International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 05 | May - 2023 SJIF 2023: 8.176 ISSN: 2582-3930

AUTOMATIC VEHICLE WASHING SYSTEM

B. CHANDRASEKHAR

A. Sridhar, D. Akhil, K. Ravi Teja, Guru Nanak Institution of Technology, Hyderabad, Telangana

ABSTRACT: Automatic vehicle washing system is very common in developed countries. Vehicle washing system is usually associated with fuel filling stations. It consists of large machines with automated brushes controlled by program logical controllers. Automatic vehicle washing system is fully automated with different stages of foam, washing, drying and brushing. This system uses large quantity of water this water recycling plant is also an integral part of the automatic vehicle washing system but at this level we are only presented the vehicle washing only. As compared to foreign countries this system is used in very less no. of cities in India because of its cost and complexity but we have tried to minimize it according to the device list which will be definitely helpful for our project. In this project we have two stages of cleaning system, they are:
• Water wash
• Brush clean
• drying

I. INTRODUCTION

Robotics is a branch of engineering and science that includes electronics engineering, mechanical engineering and computer science and so on. This branch deals with the design, construction, and use to control robots, sensory feedback and information processing. These are some technologies which will replace humans and human activities in coming years. Robots can take any form but many of them have given the human appearance. Most of the robots of today are inspired by nature and are known as bioinspired robots. Robotics is that branch of engineering that deals with conception, design, operation, and manufacturing of robots. There was an author named Isaac Asimov, he said that he was the first person to give robotics name in a short story composed in 1940's. In that story, Isaac suggested three principles about how to guide these types of robotic machines. Later on, these three principals were given the name of Isaac's three laws of Robotics. These three laws state that: Although a significant numbers of engine valve-actuation systems including cam-based and cam less mechanisms have been already introduced by several researches and companies, only few types of these systems (mainly cam-based) have been employed on commercial vehicles due to the liability, durability and cost issues. Cam-based valve systems offer reliable and durable functionality, the cam less valve trains can vary valve lift and more timings to a greater extent comparing to the cam-based types. Among various categories of cam less mechanisms, the electromagnetic actuator system is the most desired one.

- Robots will never harm human beings
- Robots will follow instructions given by humans with breaking law Robots will protect themselves without breaking other rules.

Many robots are built to do jobs that are hazardous to people, such as defusing bombs, finding survivors in unstable ruins, and exploring mines and shipwrecks. Robotics is also used in STEM (science, technology, engineering, and mathematics) as a teaching aid.

1.1 HISTORY

The history of robotics has its origins in the ancient world. The modern concept began to be developed

with the onset of the Industrial Revolution, which allowed the use of complex mechanics, and the subsequent introduction of electricity. This made it possible to power machines with small compact motors. In the early 20th century, the notion of a humanoid machine was developed. The first uses of modern robots were in factories as industrial robots – simple fixed machines capable

of manufacturing tasks which allowed production with less need for human assistance. Digitally controlled industrial robots and robots using artificial intelligence have been built since the 2000s.

1.2 WHY AUTOMATE?

Automation is renowned for improving productivity and throughput, reducing labour costs, and boosting quality. It can also save floor space by better utilizing available work areas and improving process flow. Many other benefits may be difficult to quantify, but just as impactful.

- Increase productivity and throughput Reduce labour costs
- Save floor space
- Improve quality and consistency
- Reduce waste
- Increase tracking and traceability Improve safety
- Promote labour to higher-value tasks

Humans are humans, they will mess up from time to time," says Mark Sumner, Vice President Sales and Marketing at Acieta LLC, an RIA Certified Robot Integrator. "Robots are very repetitive, they are very consistent, which means you will get a rather consistent part every single time. This reduces scrap

1.3 ROBOTIC COMPONENTS

Robot parts include a wide variety of items such as servos, encoders, power supplies, motors, wheels, gears, cogs, arms, probes, and cameras. The various components used to construct a robot are listed below:

