

WEB OPERATED BEVERAGE VENDING MACHINE USING PLC

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Abstract : In industries vending machines play an important role for fulfilling the immediate needs of the society. In a competitive industrial world, a system must be flexible, efficient and cost effective, so automation in machines is very much essential. The concept of automation is so versatile that it can bring radical development in almost every field. New beverages are increasing day by day in the market, so this project provides the method of preparation of soft drinks like Orange and Mango in a new approach by implementing automation using **PLC & Web Operation** for its preparation and filling. The objective of this work is to operate on mobile phones, computer using web page. This work will provide low power consumption, low operational cost, less man power, accuracy and flexibility to the system and at the same time it will save the operational time.

Index Terms- PLC Siemens-S71200, Conveyor, SMPS24VDC, Solenoid Valve-24VDC, DC Motor-10RPM,12VDC

I. INTRODUCTION

Automation is the use of control system and information technologies to reduce the need of human work in the production of goods and services. The manual filling process has many shortcomings like spilling of juice filling it in bottle, equal quantity of juice may not be filled, delay due to natural activity. Use of automation solves these problems so this project is developed. The project is to design and develop a new approach for vending beverage using PLC and mobile phone/computer. We can operate and control automatically the beverage preparation by using PLC and mobile phone/computer. In this plant, several operations will run simultaneously with the help of PLC. In the first process the pump feed the ingredients to the ingredients tank from the reservoir. In the second process the liquid concentrate of different beverages (Orange and Mango) are mixed with the ingredients in their respective tanks. In the third process the bottles are filled with the beverages, moved by a conveyor which is driven by a conveyor motor. These all automated processes lead to more accuracy and flexibility of the system.

II. System Specifications

- 1) Coding language - Ladder Diagram Programming.
- 2) Software - TIA Portal
- 3) PLC S7-1200 - It has 8 input ports and 6 output ports.
- 4) Proximity Sensor - Range of sensor up to 1m to 5m.
- 5) Power Supply - 24V DC.
- 6) DC Motor - 12V, 10 RPM

III. Block Diagram

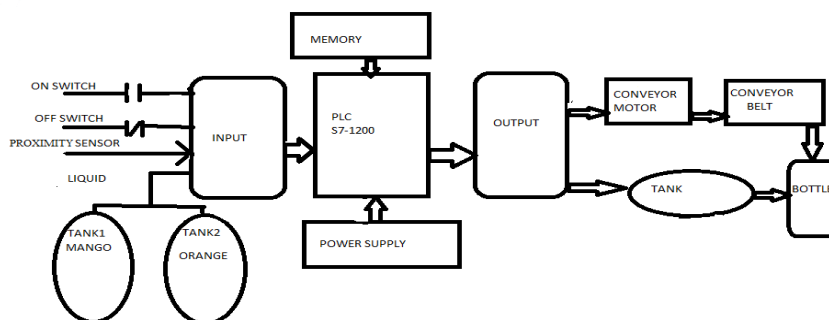


Figure 1: Block Diagram

IV. COMPONENTS USED:

1. PLC S7 1200: It has three compact controllers with graded performances, two signal board, 13 different input output modules, ethernet with 4 ports for implementation of many different topologies. Two communication modules via communication point to point connection.

2. DC motor: The motor gives 12v ,10RPM. motor runs smoothly 4v to 12v and gives wide range of RPM and Torque. The shaft has hole for better coupling. Rates Torque 7kg-cm.
3. Proximity sensor: Use capacitive sensor to sense the presence of bottle and then initiate some action, sensor don't require any physical contact.
4. Solenoid valve: It is a 24 VDC Hero water RO solenoid valve.
- 5.SMPS: SMPS is used to provide power supply to the system. It operates on 24VDC.

V. METHODOLOGY:

In this system use Siemens S7-1500 PLC for controlling the whole system. first the pump feed the ingredients to the ingredients tank from the reservoir. Second the liquid concentrate of different beverages (Orange and Mango) are mixed with the ingredients in their respective tanks. In the third process the bottles are filled with the beverages and moved by a conveyor which is drive by a conveyor motor. Create a Webpage, Using this webpage we can operate this whole system with the help of cell phone or computer.

