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Automatic wall painting robot

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ABSTRACT

The painting chemicals are found very much harmful to human painters which were causes the problem to eyes and respiratory system of a human being. Also, the nature of the painting process that requires habitual work and hand rising makes it boring, time and effort consuming. To overcome these problems the proposed system has developed. The belt drive mechanism based systems used to drive the roller up, down, left and right for painting on the wall. And the sensor is using to detect the presence of wall

Keywords— *ATMEGA328, IR sensor, DC motors, Belt-Drive*

1. INTRODUCTION

The development of service robots became popular recently due to the fact that society needs robots to relax humans from tedious and dangerous jobs. Despite the advances in the robotics and its wide-spreading applications, painting is also considered to be a difficult process. Painting is classically done by human and generally requires exhaustive physical efforts and involves exposure to dangerous chemicals. Chemicals can seriously impair the vision, respiratory system and general health of the human painter.

Therefore, the development of a painting robot that can perform the painting task with minimum human intervention is needed. And will improve the quality of the painting.

2. RELATED WORK

Kahane and Warszawsky developed a robot for interior finishing tasks of painting, plastering, and tilling. The robot can move between workstations and deploys four stabilizing legs each site[1] and [2]. A full-scale mechanism foe ceil painting. This robot is bulky and has a small workspace and designed to paint the ceiling only[3]. A scaled-down model for interior wall painting using multi-colour spray were implemented by Nattichia[4]. Sorour described a full-scale wall painting robot, composed of a simple two-link manipulator fitted on a mobile platform[5].

3. PROPOSED BLOCK DIAGRAM

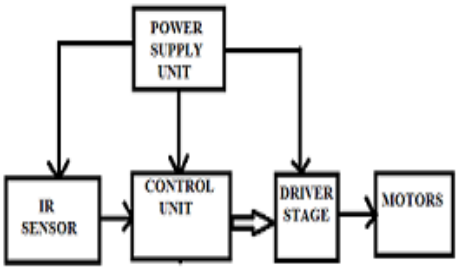

Fig. 1: Block diagram

The proposed system uses One sensor, one motor, One microcontroller, motor drivers, alarm and indicators.

This system is built around the microcontroller. The microcontroller is the brain of the system which will control the entire system in response to the IR sensor controller through the receiver. The battery is the power supply for the system. two motors are used to the motion of automatic wall painting robot.

A motor driver IC is an integrated circuit chip which is used to control the motors. Motor driver IC's act as an interface between the Arduino and the motors.

4. METHODOLOGY

To avoid the risky jobs like painting and maintain the good health of human the proposed system introducing a combination of mechanical and electronic-based automatic wall painting robot, the system introduces an IR sensor(transmitter and receiver) which is fitted on the bout. Which will distinguish or detect the nearness of the wall According to that robot will move system is also introduce the belt drive mechanism to drive the

roller up, down. This proposed system is based on roller painting. The roller brushes are used for the painting instead of a sprayer.

5. MECHANICAL AND HARDWARE

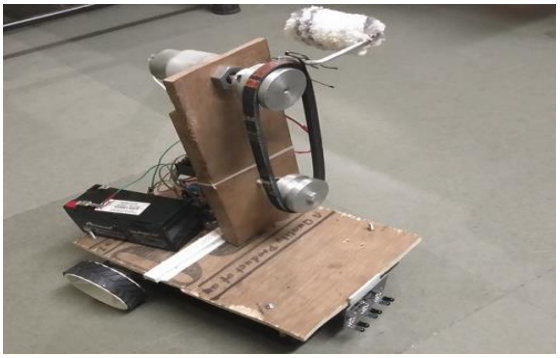

Fig. 2: Mechanical system of the wall painting robot

The 12V DC supply has given to the Arduino and motor drivers. The DC motor is controlled by motor drivers. IR sensor is interfaced to the Arduino. Which is used to detect the presence of the wall? IR (transmitter) fetch the infrared light on the wall and it will be reflected back to the receiver.

The programming is uploaded on Arduino board. According to programming roller will move towards the forward and backward direction. The two-stroke of paintings will put on the wall after that roller will move towards the reverse direction and again it will come to its proper position at that time one procedure of painting well do and the bout wheel will move and the same procedure will continue.

