

## AUTOMATIC WATER BOTTLE FILLING SYSTEM

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### ABSTRACT

The project is aimed at automatic bottle filling and counting. This project will automatically count the bottles using IR sensors. The overall system is liberated from human interventions. The efficiency of this system is high and it helps in automatic bottle filling and counting. Control system is the main part which includes Arduino programming to control various components in this system. It is aimed to eliminate the various problems faced by small scale industries while packing the bottles. This system works automatically and reduces working and operation costs respectively.

**KEYWORDS:** DC pump, DC motor, LCD 16x2, Actuator, DC gear motor, Conveyor belt, Pipe, Bottle (250ml), Wheels, Arduino.

### INTRODUCTION

In today's world the importance of automation has immensely increased. The industry has now shifted its purpose of automaton to broader level. Our project works on automatically filling bottles using Arduino controller, its counting and packaging. It is less costly, cheap and widely used technology. This project looks on reducing the cost of automation in small scale industries. For counting of bottles we have used IR sensors which are more accurate in working and cheap as well. For packaging of the bottle's (i.e. fitting of cap on the bottle) we have used actuator valve and DC gear motor. For transportation of bottles in the factory we are using conveyor belt. The material used in belt is rubber which rotates on three DC motors. To fill bottles of 250ml, we have used DC pump which takes 30 seconds to fill the bottle.

### OBJECTIVE

- 1] To fill the water in bottle
- 2] Counting the bottle by using IR sensor
- 3] Fitting of cap on the bottle

### LITERATURE SURVEY

We have referred to three research papers VIZ "Automatic Water Tank Filling System Controlled using Arduino TM based Sensors for Home Application", "Faculty of Electronics and Instrumentation Engineering Aarupadai Veedu Institute and Technology" and "International research Journal of Engineering

and Technology (IRJET). This research papers provided knowledge about Arduino programming, filling the bottles, running the bottles using conveyors, and its packaging, etc.

## COMPONENT SELECTION

### DC motor

A DC motor is the one which converts current electrical energy into mechanical. DC motor contains mechanisms such as electromechanical or electronic to change the flow of current. We have used DC motors to make the constant motion of conveyer belt. We have used three DC motors in our project.

### LCD(Liquid Crystal Display)-

LCD is used to notify the bottle count. We have used 16x2 dot matrix display. It also shows counter, time delay, etc.

### DC rotary pump-

In this project, Rotary pump provides a fixed volume of water to flow into the bottle. It is submersibles pump.

### IR Sensors(Infrared Radiation)-

IR rays can be used to detect the object. IR sensor consist of two parts which are transmitter and receiver .A transmitter sense the infrared radiations and principle of reflection sensed using receiver.

### SMPS (Switched Mode Power Supply)-

SMPS is a electronic power supply that incorporates a switching regulator to supply electric power efficiently. SMPS power supplies power from mains (i.e. AC or DC supply) to DC loads and also converting voltage and current characteristics. It minimizes the wastage of energy by spending very low time on high dissipation transitions.

### Conveyer belt-

To carry material from one place to another, safely and efficiently, conveyer belts are used. It is most economic way to transport bottles and also the safest. Belt is made up of rubber and consists of three wheels which rotate the belt.

### Relay-

A relay is an electrically operated switch. To operate the switching mechanism mechanically, electromagnets are used commonly inside a relay. Not only this but other operating principles are also used. For fluctuating voltages, a relay is more useful as it off all the working devices. This helps in reducing the sudden break down of any object.

### Actuator-

Actuator can be used to control a mechanism or also to move them any a specific direction. The actuator used in our project works on electric current. Actuator is used in our project to cap the bottle (i.e. packaging).

### Arduino-

The main purpose of the Arduino is to control the program of water bottle filling system. Arduino is a simplified version of c and c++ programs. In Arduino we can burn the program as per project requirement. So using Arduino we can run the project.

### Connecting wire-

Connecting wire is used to connecting one circuit to another circuit. Connecting wire is made of the aluminum or alloy and it is flexible.

### 7805 Regulator IC-

The purpose of the 7805 regulator IC is to provide undesirable quantity voltagedesirable quantity voltage.

### Roller-

In our project we used two rollers, which is made up of plastic.Roller is used to roll on conveyer belt and provide friction between surface contacts.

### Plywood-

Plywood is used to mount the electrical component. Relays, DC gear motor, Belt rolling assembly, capping assembly are placed on plywood.

## WORKING

In automatic bottle filling, the whole process must be completed without interference of human in it. Our project consists of a motor connected with a pipe to fill the bottle. The bottle is of 250ml and the program type is of 30 seconds. The bottle is filled using that pipe and then it is taken forward on to a conveyer. IR sensors are used to count and then stop them for packaging. An actuator valve and a DC gear motor are used to pack the bottle.

## BLOCK DIGRAM

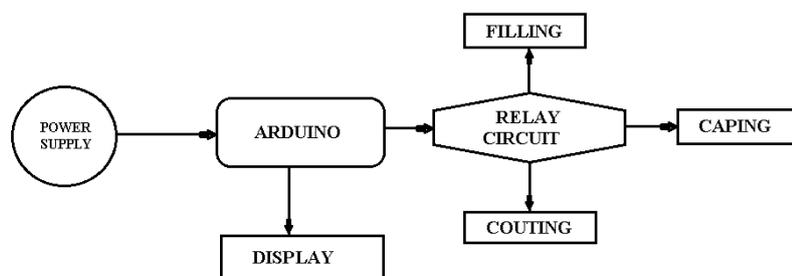
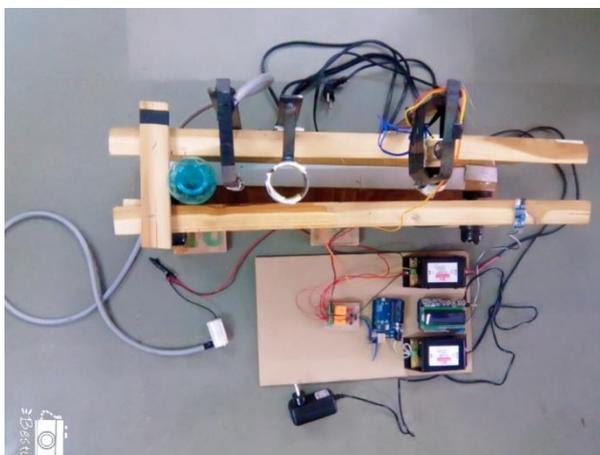


Figure no 1. Water Bottle Filling System

## ADVANTAGES

- 1] To reduce human effort
- 2] Time saving
- 3] Saving water
- 4] Reduce worker cost

## RESULT



Photograph no 1. Water Bottle Filling System (Hardware)

## CONCLUSION

In this project conclude that, the automatic bottle filling system using pump filling concept was successfully implemented and studied.

## REFERENCES

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