- Power source Actuation
    1. Electric motors
    2. Linear actuators
    3. Air muscles
- Piezo motors Sensing
    1. Touch
    2. Vision
    3. Other
- Manipulation
    1. Mechanical grippers
    2. Vacuum grippers
- Locomotion
    1. Rolling robots
    2. Walking applied to robots
    3. Other methods (flying, skating, climbing etc)
- Environmental interaction and navigation Human robot interaction
    1. Speech recognition
    2. Voice
    3. Gestures
    4. Facial expression
    5. Social intelligence

1.4 APPLICATIONS

A professional service robot is defined as a semi- or fully autonomous robot for automation of commercial tasks, excluding manufacturing operations. Service robots for professional use are experiencing a technological revolution. A rapid proliferation in robot capabilities – driven by innovations in machine learning, artificial intelligence, adaptive computing and vision systems – is causing the market to nearly triple in value. The combined market value for 2019 through 2021 for professional service robots is estimated to be worth $37 Billion, according to the International Federation of Robotics World Robotics 2018 Service Robots report. Current and potential applications include:

- Agriculture robots
- Construction robots
- Customer service robots
- Demolition robots
- Exoskeleton robots
- Field robots
- Humanoid robots
- Industrial cleaning robots

1.5 Introduction to automated vehicle washing system

The first automatic vehicle washes appeared in the late 1930s. Automatic vehicle washes consist of tunnel like buildings into which customers (or attendants) drive. Some vehicle washes have their customers pay through a computerized POS (point of sale unit), also known as an "automatic cashier". The mechanism inputs the wash PLU into a master computer or a tunnel controller automatically. When the sale is automated, after paying the vehicle is put into a line-up often called the stack or queue. The stack moves sequentially, so the wash knows what each vehicle purchased. After pulling up to the tunnel entrance, an attendant usually guides the customer onto the track or conveyor. At some washes, both tires will pass over a tire sensor, and the system will send several rollers. The tire sensor lets the wash know where the wheels are and how far apart they are. On other systems the employee may guide the customer on and hit a 'Send Vehicle' button on the tunnel controller, to manually send the rollers which push the vehicle through. When the customer is on the conveyor, the attendant will instruct the customer to put the vehicle into neutral, release all brakes, and refrain from steering. Failure to do so can cause an accident on the conveyor. The rollers come up behind the tires, pushing the vehicle through a detector, which measures vehicle length, allowing the controller to tailor the wash to each individual vehicle. The equipment frame, or arches, varies in number and type. A good vehicle wash makes use of many different pieces of equipment and stages of chemical application to thoroughly clean the vehicle.

Rotating brushes inside a conveyor vehicle-wash

Also visible is the conveyor. Thevehiclewash will generally start cleaning with pre-soaks applied through special arches. They may apply a lower pH (mild acid) followed by a higher pH (mild alkali), or the order may be reversed depending on chemical suppliers and formula used. Chemical formulas and concentrations will also vary based upon seasonal dirt and film on vehicles, as well as exterior temperature, and other factors.

Chemical dilution and application works in combination with removal systems based on either high pressure water, friction, or a combination of both. Chemical substances, while they are industrial strength, are not used in harmful concentrations since vehicle washes are designed not to harm a vehicle's components or finish. The customer next encounters tire and wheel nozzles, which the industry calls CTAs (Chemical Tire Applicators). These will apply specialized formulations, which remove brake dust and build up from the surface of the wheels and tires. The next arch will often be wraparounds, usually made of a soft cloth, or closed cell foam material. These wraparounds should rub the front bumper and, after washing the sides, will follow across the rear of the vehicle cleaning the rear including the license plate area. Past the first wraps or entrance wraps may be a tire brush that will scrub the tires and wheels. This low piece is often located beneath a matter (the hanging ribbon-like curtains of cloth that move front to back or side to side) or top wheels. There may also be rocker panel washers which are shorter in size (ranging in size from 18 inches [45 cm] up to 63 inches [160 cm] tall) that clean the lower parts of the vehicle. Most rocker brushes house the motor below the brush hub so they don't inhibit cloth movement and allow the brush to be mounted under a support frame or below a matter. Some vehicle washes have multiple matters, or a combination of matters and top brushes.