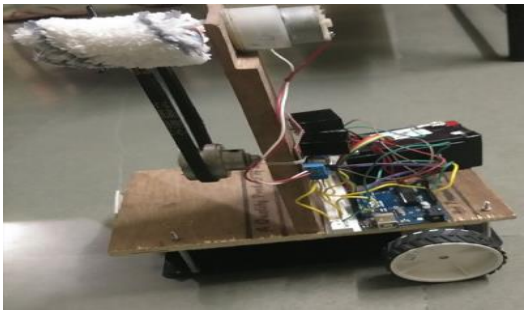

Fig. 3: Mechanical and elctronics composition

6. SOFTWARE DISCRIPTION

6.1 Main program

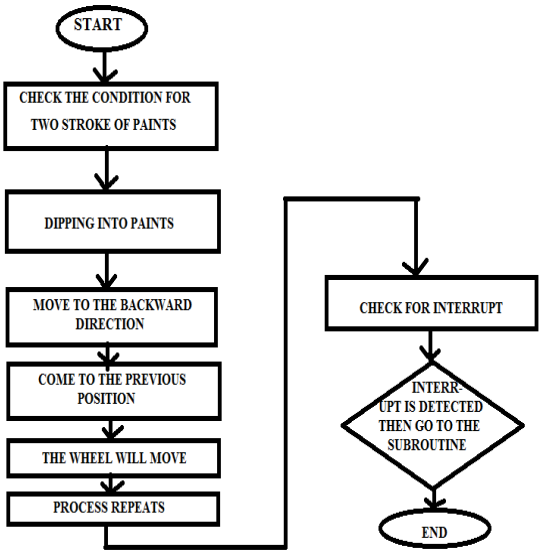

Fig. 4: Main program

6.2 Interrupt subroutine

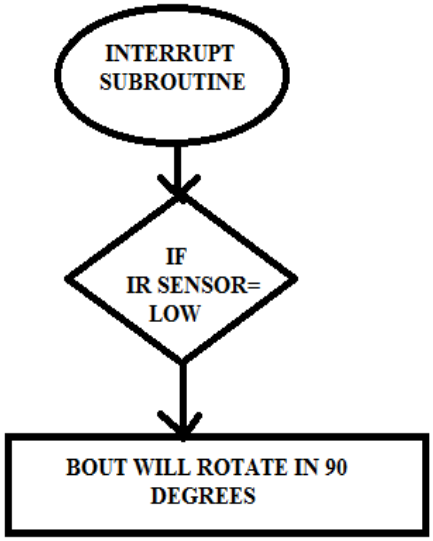

Fig. 5: Interrupt subroutine

7. COMPONENTS SPECIFICATION

7.1 IR sensor

- Working voltage: DC5V
- Working current: 20mA
- Detection range : 30cm
- The wavelength of IR light: 700nm-1mm

7.2 Motor driver

- Drive Voltage : 5V-35V
- Drive Current : 2A

7.3 Software used

- Arduino IDE

7.4 Hardware used

- IR Sensor
- Arduino
- Belt Drive Mechanism
- Bout

Fig. 6: Arduino module

Fig. 7: IR sensor

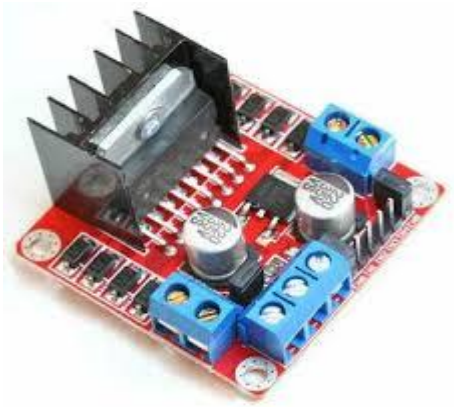

Fig. 8: Motor driver

8. ADVANTAGES

(A) Accuracy and specification

The painting robots are able to paint with high accuracy and comply with the human specification.

(B) Space consumption

The painting robot is able to fit in tighter space because of their slim designing.

(C) Access and paint more parts

The robots are programmed to paint the equipment or wall so they can apply an even roller without wasting paint.

(D) Avoid the risky work

The painting robotis still requires human.
Supervision, but they significantly reduce.
Team's risk of injury.

(E) Efficiency and productivity

The proposed system has higher efficiency.
Better productivity.

9. ACKNOWLEDGEMENT

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10. CONCLUSION

The system has been developed for wall painting using robots. which helps to avoid the physical efforts and risky works of humans.the proposed system has included the belt drive mechanism which are helping to dipped the roller into the paint and drive the roller on wall. the wall is done by an IR sensor which is interfaced to Arduino.

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