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Automatic Car Washing System Using PLC

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ABSTRACT: Introducing a car washing system using Programmable Logic Controller (PLC) involves a washing system using PLC offers an automated and efficient solution for cleaning vehicles, the system can be programmed to perform various cleaning operations with precision and reducing the need for manual labor and human intervention. Automation streamlines the cleaning process, reducing the time required to wash each vehicles. The PLC-based control system ensures that each cleaning cycle follows predefined sequences and parameters, eliminating variability and human error. Another aim is to provide flexibility in the cleaning process to accommodate different vehicle types, sizes, and levels of soiling. PLCs offer robust and dependable control, with built-in diagnostic features for fault detection and troubleshooting, thereby enhancing the reliability of the overall system. While automation is a key aspect, providing a user-friendly interface for operators and customers is also important. By automating the car washing process and optimizing resource usage, the PLC-based system can result in cost savings for the car wash operator. The implementation of a car washing system using PLC technology delivers tangible benefits in terms of efficiency, reliability, customization, and sustainability, ultimately enhancing the overall customer experience and business success. The integration of a car washing system using PLC technology represents a significant advancement in the automotive service industry. The benefits of a PLC-based car washing system are multifaceted. By automating the cleaning process, operators can significantly reduce reliance on manual labor, streamline operations, and increase throughput attain the maximum benefits thereby enabling a surge in their production

KEYWORDS : programmable logic controller, car washing sytem, sub line conveyor, dryer, motors

I. INTRODUCTION

Traditional car washing methods often suffer from inefficiencies, excessive water usage, and limited customization options for customers. Moreover, the lack of automation can lead to inconsistent results and increased labor costs. To address these challenges, our project aims to develop an innovative Car Washing System using a Delta Programmable Logic Controller (PLC) to automate and optimize the car washing process. The automatic car wash control system should select the working mode according to the actual situation when using, the working process of the two modes is as follows: The type of car washing is optional, but the car washing process contains 3 processes: foam cleaning, rinsing and drying. If the switch is placed in the manual mode, press the start button to perform the foam cleaning. According to the flushing button, clean water is carried out; the air dry button is used for air drying; the end button is used to finish the car washing operation. , the photoelectric monitoring switch identifies it. When the drum drops to the designated position, the portal frame moves to the rear while the horizontal drum and the vertical drum rotate at the same time

II. RECENT WORK

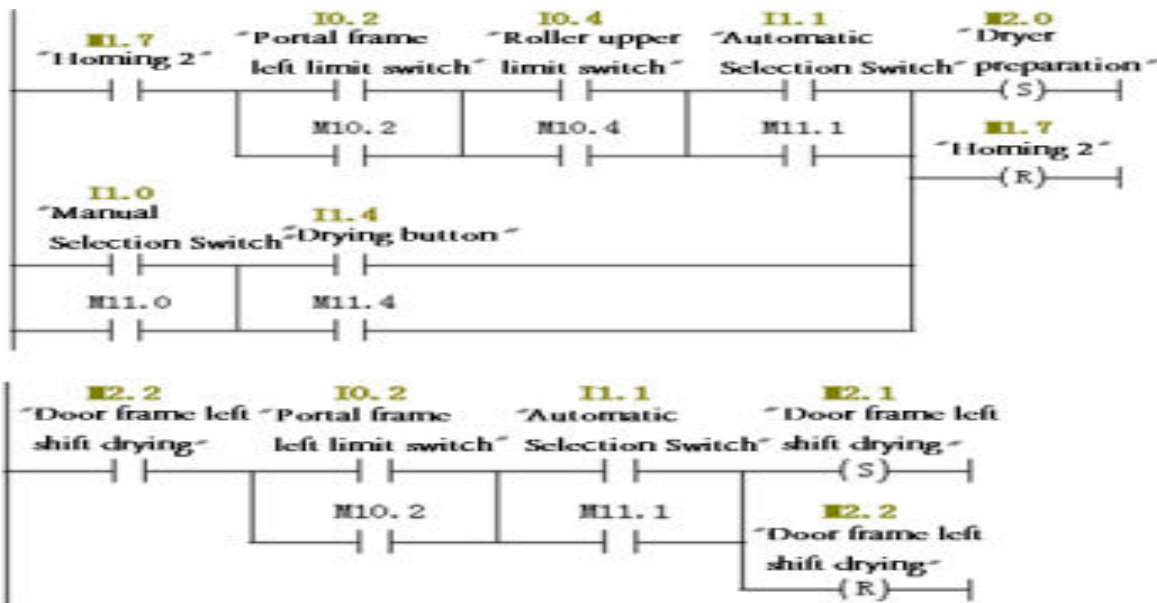
The central component of the system, in charge of directing and arranging all activity. With characteristics like solid reliability, diverse connectivity choices, and high-speed processing, Delta offers a variety of PLC models that are appropriate for various applications. These track variables including temperature, pressure, and water level as well as identify the presence of automobiles. For instance, water level sensors make sure there is enough water for the washing operation, and proximity sensors can identify when a car approaches the washing station. The movement of brushes and other mechanical parts, as well as the flow of water, soap, and other cleaning substances, are all managed by motors, pumps, and valves. Different kinds of actuators can connect with Delta PLCs to carry out
Proposed work explanation