a vehicle in the high-pressure rinse stage of the wash

After the mutter or top brushes, the vehicle may pass through a second set of wraparounds. This may also be where high-pressure water streams are used to clean difficult to reach parts of the vehicle. The vehicle generally passes over an under vehicleriage wash and/or has high pressure nozzles pointed at it from various positions. Next may be a tire spinner, high pressure nozzles angled specifically to clean wheels and tires. After the several wash stations the vehicle may go through triple foamers, usually red, blue, and yellow, although colours can be customized with higher end chemical suppliers. The triple foam process includes special cleaners as well as some protective paint sealant. Protectants vary by manufacturer. Near the rinse is where a tire shining machine is often installed, which is designed to apply silicone tire dressing to the tires. This application makes the tires look good (new and glossy) and preserves the rubber. Next the vehicle is treated with a drying agent and a final rinse. Many vehicle washes utilize a "spot free" rinse of soft water that has been filtered of chlorine and sent through semi permeable membranes to produce highly purified water that will not leave spots. After using spot free water, the vehicle is finished with forced air drying, in some cases utilizing heat to produce a very dry vehicle.

1.6Stagesofvehiclewashing system:

1.6.1 Pre-wash/foam wash:

foam wash of vehicle

Foaming Vehicle Wash is an easy to use and safe pH neutral formulation. Its rich foam quickly breaks down and removes everyday contaminants from your vehicle. For a long-lasting shine, finish with Rapid Aqua Wax. The Foam Wash technique, introduced in 2014 at Nissan service centres, uses only 90 litres of water per vehicle which

reduces water consumption by 45 percent. The amount of water saved by the company is equivalent to the water consumption of around 25,000 households in India for one day

1.6.2 Brushing sides of the vehicle.

brushing sides of the vehicle

1.6.3 Brushing top of the vehicle

brushing top of vehicle

1.6.4 Clean wash

cleaning of vehicle with water

1.6.5 Drying

drying of vehicle

CHAPTER-2

LITERATURE REVIEW

K. Vidya sagar Etal. In RFID-GSM Autonomous Vehicle Washing System, in international journal of computer application (0975-8887) vol.121-NO.2, July 2015. This paper describes the automatic vehicle washing system by imparting the micro controller to process the operations. GSM Technology is used to send the information of the process to the vehicle owner this paper aims to demonstrate the water resource to wash the vehicle. Water contamination water recycling system is focused for modern vehicle washing system.

Mr. Bam bare tejas Etal in IJSTE vol.4 issue 5 ISSN: 2349-784xs. Automatic vehicle washing and

drying system explains about the use of electro-mechanical system for controlling automatic vehicle washer. The mechanism for automatic vehicle washer includes lifting of parallel vehicles and moving in forward direction. Then washing of vehicles takes place firstly with foam water then with soap water and again with clean water. Finally vehicle is lifted again and placed back parallel. The system is ma0inly divided into two section namely mechanical assembly and electrical control. It stresses the use of PLC in controlling of vehicle washer.

S.V. Rokade Etal, in IJARSE (international journal of advance research in science and engineering) vol. No.-7 ISSN: 2319-8354 explained that all the operations in automated vehicle washing system can be processed using plc (programmable logic controller) by the installation of this system the vehicle washing will be effective, time saving and pollution free and we can clean a vehicle upto 95%.

Kailash sharma Etal, in IRJET (international journal of engineering and technology) vol. 5 eISSN: 2395-0056, p-ISSN: 2395-0072 explained that the proposed method for controlling automatic vehicle wash removes restrictions that exist on common systems and introduces a unique way to create error-free and highly efficient project. This prototype will help to perform vehicle washing automatically and results in high quality end product. It requires less man power, time and no pollution.

