordering the drugs on the shelves, orders preparation, accounting, and these tasks consume a lot of time.

This system is designed to solve the most important problems facing the pharmacists and that have been mentioned previously, where the system can:-

1. Storage drugs.
2. Retrieval drugs.
3. Monitoring pharmacy incoming and out coming

Beside pharmacy it can be used in many areas as:

* In big inventories to do classifications of product.
* To classify medicine in medical inventories on shelves.

##  Project objective

The project objective is to make a perfect automated storage and retrieval system; it uses different system types: mechanical, electrical and control systems, our chosen example for this system is **{Automated Pharmacy}**.

 System Benefits:-

This system is designed so that to solve most problems facing the pharmacists, where the system:-

1. Storage and retrieval drugs.
2. Print the instruction on the packet.
3. Monitor inputs and outputs.

## Components of the project

1. Mechanical part

Mechanical part one of the important parts you need to be careful in order to construct safe, stable, and efficient design with available resources .mechanical section consist the structural shape of machine and all component were used as screw, bearing, Chrome bar, belt... and etc. load and electrical available parts play role in determination of type,dimensions and also shape of mechanical design. This chapter has sections which describe all feature and calculation that used for each part.

1. Electrical part

This project is mechatronics system so it integrates the mechanical, electrical and control systems. The electrical system of this project consist of : motors which convert electrical energy to mechanical energy, there are two types of motors that used in project : three stepper motors which move in steps and the size of the step measured in degree and it can be vary , the three stepper motors are different in the size, shape and torque according to the load applying to it .the smallest stepper motor is used in the rail of gripper , and the medium is to move the rail of gripper perpendicularly and the biggest is used for moving all rails horizontally .The other type of motors is servo motor is used with gripper to control and move it . the drivers are used to control the step and direction of the stepper motors , and it connected between the Arduino controller and power supply which is a charging switching power supply and it used to convert AC 240 V and to the DC 12V and 5A and it providing protection for the system .

1. Control part

Control system is a devise used to manage command and direct the behavior of the other systems in the project.

Automated pharmacy project has a feedback control system ,it used the Arduino controller which receives the inputs from the computer to control the motion of the robot in the three axis by controlling the steps of the stepper motors . the coordinates of the position is send to the Arduino controller and it make the stepper motors to spine a certain steps to reach to the required position .

1. Mechatronics part

A mechatronic system is neither just a marriage ofelectrical and mechanical systems nor just a control system; it is a completeintegration of all of them. The Automated pharmacy project combine between the three systems, it uses mechanical principles of motions by chrome rods, bearings, ACME thread rod, and gripper, and that components are moved using stepper motors which connected to the drivers and power supply which are the components of the electrical system, and these systems controlled by Arduino controller.