Eleyon
SOUTH ASIAN JOURNAL OF ENGINEERING AND TECHNOLOGY

A VALIDATION SYSTEM FOR ENAMEL REMOVING FROM THE HORN COIL USING RASPBERRY PI

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1. ABSTRACT

A horn is a sound making device that can be equipped to motor vehicles. The horn manufacturing consists of many processes such as coil winding, spool assembly, terminal base assembly, diaphragm assembly etc. Coils are used as components of circuits and to provide the magnetic field of electrical machines such as motors and generators and in manufacture of loud speakers and microphones. The coils in the horn are used for the conductivity. The enamel in the coil is removed manually. The main aim of this project is to implement some innovative idea in enamel removing. The disadvantage in the enamel removing section is that the enamel in the coil may be removed improperly. To overcome this disadvantage and give assurance that the enamel has been removed properly, an image processing technique is implemented. An image processing algorithm is created and comparison is done to check whether the enamel is removed properly or not. Image processing technique involves image acquisition, while comparing with other methods, this method is more effective. The time taken for execution is below 5 seconds.

Keywords: Image processing technique, raspberry pi, coil winding.

2 INTRODUCTION

A horn is a sound making device that can be equipped for automobiles. The automobile operator uses the horn to warn others of vehicles approach or presence or to call attend to some hazard. There are many types of horn being manufactured. Horn most initial process is coil winding. Coils are loops in a wire are winded in spool. Coils are coated with enamel. When the enamel in the coil is been removed they start conducting. Coils are placed in the horn by housing. Coil of wire that forms an electromagnet, a switch and a housing that function quite like a megaphone. The project "A validation system for enamel removing from the horn coil using Raspberry pi". The project gives the assurance that whether the enamel in the coil is been removed properly or not. Using the Image processing technique in the Raspberry pi, the project is been carried out. When the coil is placed under the web camera the image of the coil is been captured by the camera. The default images of the positive sample of the coils (902546, 915530) are stored. Using the algorithm the captured image and the default image of the coil are been compared. When the two images have same features the coil is passed and it is indicated with LED. When the two images have different features the coil is not passed

and it is indicated by the buzzer sound. When the image has different features, the algorithm plots the difference between the captured image and the default image. This helps the viewer that at which the position in the coil the enamel need to be removed. This work proposes the method for quality assurance in the horn manufacturing company. By this method all the manufactured coil horn are undergone the quality assurance process so that the enamel which is not properly removed in the coil are easily identified.

3 PERFORMANCE AND REVIEW ANALYSIS

The algorithms for image processing techniques uses various steps such as image acquistion, histogram, comparison, difference plotting etc. The most efficient system is designed for validation system using comparison. Any coil in which the enamel is not properly removed can be easily identified by this system. The captured images will be compared with the default images. The captured image and the default image is converted into the array format and the comoparision process is done. The comparison process is done. After this process output will be indicated. In this project the features of the coil can be easily identified. In the output by plotting the difference it helps the viewer to understand the position where the enamel need to be removed. This efficient system is used to give the assurance to the manufacturer. This work is implemented in the private horn manufacturing company.

4 EXISTING SYSTEM

In industry after production of horn coil, they are dispatched to the Assembly section for horn manufacturing. Before dispatching, the horn coils are checked randomly by the supervisor whether the enamel in the coil is removed properly or not.

5 PROPOSED SYSTEM

In this project, focus on automatically detecting the enamel of coil is removed or not by implementing the image processing technique. In Image processing technique, an algorithm is created to detect the enamel is removed properly or not. By checking parameter and giving the quality assurance to the manufacturer is the aim of this project. The coil types such as 902546, 915530, and 915570 are used. If any improper enamel removed coil is detected, then the buzzer is used to indicate the supervisor that the enamel is not removed properly and need to remove the enamel in the coil.