N.B. Bankhele Etal, in IOSR journal of engineering (IOSR JEN) ISSN: 2250-3021, pp 45-51 explained that, all the process of automated vehicle washing systems can be made easier with the help of PLC and SACADA with the help of operating systems and codings in the operating system

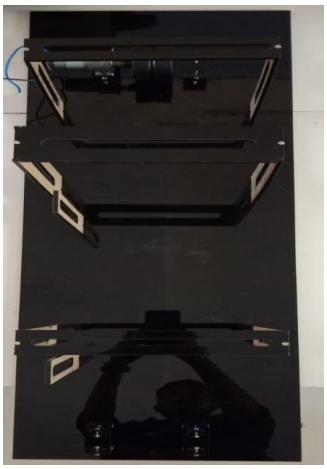
CHAPTER 3

HARDWARE REQUIREMENTS As this system deals with the automated vehicle washing system, in this system the hardware requirements are as follows:

3.1 Layouts of automated vehicle washing system:

The layout of automated vehicle washing system is made up of acrylic material. In this there are different layouts are joined together to construct the whole setup of automated vehicle washing system. The layouts are fixed together with the help of m10 screws.

side view of acrylic layout



top view of acrylic layout

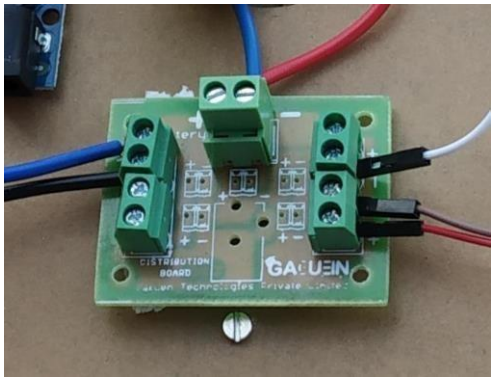
3.2 Arduino Uno R3 board:

The **Arduino Uno** is a microcontroller **board** based on the ATmega328. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs), a 16 MHz resonator, a USB connection, a power jack, an in-circuit system programming (ICSP) header, and a reset button. The technical specifications of the board are:

Arduino uno board

3.3 DISTRIBUTION BOARD

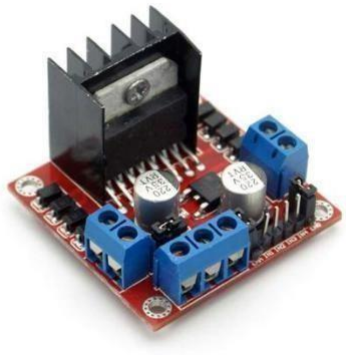
A distribution board (also known as panel board, breaker panel, or electric panel) is a component of an electricity supply system that divides an electrical power feed into subsidiary circuits, while providing a protective fuse or circuit breaker for each circuit in a common enclosure.



DISTRIBUTION BOARD

3.4 MOTOR DRIVER BOARD (L298n 2A)

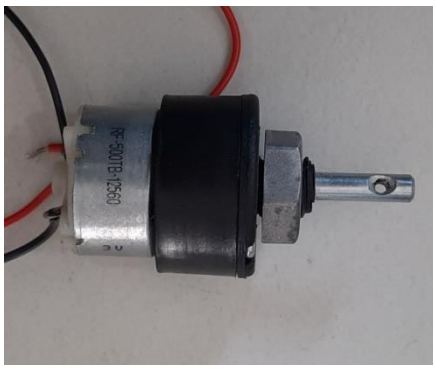
This L298N Based Motor Driver Module is a high power motor driver perfect for driving DC Motors and Stepper Motors. It uses the popular L298 motor driver IC and has the onboard 5V regulator which it can supply to an external circuit. It can control up to 4 DC motors, or 2 DC motors with directional and speed control. This motor driver is perfect for robotics and mechatronics projects and perfect for controlling motors from microcontrollers, switches, relays, etc. Perfect for driving DC and Stepper motors for micro mouse, line following robots, robot arms, etc.



