



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 4, April 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

9940 572 462

6381 907 438

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Automatic Car Washing System

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ABSTRACT: Now a days, Automation is need of time. Today in this modern era automation helps us to save time, cost as well as manpower. Vehicles are used extensively for transportation. It is also important to have easy and effective system for maintaining the vehicles cleanliness. Our paper focuses on car washing using Arduino Uno. Car Washing can be done at spaces where cars can be parked for a long time and washing car can be done easily like fuel filling stations, super markets, hospitals, government buildings etc.

I. INTRODUCTION

In the past century, man began to acknowledge the balance that existed between the environment. In the course of the previous two centuries, man's industrialization efforts and activities offset the balance that had been maintained between the climatic conditions that prevailed. Detrimental practices such as deforestation, air and water pollution began to rise and consequently posed a threat to mankind's own survival. These malevolent practices could chiefly be attributed to the rise in the global population accompanied by rapid technological advancement which was characterized by all manner of pollution.

Car washing is simple actively done in order to keep the exterior of the car clean. Mostly it is done manually in automatic garage or service centre of automobile companies. This manual way of cleaning car results in more consumption of water, manpower and time.

The automatic car washing system explained in this paper minimises the use of water and also manpower requirement. Our car washing system utilises control using Arduino Uno system. There are three process involved in our car washing system namely washing, cleaning, drying. Cycles of washing includes washing with water, and another is wiping with the brushes and then it will be get dry with the help of fan.

Using this automatic car washing system, many cars can be washed and it will save time, energy and manpower. Such system can be installed anywhere such as malls, airport, railways stations, residential buildings etc. The automated car wash method, as the name indicates, uses a series of machines that work together to clean your car. Automatic car cleaning can be done in two ways; roll-over and conveyor style. In a roll-over car wash system, you drive into a wash bay and stop your car. The car wash management system allows car wash service providers to manage profiles of customers and keep track of the cars that are washed and also records each customer. The car wash management system also allows service providers to create customizable reports based on specific criteria.

II. LITERATURE REVIEW

A car is seen as a visual representation of our tireless work efforts, a reward for a job well done. However, car washing is a process that requires much water. In as much as it is a worthwhile endeavor, there is a need to take caution. This is attributed to the fact that the more times we wash the cars, the more water and chemical will be used.

According to Residential carwash water monitoring study of Federal way in 2009, the average frequency of residential car washing in the Puget Sound region is once every two weeks (Livingston, 2005). During these intervals, an average of 20 gallons of water is used to wash a vehicle. 10 gallons of water each week doesn't sound like a big deal. However there are an estimated 62,000 passenger cars and trucks registered in Federal Way (Smith et al, 2009).

That means 620,000 gallons of water is used by car owners for car washing every week. This not only indicate an unnecessary wastage of water, but also the high potential of environmental pollution that may arise from the dirt and soapy water that emanates during the car washing process.

As Smith et al assert, the chemicals used to wash the cars accompanied by the oil, gasoline and grease extracts that are removed during car washing presents potential environmental pollutants. The results compiled from the Residential carwash water monitoring study of Federal way support the findings of the Puget Sound Partnership 2008 Action Agenda. The Action Agenda also points out that majority of the pollutants getting into the rivers, lakes and marine



waters around Puget Sound came from various pathways. Surface water runoff was highlighted as the primary transportation route for the main contaminants. As documented in the final report, the most concentrated contaminants came from the developed lands (residential and commercial estates). This study simply highlighted how the situation is thereby emphasizing on the need to take action in regards to car washing as a root cause of water pollution in this area. A review of ‘The Impact of Social Capital on Residential Water-Affecting Behaviours in a Drought-Prone Australian Community’ points out that: “Researches have focused on reducing the quantity of water consumed, with the impact of everyday behaviours on water quality largely overlooked in the academic literature and mainstream media.

As Alvord reiterates, car washing practices involve the use of excessive water and chemicals. However, if the practices are not regulated, they lead to a situation where the water used ends up polluting the runoff and storm drains. This can in turn have negative environmental impacts on both the quality and quantity of urban water resources.

III. DISCUSSION

As the Block Diagram is shown in the Fig.1. it is clear that the working of the system is only start when conveyor belt motor will rotate and belt will going to rotate within the time delay which is fixed. The algorithm or step by step procedure is explained in the flow chart below.

