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Abstract- Industrial inspection is one of the critical factors to ensure quality of products before reach the market. The inspection tasks can be done by using visual system such as human vision or machine vision or combination of both. In this paper, we describe a system that capable to control quality of press part product. The purpose of visual inspection system is to perform quality assurance by separating accepted part from rejected product. The aspect is to perform total quality control of the material for the large-scale production industries. The main objectives are to develop image processing algorithm which can measure the dimension of parts and decide whether it is accepted or rejected. The dimensions of the part can be obtained by calculating the pixel value. The result shows its possibility to be used as automated visual inspection system.

Keywords: Visual inspection, Press part, Webcam, conveyor belt.

I. INTRODUCTION:-

Today’s businesses are facing many financial challenges, especially when it comes to developing IT applications. New technologies have arrived on the scene that reduces those financial burdens, while speeding the application development process. The solution to those problems lies with the ability to expedite the development cycle, reduce overhead, and quickly accommodate project modifications, which will enable developers to more efficiently create, modify, and deliver new applications.

The objective of this research is to enhance on modeling, integrating, and implementation of intelligent visual inspection system in the process of quality control in industrial manufacturing.

A software framework for image processing in defect detection of real-time visual inspection system has been developed using stationary wavelet transform technique and is the Real-Time Intelligent Visual Inspection. The framework will start at image acquisition and will go through a series of processes before the results can be output.

The process start with image acquisition where image will be capture, follow by pre-processing of the images captured to reduce noises in the image. Images are then enhanced to ease the analyzing process. After the images have been enhanced, the edge inside the images was then determined. Lastly according to the parameter of edges, process can be determined by using neural network and action can be taken to follow up this result.

When come into development of a vision system, image acquisition is the first and most important step to take care of any deficiency of the initial image can cause a major problem while processing and analyzing the image. Hardware equipment carries a very important role to acquire image with sufficient contrast and sharp focusing.

There are several ways to acquire a video stream from a webcam. The most common ways are DirectX, QuickCAM or VFW (Video for Windows). A real-time series of image
can be acquired using the tools mentioned. Each individual image was stored and further analyzing can be carried on thereafter.

After the image has been captured from the first stage, each image will go through the pre-processing stage to eliminate noise inside the image, to enhance the result of the output. Imaging sensor including camera-like devices, rarely have evenly illuminated image. Even in the absence of vignetting image brightness falls off rapidly away from the axis of the imaging lens. After the noises have been removed at the pre-processing stage, the image is then processed to maximize the contrast to give optimum output for processing the edges. The hardware system provides a communication between the prototype setup and the MATLAB code.

In industrial manufacturing, product inspection is an important step in the production process. Since product reliability is of utmost importance in most mass production facilities, 100 percent product inspection of all parts, subassemblies, and finished product is often being attempted. The most difficult task for inspection is inspecting by visual appearance.

II. LITERATURE REVIEW:-

This paper [1], present, one way to capture the live image of object according to camera parameters, for e.g. intensity, focusing etc. Typical camera is sensitive to the environmental conditions then it would be necessary to control the lighting condition. The lighting condition can be controlled using dimmer control based on the requirement of product being observed.

In the paper [2], Human inspection can perform complete quality inspection but it is a time consuming process and causes inconsistent result between operators. Although it is the most common and simple inspection method but there are several disadvantages because human can suffer of illness, human error, and slow. So instead of human inspection we refer automated inspection system.

In paper [3], Real time inspection offers many advantages such as increasing speed, accuracy and reliability. In addition, vision based systems have been implemented in the industrial sector all over the world. There are hundreds and thousands of different applications and many more are being developed or improved day by day.

While in paper [4], Automated inspection system covers the full range of technical difficulty in computer vision. Real time visual inspection is not a simply image processing problem but the system combines of many aspects as stated in earlier.

III. PROPOSED WORK:-

Quality is one of the factors which determine the customer satisfactory and its interchangeability to replace other part. The process is done by comparing actual part and a set of requirement and its standard. The method for determine quality is divided into human inspection and machine inspection.

In contrast, machine inspection performs the measurement while the part being produced on line production. The system integrates lighting system, acquisition devices or camera, computer, image processing software, and handling equipment. The camera will capture images under suitable lighting condition. Then, the image enters the software to be analyzed and processed. Although most of typical camera is sensitive to the environment then it would be necessary to control the lighting condition. The lighting condition can be controlled using dimmer control based on the requirement of product being observed.
Hardware Interface:

![Diagram of Hardware Interface]

Software Interface:

![Diagram of Software Interface]

Fig.1 Block diagram of the Web Cam Industrial Inspection System

The camera will capture images under suitable lighting condition. Then, the image enters the software to be analyzed and processed [2]. The result of image processing stages then enters the classification module to determine whether an actual part matches the requirement and its standard or not. If the part does not fit the quality, the output from this module will trigger the handling equipment to reject the part from production line simulation.

The requirements for the design and development of a successful visual inspection system vary depending on the application domain and are related to the tasks to be accomplished, environment, speed, etc. For example, in visual inspection applications, the system must be able to differentiate between acceptable and unacceptable variations or defects in products, while in other applications, the system must enable users to solve guidance and alignment tasks or, verify measurement and assembly tasks.

1) Visual Inspection:

The choice of image acquisition devices is based on minimum requirement of pixel accuracy. Low resolution web camera can be using because it is very cheap [3], [5].

2) Noise Illumination:

The filter circuit use illuminates the unwanted noise signal in the captured image [10]. We assume that the noise can be a presented in the capture image as additive and random.

3) Edge Detection:

Edge is a sharply changes of intensity in image. The techniques based on first and second order derivative [6]. Technique is using gradient vector and estimate the gradient
direction and the second technique is using zero-crossing or non-linear differential expression.

4) Id Formation:

The output of edge detection algorithm for every pixel of the image generating the different grey levels dimensions. The information represented by the vector represented is determined [6], [7]. We used the rule-based method classify data to if-then rules. This method use causality to perform classification of object.

For example shown in the following rule:
IF feature 1 > reference + tolerance THEN reject
IF feature 1 < reference - tolerance THEN reject
Otherwise THEN accept

5) Motor Control:

If the rule was satisfied reference condition, then job should be forwarded, i.e. the image captured by camera is correct and transmitted to dispatch section. If the rule false, then job rejected and forwarded to the re-working section by motor pulley.

IV. FLOW CHART

```
Start
Switch on power supply & light source.
Relay driver card on by using Matlab
If there any object
Yes
Capture image and convert it into Gray code
Convert into pixel value to find the dimension of object
Store the data into memory
Put next object on conveyor belt for measurement
IF dimensions are equal
Yes
Forward
No
Reject
```

Power save mode

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V. CONCLUSION:

We have to compare both of inspection method in Industrial application. The real time visual inspection is an integration system of lighting system, image acquisition, computer controller and handling equipment. The results show that the dimension can be calculated using image processing algorithm which measures the length, width, edge, and diameter of press part. The real time inspection method can be expected to improve quality control in manufacturing environment. However, the implementation of computer vision in manufacturing is not simply image processing problem.

VI. REFERENCES: