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Automatic Robot Spray Painting

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Abstract
Today, robots are extensively used in several industries, including the military, medical applications, factories, entertainment, and automobiles. The application of robots is, however, still relatively rare in construction. A robot is used to increase the speed and improve the accuracy of construction field operations in the construction industry. Also, it can be used to do hazardous work in the construction industry. As an example, painting a house is currently a manual process. A robot that is specially designed for this purpose can simplify the process. Working in an upright position for long periods is very difficult and troublesome for human beings, especially when painting, cleaning, and screwing in the ceilings. Furthermore, standing up while painting is very dangerous for the eyes. We propose, design, and develop a wall painting robot system to solve this problem. According to the testing results, the painter robot performs better than a traditional painter. Thanks to the advances in IT technology, it is now possible to program robots fully automatically and automate industrial tasks. The paper reports on the EU-project Flex Paint, which developed a methodology to automatically generate robot programs for spray painting unknown parts. Four steps are involved in the solution: laser triangulation sensing, geometric feature detection, tool path planning, and generation of the collision-free robot program. A demonstration at an industrial partner shows the results.

Keywords: *Automated robot programming, feature detection, path generation, collision avoidance, sprays painting.*

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I. INTRODUCTION

By automating the process of spray painting objects passed on a conveyor, the need for human intervention is minimized while speeding up the process. Spray paint is typically used in the auto industry, the bodybuilding industry, and the material handling industry. Mostly in industrial works, spray paint is used, mostly in parts of industries and in assembly lines. The painting on the parts will help protect them from rust and give them a color finish. Using hand spraying, multiple nozzle assembly systems are used instead of robot end effectors, which eliminate the initial cost. As we increase production in the assembly line, we have to change the colors of the parts as well. The spraying process takes into account the structure and architecture of the industry's work and helps the assembly line. Most of the spray paint particles miss the targets, causing pollution in the atmosphere. Pollution in the atmosphere alters the environment. As a result of the pollution that will come from this pipeline, industries will also be affected. As part of the painting process, we often use orange peels, blisters, etc. to enhance the products' reflective properties.

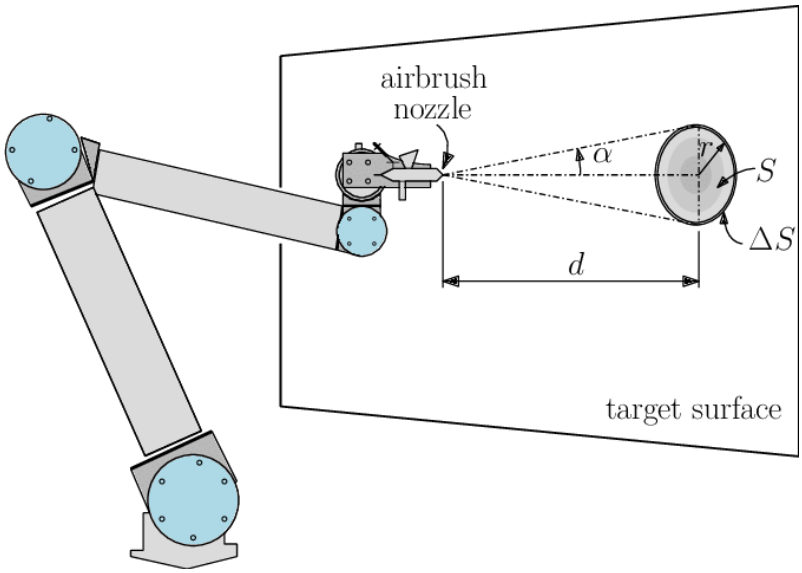
II. COMPONENTS

1. Spray Gun.
2. DC Motor.
3. Robot.
4. Compressor.

III. WORKING PRINCIPLE

The construction of paint ways is apart into the subsequent steps:

Outlining of the painting method, coming up with of encounter free applicator motions. Specifies a mechanical phenomenon of the applicator that satisfies the specified paint quality. During this module solely applicator motions are thought-about in regard to method quality. No, restrain of machines are created and collisions between the applicator and its background don't seem to be thought-about. The system uses the "Geometry Library" and therefore the "Procedure Library" so as to set up this mechanical phenomenon. The arithmetic library specifies for every arithmetic primary or a lot of painting theme, which can be e applied for painting that specific variety of geometric primitive. The painting procedure specifies a way to apply applicator motions to the surfaces so as to realize a satisfactory method quality. The procedure library is established through experimental work. The fundamental plan is to modify outlining of paint strokes that continue everyplace the components albeit totally different geometric primitives should be coated on the surface and albeit continuous automaton motions cannot follow the surface. The system can conceive to approximate the triangular patches of the surface model by larger plane regions (virtual surfaces), that are familiarized during a few main directions. DP/DT switch features a central OFF position, once operated to at least one of the ON positions, the motor can rotate during a right-handed direction, in operation the worm casing and thereby the pinion shaft. The pinion rotates to rotate the gear and thereby the most shaft and change a right-handed direction taking the stand to an in depth position. Once another ON position is operated the motor can rotate during a counterclockwise direction, in operation the worm casing and thereby the pinion shaft. The pinion rotates to rotate the gear and thereby the most shaft and change a counterclockwise direction taking the stand to open position.



IV. ADVANTAGES

1. The painting process is virtually impossible without the painting robot set up.
2. The painting robot saves on the time required for painting.
3. The painting robot saves on the labor cost.
4. A robot is automatic, it reduces human effort.
5. Easy to maintain.

V. APPLICATIONS

1. Substance industry: resin, pigment, industrial medicine, cosmetic, coatings.
2. Foodstuff industry: sugar powder, starch, salt, rice.
3. Environment: assistant detergent, active carbon.
4. Coatings: Powder coatings, pigment paints, etc.
5. Metals: Metal powders, zinc powder, copper powder, coal powder, alloys, etc.
6. Agricultural:-sorting of fruits grain.

VI. CONCLUSION

A method for automatically spray painting families of unknown parts has been presented. As part of the method, a sensing cell is placed in front of the painting cell, where the part geometry is acquired. Process-relevant features are extracted from the part geometry, and corresponding painting routines are found and grouped in order to obtain optimal painting trajectories. As a result, the robot path and robot program are derived that are collision-free.

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