6 METHODOLOGY

6.1 FLOW DIAGRAM

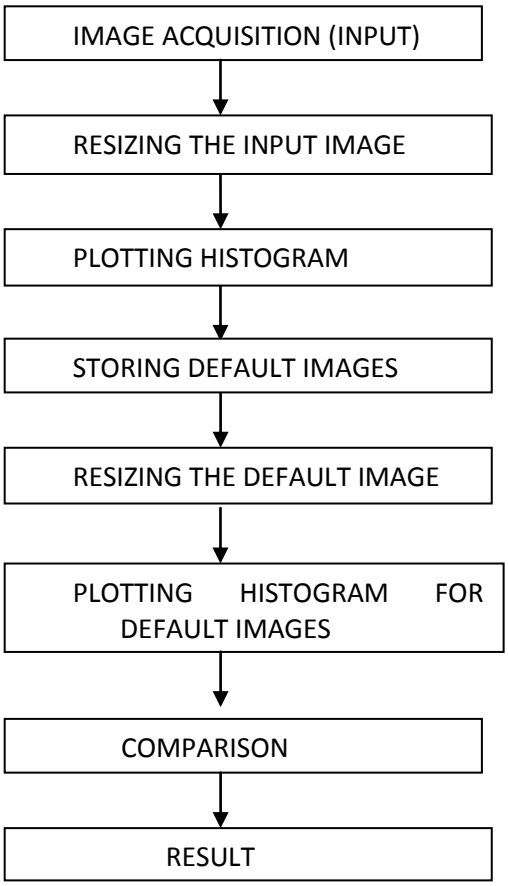

Fig.1 Flow Diagram of Proposed Method and explanation of working process of the proposed method.

6.2 PROPOSED METHOD

Step-1. The input images are been captured by the web camera.

Step-2. The captured image can be of any size so that the input image is resized to the particular size.

Step-3. The histogram of the input image is been plotted. Histogram is a graph that shows the number of pixels in an image at each intensity value in the image.

Step-4. The default images of the positive samples of coils (902546, 915530)are stored.

Step-5. The default images can be of any size so the two images are resized to the particular size. So that the default image and captured image are in same size.

Step-6. The histogram of the default image are been plotted. Histogram is a graph that shows the number of pixels in an image at each intensity value in the images.

Step-7. Comparison of the default image and captured image is done.

Step-8. If the compared images have same features then the enamel from the coil is removed properly and it is indicated by the LED. If the compared images have different features then the enamel from the coil is not been removed properly and it is indicated by buzzer sound. To check at which position enamel need to be removed is also plotted by the difference from the captured image and default image.

7. RESULTS AND CONCLUSION

In this research paper, web camera is used for capturing the image. The captured image and the resultant images are shown in the following figures.

Fig (a)

Fig (b)

Fig (a) and (b) shows the default images of the positive sample of the coil which is been resized.

Fig (c)

Fig (d)

Fig (e)

Fig (f)

Fig (c, d, e, f) are been captured by the camera

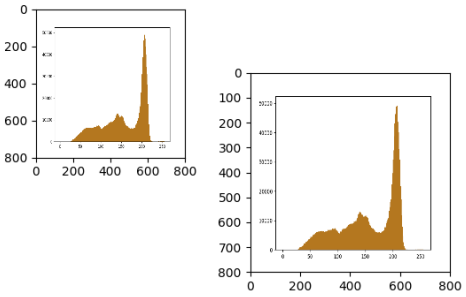

Fig (g)

Fig (g) shows the histogram of the images.

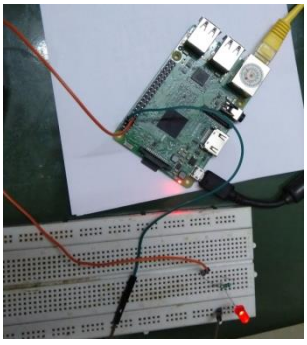

Fig (h)

Fig (h) shows that the compared images have same features and it is indicated by blinking of LED.

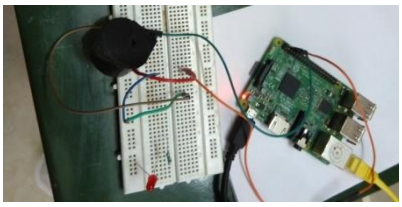

Fig (i)

Fig (i) shows that the compared images does not have same features and it is indicated by buzzersound.

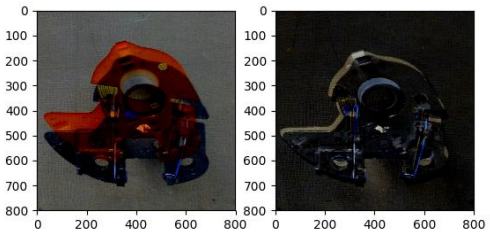

Fig. (j)

Fig. (j) Shows the difference of coil in which the enamel is not been removed properly.

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