L298n MOTOR DRIVER

3.5 Dc motor:

A DC motor is an electric motor that runs on direct current power. Practical DC Motor consists of field windings to provide the magnetic flux and armature which acts as the conductor. Brushless DC Motors Work. The input of a brushless DC motor is current/voltage and its output is torque the metal gears have better wear and tear properties. Gearbox is sealed and lubricated with lithium grease and requires no maintenance. Although motor gives 300 RPM at 12V, motor runs smoothly from 4V to 12V and gives the wide range of RPM, and torque.



dc motor

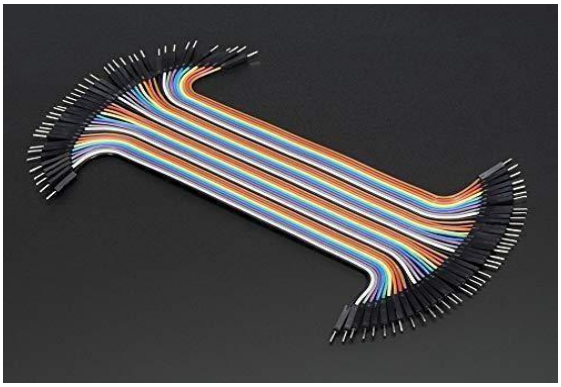
3.6 Dc Geared Motor

A gear motor is an all-in-one combination of a motor and gearbox. The addition of a gear head to a motor reduces the speed while increasing the torque output. A gear motor is a specific type of electrical motor that is designed to produce high torque while maintaining a low horsepower, or low speed, motor output. Gear motors can be found in many different applications, and are probably used in many devices.

Dc geared motor

3.7 Jumper Wires

Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed. There are three types of jumper wires they are



jumper wires

3.8 Proximity sensor:

A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation and looks for changes in the field or return signal. The object being sensed is often referred to as the proximity sensor's target. Different proximity sensor targets demand different sensors. For example, a capacitive proximity sensor or photoelectric sensor might be suitable for a plastic target; an inductive proximity sensor always requires a metal target. Proximity

sensors can have a high reliability and long functional life because of the absence of mechanical parts and lack of physical contact between the sensor and the sensed object.

Proximity sensor

3.9 DC FAN

The direct current fans, or DC fans, are powered with a potential of fixed value such as the voltage

of a battery. In contrast, the alternating current fans, or AC fans, are powered with a changing voltage of positive and of equal negative value. In general, this changing voltage has sinusoidal shape • Size: 3 × 3-inch (80 x 80 x 25mm)

Dc fan

3.10 PUMP

This DC 3-6 V Mini Micro Submersible Water Pump is a low cost, small size Submersible Pump Motor which can be operated from a 2.5 ~ 6V power supply. It can take up to 120 litres per hour with a very low current consumption of 220mA. Just connect tube pipe to the motor outlet, submerge it in water and power it.
Make sure that the water level is always higher than the motor. The dry run may damage the motor due to heating and it will also produce noise.

Dc pump

3.11 Conveyor Belt

A conveyor belt is the vehiclerying medium of a belt conveyor system (often shortened to belt conveyor). A belt conveyor system is one of many types of conveyor systems. A belt conveyor system consists of two or more pulleys (sometimes referred to as drums), with an endless loop of vehiclerying medium—the conveyor belt—that rotates about them. One or both of the pulleys are powered, moving the belt and the material on the belt forward. The powered pulley is called the drive pulley while the unpowered pulley is called the idler pulley. There are two main industrial classes of belt conveyors; those in general material handling such as those moving boxes along inside a factory and bulk material handling such as those used to transport large volumes of resources and agricultural materials.