The primary object of this study is to develop a feasibility ,effectiveness and potential benefits of automation for an industrial product sorting machine .The research aims toaccess the feasibility of industrial automation with programmable logic controller

- Access the technical feasibility of automation in real world of industrial automation
- Evaluate the economical viability and cost effectiveness of plc based industrial automation
- Analyze the environmental impact and sustainability benefits of automation
- Develop practical recommendation and guidelines for the design and implementation of automated product sorting machine

III. LADDER DIAGRAM



AUTOMATION

PLC is the main tool uses in the industrial for automation for power up the total industry It will helps to improve the efficiency of the industry

PRODUCT SORTING

In this system we use plc to sort the product by using their sizes this product sort two different size of the product one is in 10cm another one is in 15cm

SENSORS

In this prototype we uses two different type of sensors they are proximity sensor is used to detect the product and pneumatic pistons used to move the products

PROXIMITY SENSOR





Proximity sensor detect the object without touching it and therefore ,they do not cause abrasion or damage to the object the device such as limit switches detect an object by contacting it,but Proximity sensors are able to detect the presence of the object electrically ,without touching it anyway

DRYER



The movement of the piston is triggered by compressed air,controlled by a directional valve .The direction is defined by the chamber into which compressed air allowed to flow inside the cylinder .The force is transferred by the piston rod

CONVEYOR



The 240V gear guided motor is used to run the conveyor this conveyor set up is driven by the conveyor belts

V. RESULTS AND DISCUSSION

Discuss the sorting machine's accuracy in accurately classifying products according to the preprogrammed criteria. If available, provide quantifiable data, such as the proportion of products that were correctly sorted against those that were misclassified.



SPEED: Assess how quickly the sorting is going. Metrics like products sorted by hour or minute may be included in this. Compare the desired or anticipated throughput with the actual performance.

RELIABILITY: Evaluate the PLC system's capacity to reliably carry out the sorting duties over an extended length of time without faults or malfunctions.

Talk about how adaptable the device is to handling various product kinds and adjusting to shifting sorting requirements. Determine how simple it is to adapt the PLC program to different sorting tasks. Examine how economical the sorting machine is in relation to other approaches

Examine the PLC system's user interface, paying particular attention to its accessibility and ease of use. Talk about any enhancements or user comments that you encountered while testing.

Analyze performance by interpreting the findings in the Results section. Talk about any trends or patterns in the machine's performance that you have seen, like differences in accuracy or speed depending on the operating environment.