A. Washing:

This is the first step after wiping the car and then water will sprinkled on the car to clean.

In a car washing system, washing is a primary stage. In the first stage car is to be washed by water necessarily to remove dust or mud from the outer body and from wheels of car. This process is done manually in service stations. In our automatic system when the car is sensed on the conveyor belt by the proximity sensor, the conveyor belt stops the solenoid valve is opened and hence water is sprayed on the car.

There are three process of getting the car to be washed:

- ✓ Wiping with the Brushes.
- ✓ Washing with the water.
- ✓ Drying with the fan.

After wiping with the brushes , the car has to be washedwith water to remove the excess dirt and dust.When this stage is completed the conveyor belt starts and car is moved ahead.

B. Cleaning:

After washing the next process is called Cleaning. In cleaning, car is sensed by the sensor and the mechanism of motor with curtain is use for cleaning. A set of horizontal brushes wash the top, front and rear of the vehicles. Sets of brush will wash the area around the vehicles, and another set of wheel brush cleans the wheel. The water rinses away. Here in cleaning section dirt and dust are being clean with the water as well as brushes.

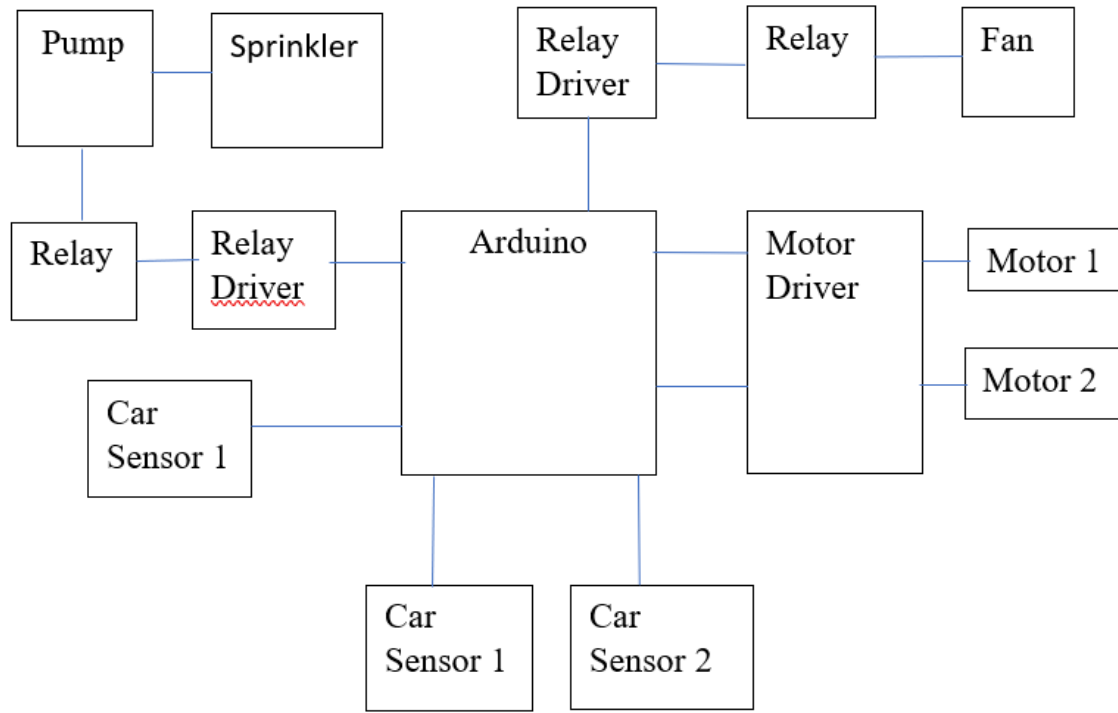


Fig. 1. Block Diagram of Automatic Car Washing System.

When the second sensor will sense the position of the car then after some time delay pump will operate and sprinkle the water on the car and the car will going to wash very cleanly, in this process the conveyor belt will stop when wiping, pumping, drying process is carried out.