conveyor belt

3.12 Brushes

The equipment has total 3 brushes 1 Horizontal
Horizontal Brush follows the contour of the vehicle and cleans the body effectively. The Brushes have X profile bristles with feathered brush tips to remain gentle on the vehicle always. Wheel Wash and on Board Blower can be included as an add-on. In conveyor/tunnel vehiclewashes, the main brushes used are top brushes, which descend on an arm from above and roll over the top of the vehicle; wraparounds, which stand on the sides of the tunnel and spin to clean the front, sides and rear of the vehicle; mitter curtains, which are suspended lengths of brush that oscillate to clean the top surfaces of vehicles; wheel and tire brushes**;** and rockers/low side washers (LSWs), which sit low and spin to clean the rocker panel area of a vehicle. Brush materials include nylon, polyester, polypropylene, and hog's hair. It turns out that the soft, natural hog's hair is

the best choice for vehicle wash brushes. It is gentle on your vehicle's paint and the bristles recover their natural shape when bent

brushes of vehicle washing system

3.13 Battery

A 12-volt battery has six single cells in series producing a fully charged output voltage of 12.6 volts. A battery cell consists of two lead plates a positive plate covered with a paste of lead dioxide and a negative made of sponge lead, with an insulating material (separator) in between.

battery

3.14 MATERIAL

Cast Acrylic is a form of poly(methyl methacrylate) (PMMA). It is formed by casting the monomer, methyl methacrylate, mixed with initiators and possibly other additives into a form or mold. Sheet and rod stock are generated by casting into static forms, while tubing is done in rotational molds. It has better thermal stability, higher resistance to crazing when exposed to solvents, wider thermoforming range than extruded acrylic. Cast acrylic has a better ability to be reworked hot and it is known for its superior surface finish and optical properties. Also cast acrylic is more scratch resistant than extruded acrylic. Cast acrylic is also preferred over extruded in applications that require machinings, such as turning on Engine Lathe or milling/drilling. Extruded acrylic, with far less thermal stability, tends to melt and clog cutting tools. Even with slow speeds and lots of coolants, extruded acrylic does not produce the surface finish and tight tolerances achievable with cast acrylic

JUMEI CAST ACRYLIC SHEETS

CHAPTER 4

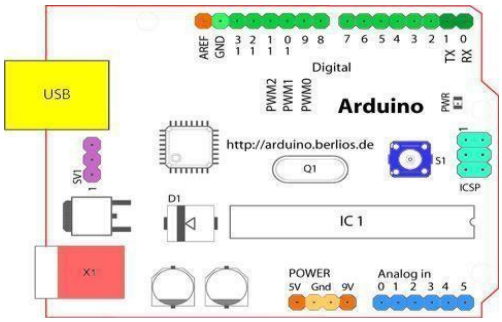
4.1 SOFTWARE REQUIREMENT AND CODING

INTRODUCTION TO ARDUINO

Arduino boards are small electronic circuits including AT-mega microcontroller and other electronic components. There are different types of Arduino boards that their functionality is same, but their size, pin numbers and microprocessor capabilities are different. The basic idea behind the Arduino comes from the fact that it is open source and available to everyone interested in developing new projects. Arduino IDE (integrated development environment) is also very easy to install, use and develop new sketches based on the integrated examples. Arduino boards also support different types of shield by which anyone interested in developing new and large projects could use it easily.

ARDUINO UNO

4.2 ARDUINO BOARD



ARDUINO BOARD

4.4 DIGITAL PINS

In addition to the specific functions listed below, the digital pins on an Arduino board can be used for general purpose input and output via the pin Mode(), digital Read(), and digital Write() commands. Each pin has an internal pull-up resistor which can be turned on and off using digital Write() (w/ a value of HIGH or LOW, respectively) when the pin is configured as an input. The maximum current per pin is 40 mA.

4.4 ANALOG PINS

In addition to the specific functions listed below, the analog input pins support 10-bit analog-todigital conversion (ADC) using the analogRead() function. Most of the analog inputs can also be used as digital pins: analog input 0 as digital pin 14 through analog input 5 as digital pin 19. Analog inputs 6 and 7 (present on the Mini and BT) cannot be used as digital pins.