V. CONCLUSION

This design is based on PLC automatic car wash control system, which has high efficiency, strong stability, low cost, greatly improves the car wash efficiency and automation, and can realize the switch between manual and automatic modes. The PLC controller is stable, reliable, easy to maintain and compatible. It can work in various environments. At the same time, the visual mode of WinCC is easy to monitor and operate. The automatic car washing control system not only cleans all aspects of the vehicle, but also adapts to many types of vehicles, and has practical application value

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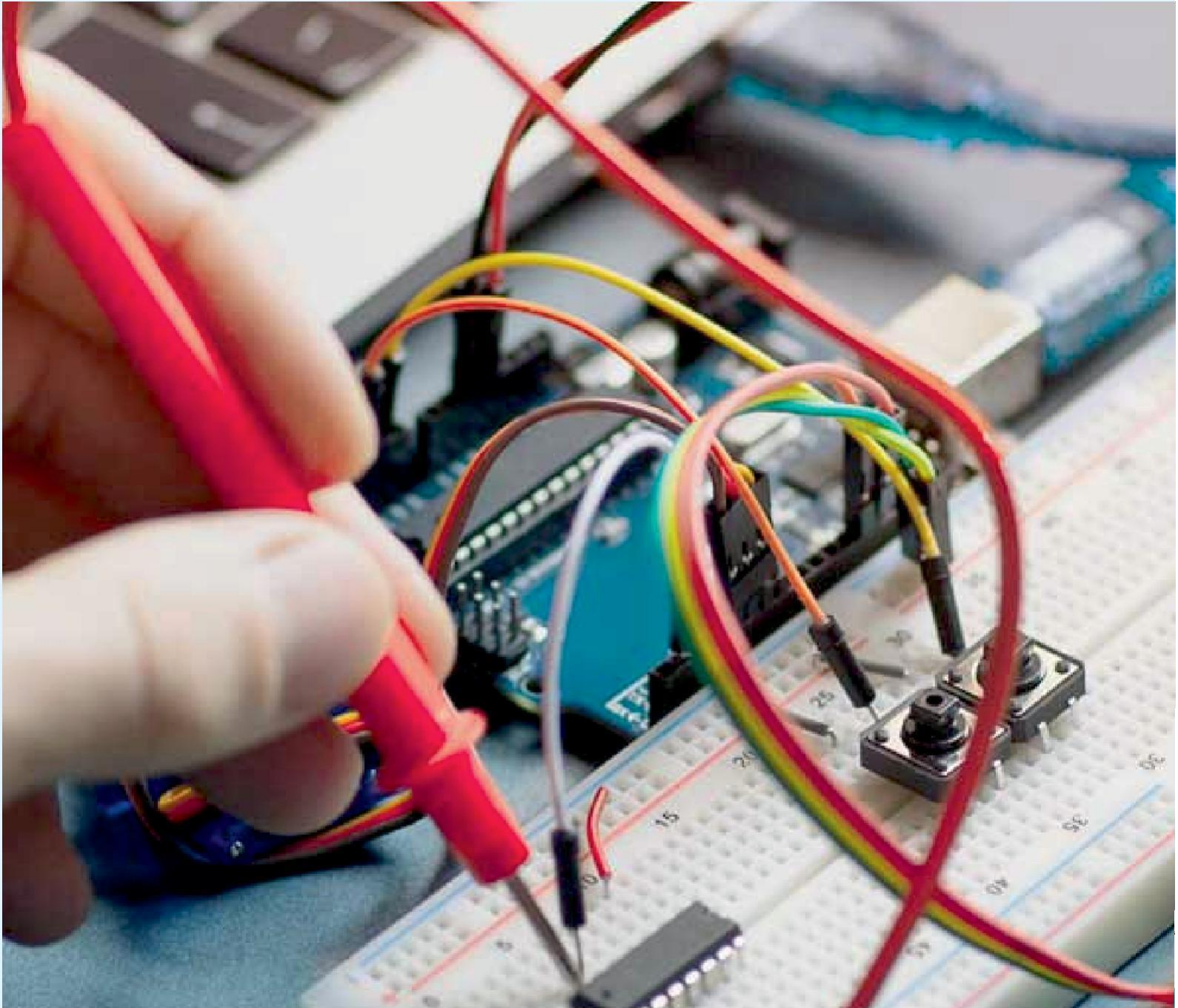
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