The use of water supplies and energy is self-evident since car washes are users of such resources. The professional car wash industry has made strides in reducing its environmental footprint, a trend that will continue to accelerate due to regulation and consumer demand. Many car washes use water reclamation systems to significantly reduce water usage and a variety of energy usage reduction technologies. These systems may be mandatory where water restrictions are in place.

C. Drying:

After cleaning the further process is called drying. In drying, car is sensed by the IR sensor and so the conveyor belt stop and dryer/fans starts. A compressed air dryer is used for removing water vapour from compressed air which are commonly found in a wide range of industrial and commercial facilities. Hence the car will be dried using the dryers.

Drying process is very much important because whatever the water is sprinkled on the car that is to be clean, otherwise their will be spots on the car, and this is create the bad appearance on the car. So as all the above process are important likewise this drying method is also necessary to be happened.

After this stage the car is cleaned and hence the conveyor belt starts and the car is removed from the conveyor belt. This is the drying process of car and the car is ready to move towards the owner. Following are some advantages of car washing system, and that is why this process is more popular now a days:

Multiple protection switches ensure the security and reliability during washing process.
Extreme high cost performance with service life exceeding 10 years.



Anti-explosion, auto-locking prompt and other prompts ensure the car security. Simple operations and all washing modes can achieve Two-Click Car Washing. Built-in self-diagnose system can recognize and remove obstacles during car washing.

IV. FLOW CHART

In car washing system, the car is moved to the conveyor belt and the presence of the car is detected by a sensor. As seen in the flow chart when the car is detected the sensor gives signal to the relay and hence the conveyor belt stops. After this stage the car has to be washed with water and hence the pump is operated and water is sprayed on the car.

The car washed with water to remove all the dirt and dust so for this another solenoid valve is to be opened. After the washing stage the car is moved ahead for cleaning using fan. The IR sensor detects that the car is in place and hence the car is cleaned using the brushes. The last stage of car washing system is drying the car for which the car is again moved ahead and when the IR sensor detects the car in place the dryer turns on and the car is dried. The conveyor is moved on again and the car is removed from the conveyor belt as shown in the flow chart. Thus all the three stages are completed after which the car is cleaned automatically

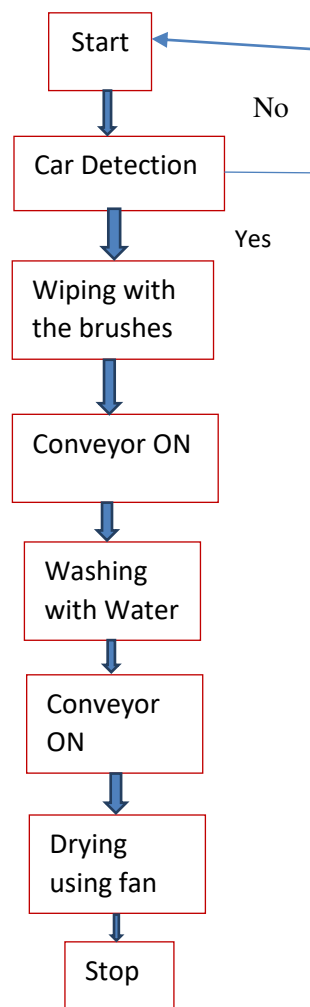


Fig.2. Process Flow Chart



|| Volume 12, Issue 4, April 2023 ||

| DOI:10.15680/IJIRSET.2023.1204049 |

V. RESULT

In Automatic Car Washing System, we performed all the operations needed to clean the car successfully by using Arduino Uno and perform some test to checked the overall process step by step by visualization. After checking the process step by step we have face some problems regarding the operation of the delay and the position of the car. After completion of the above processes by installation of this system car washing will be cost effective, time saving and pollution free. The results are we have completed the process of car washing effectively.

VI. CONCLUSION

This prototype will help to perform car washing automatically and results in high quality end product. Thus it will be User-friendly and capable to wash multiple cars at a time. Also require less man power, time and no pollution. The demand of the Automatic Car washing Services is much high and the people are willing to wash their cars in such a place where their car paint is not damage. And a better wash is given. Very important factor that the people are able to save their time as this car wash takes less time period and the car is dried as well. So this new Automatic car wash service should be introduced to there are so many potential customers waiting for such services.

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Impact Factor: 8.423



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