4.7 LIMITATIONS OF ARDUINO

Some studies mentioned the limitations of the Arduino boards. For example, Scolnic (2015) argued that Arduino has traditional text-based programming language based on C++ and makes it hard to understand the structure of the programming of the Arduino for people who are inexperienced or new to Arduino. Other studies also argued that a well-designed visual programming might be easier to understand since Arduino sketches also include traditional code writing mentality. Another challenge comes from the fact thatmany researcher and institutions are trying to understand how to integrate Arduino more deeply in class environments, for K-12 (David, 2011).

Scolnic (2015) indicated that Arduino, normally, was not designed for educational purposes. The

starting point of the Arduino was based on developing DIY electronic circuits for hobbyists and designers.

Because of this, many researchers found it hard to implement Arduino based activities into class environment. Moreover, Arduino, for many high-level applications and projects, needs external programs and userdeveloped libraries by which users might develop further projects and expand the capabilities of the Arduino boards. Similarly, Linsalata (2012) indicates that Arduino boards, as integrated software and hardware environment, maintain high-level coding knowledge and wiring system thorough libraries for inputs and outputs that make it hard to combine basic functions together. Especially, high-level projects like Arduino robotics systems need abstraction of many different functions rather than simple processor operations.

CHAPTER-5

WORKING OF SYSTEM

5.1 INPUT POWER

Input power is given through a 12 V battery which is connected to distribution board. From distribution board, power is distributed to arduino Uno board and two motor drivers. When the power supply is given the motor (M1) which is Johnson motor start working, which helps conveyor belt to move forward till proximity sensor (P1) senses the conveyor plate

5.2 PROXIMITY SENSOR

When vehicle comes near proximity sensor, Sensor senses and conveyor stops moving and brushes starts brushing the vehicle with the help of three motor (M2 M3 M4) in which two brushes are horizontal and one brush is vertical. Two horizontal brushes are connected to motor M2 and M3 and one vertical brush is connected to motor M4.

As vehicle reaches near proximity sensor which is second section of system i.e. brushing of vehicle, it goes for four seconds as programmed and after four seconds the conveyor belts starts to move for next section.

5.3 PRE-WASH OF VEHICLE

Prewash of vehicle is the first section of the automated vehicle washing system, here the vehicle is prewashed with foam or made wet by water. Valve V1 will remain open for four seconds after four seconds valve will be closed automatically and when the vehicle is completely foamed or wet vehicle moves for brushing section

5.4 BRUSHING OF VEHICLE

Brushes of the system is connected to the three motors (M2,M3&M4) in which two brushes are horizontal and one

brush is vertical. Two horizontal brushes are connected to motor M2 and M3 and one vertical brush is connected to motor M4. The brush rotates and cleans the vehicle for four seconds as programmed. Brushes rotates in clock wise and anti-clock wise directions for two seconds, that is for a total of four seconds two seconds forward and two seconds backward

5.5 FINAL WASH SECTION

Valve V2 gets open for two seconds cleans the vehicle and gets closed, again conveyor starts moving until it reaches to the next section or gets detected by proximity sensor P2

5.6 EXIT

After final wash section completion the conveyor starts moving till proximity sensor P2 detect the vehicle.

Once the vehicle is detected, drying section is started. Fan starts rotating to dry the vehicle and then the vehicle is exited and circuit is turned off

5.6 ASSEMBLING

They are three stages for assembling of automated vehicle washing system

1. Sprinkling water to the vehicle
2. Brushing the vehicle
3. Drying the vehicle

Stage 1:

In this we use Johnson motor for pulley with the help of conveyor belt it is connected to one edge to another edge to the acrylic layout. For the washing we use water pump which is placed on the top and connected with the tank for the water supply to sprinkler. To sprinkle on the vehicle, the Johnson motor and water pump which is connected to the motor drive.