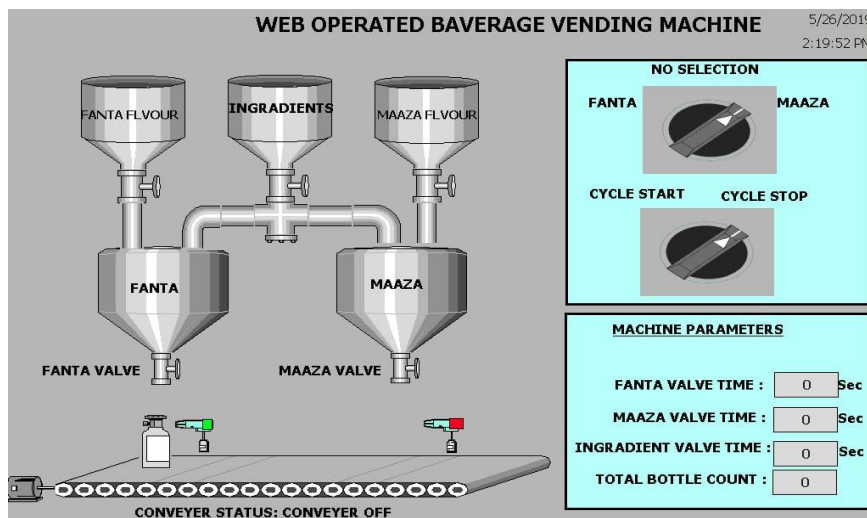


Figure 2: Prototype of System

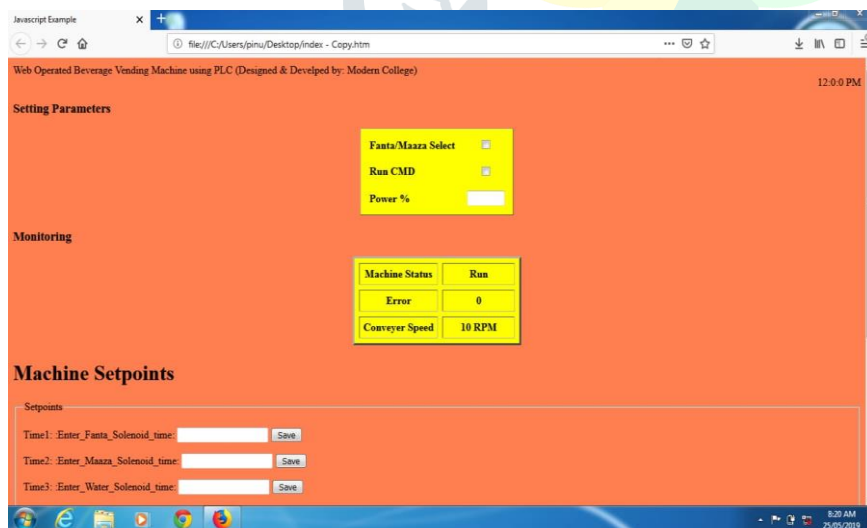


Figure 3: Web Page Design

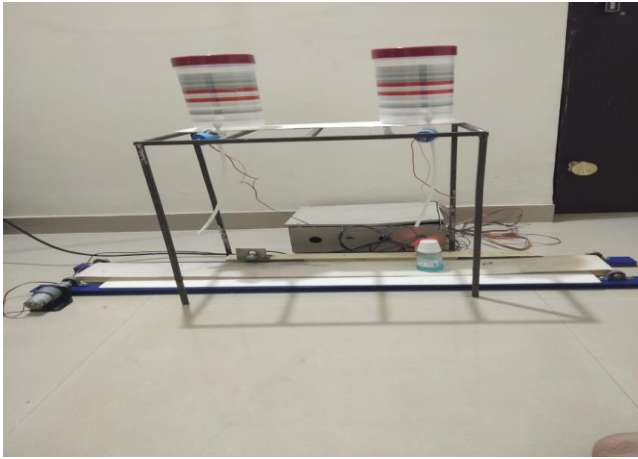
VI. RESULTS:

Figure 4: System Hardware



Figure 5: Structure of Beverage Vending Machine

VII.ADVANTAGES:

- 1.It increases the production rate because it uses in automation industry.
- 2.Requires less man power.
3. Saving the operational time.

VIII.FUTURE SCOPE:

- 1.Increase in diameter of the liquid Solenoid Valve and pipes would increase the flow rate. Hence, taking lesser time to fill in the bottles.
- 2.In this system packaging unit can be added.
- 3.Can be used for other beverages and drinks also.

IX.CONCLUSION:

The above setup provides a great deal of application in the field of automation. In the field of mass production where all units need to be processed and monitored in a short period of time which leads to increase in production. The system can start and stop by using mobile phone/computer on the web screen by sitting far away from the process. This concept helps in error detection in a process.

X.REFERENCES:

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