Stage 2:

In the 2nd stage we use three dc motors and one proximity sensor the two dc motors are placed on the

top and another dc motor placed on the right side of the acrylic layout, the proximity sensor placed at the right side after three dc motors are placed in the layout and the conveyor belt passes between them for the movement of vehicle. The 3 dc motors ate connected to the motor drive and one proximity sensor is connected to the Arduino Uno board, in this stage the proximity sensor detects the vehicle then stops the movement and rest of the 3 motors which is connected with brushes do the cleaning process to the vehicle.

Dc motor is currently used in propulsion of elevator, and hoists and in drives for steel rolling mills.

Stage 3:

In the 3rd stage we use one dc fan for drying and one proximity sensor for detecting the vehicle, the

dc fan is place on the top of the acrylic layout and the connection are directly connected to the motor drive, the proximity sensor is placed at the right side of the layout. The sensor detects the vehicle and stops and fan dries the total body of vehicle. The vehicle is moved with the help of pulley which is connected with the conveyor belt and the belt moves with the help to Johnson motor. The proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation, and looks for the changes in the field or return signal.

project completion picture

RESULT

The modelling and testing of automated vehicle washing system was done successfully. The basics of robotic automation, the need of robotic automation, the use of Arduino board in robots and the codes or programs required to run the robot has been studied thoroughly and applied in our project. The robotic automation device developed and described in this paper proves the mechanical feasibility of the design. The device is relatively compact and simple to operate, two main design requirements set at the beginning of the project. The control software offers a simple interface without the need for proprietary control stations. The material used in making the body of the system is Cast Acrylic sheets which are tough, light in weight and can withstand high temperatures. IN AUTOMATED VEHICLE WASHING SYSTEM. WE performed all the operations needed to clean a vehicle successfully by Arduino board and also developed the mimic of the whole system and checked the overall process step by step.

CONCLUSION

This prototype will help to perform vehicle washing automatically, results in high quality and product. Thus, it will be user-friendly and capable to wash vehicle in very less period of time with high efficiency. This prototype is also requiring very less man power and chances of causing of harm is very less.

The vehicle washing system produces nearly negligible pollution to the environment and thus environment friendly. The prototype is very cost efficient as less man power is needed and the task is completed in less period of time with

minimum people involving in it and uses less consumption of power and effort.

REFERENCES

1. J. S. Albus, Brains, Behaviour, and Robotics, BYTE Books (McGraw-Hill), 1981, Chap. 11
2. R. U. Ayres and S. M. Miller, Robotics, Applications and Social Implications, Ballinger, Cambridge, MA, 1983.
3. L. Conigliari, 'Trends in the Robotics Industry,' Technical Paper MS82-122, Society of Manufacturing Engineers, Dearborn, MI, 1982.
4. J. F. EngelBerger, Robotics in Practice, AMACOM (Division of the American Management Association), 1980, Chap. 9.
5. J. F. Engelberger, 'the Household Robot: by 1993,' Decade of Robotics, IFS Publications, Bedford, England, 1983, pp. 12-13.
6. P. Foster, 'Can the Robot be the Miner's Friend,' Decade of Robotics, IFS Publications, Bedford, England, 1983, pp. 102-103.
7. W. B. Gevarter, 'Robotics: An Overview.' Computers in Mechanical Engineering. August 1982, pp, 43-49.
8. E. Heer, 'Robots in Space,' Decade of Robotics, IFS Publications. Bedford, England, 1983, pp. 104107
9. V. D. Hunt, Industrial Robotics Handbook. Industrial. Press Inc... New York, 1983, Chap. 14.
10. Japan Industrial Robot Association, the Robotics Industry of Japan, Today and Tomorrow, Fuji Corporation, Tokyo, Japan. 1982.
11. Office of Technology Assessment, Exploratoly Workshop on the Social Impacts of Robotics, Washington, D.C., February 1982.
12. D. N. Smith and R. C. Wilson, Industrial Robots, a Delphi Forecast of Markets and Technology, Society of Manufacturing Engineers. Dearborn. MI. 1982.
13. Wernli, R., 'The Silent World of the Undersea Robot,' Decade of Robotics. IFS Publications Bedford, England, 1983, pp. 100-101.