

Dimensional Measurement of Braze Drilling Tool Using Image Processing

Kajal K. Mandave, Dr. K. J. Karande

*Department of Electronics SKNSCOE, Korti, Pandharpur
Maharashtra, India.*

Abstract: At the present, the competition has become increasingly violence in various sectors. So manufacturers need to improve the quality of their product, use existing resources to achieve maximum efficiency, reduce the costs of production and delivery to customers on time. Drill bits are cutting tools used to remove material to create holes, almost always of circular cross-section. Drill bits come in many sizes and shape and can create different kinds of holes in many different materials. Proposed system provides exact measurements of Braze Drill Bit. MATLAB contains the various tools and which is very useful for measurement. GUI is window which is used to make interface between the user and MATLAB This is non-contact measurement method is more useful to measure the tool wear economically. [2].

Keywords: Braze Drill Bit, GUI.

I. Introduction

In recent era the manufacturers are able to maintain properties of products and services, the manufacturers will be able to compete in the global arena. Manufacturing defects or errors are always the key concerns of any manufacturing industry. The quality of product starts from customer's requirements and expectations. In traditional method of measuring of the Product is fitted onto the measuring instrument and if it does not fit appropriately then the product is considered to be faulty. Also in some industries inspection is carried out by manually method testing is done by a human eye where in human observes the shape and size which does not fit appropriately then the product is considered to be faulty. Where in some case product is having a complicated shape, it is difficult to measure angle and length of such kind of toll by manually. Proposed system perform the quality test using Image Processing Techniques. The system with The image processing provides accuracy of measurement (up to 3-4 decimal) with continuous inspection. It does not affect the speed of working. In this process image is capture by camera, fed into the computer for further processing. Edgedetection is used to simplify the analysis of images and reduce the amount of a data.

The task of this work is to improve quality of inspection of product with the help of image processing which can help to find the faulty piece by comparing the user requirements. In this way it can accept or reject final component and increase speed, reduce cost, and increase accuracy of inspection also it will separate faulty products and good products.

II. Measurement of Braze Drill Bit Tool



Fig:1 Braze Drill Bit

Drill bits are cutting tools used to remove material to create holes, almost always of circular cross-section. Drill bits come in many sizes and shape and can create different kinds of holes in many different materials. Well drilling is the process of drilling a hole in the ground for the extraction of a natural resource such

as ground water, brine, natural gas, or petroleum, for the injection of a fluid from surface to a sub surface reservoir or for subsurface formations evaluation or monitoring.

Drilling for the exploration of the nature of the material underground (for instance in search of metallic ore) is best described as borehole drilling. In many industries, quality of drilling tool is tested by using measuring instrument such as Calipers, Bore gauge, Protractors, Fixed gauge, etc.

In case Braze Drill Bit grooves of angle are complicate to measure using above instruments. Image processing can measure parameters at complicated shape also it is easy to handle, coding language is easy to understand and it shows required result.

The system design covers the following aspects to perform quality control:

1. Developing an active and simple optical system to acquire images of inspected products.
2. Applying image processing tools to make decision about accepting/rejecting inspected product.

In image processing it take image of tool after transmitting images to the computer, approaches based on image processing are applied to extract their features. In this way accept/reject inspection of tool parameter is done.

Tool parameters such as: Angle and Length

III. Hardware and software

A machine visualization system is composed of the following hardware components such as cameras. One or more cameras are required for image capturing. Also Light source, which plays important role in providing improved images. Captured image is transfer from camera to PC. PC is used to stored captured images [1]. Software platform that responsible for image processing. Software is a critical part of machine visualization systems that is composed to three main stages: 1- Image acquisition 2-Image processing 3-parameter analysis.

After the image was taken, processing software processes it and extracts its parameter. The process is run in two modes: configuration and inspection. In configuration mode, a controlling process is established in several stages using a visual design environment which has many beneficial tools for image development, image translation and edge detection and so on. After configuration, software runs in the inspection mode and the desired parameter are removed from the image and finally acceptability of parts is gauged[1].

IV. Flow Diagram of Proposed system

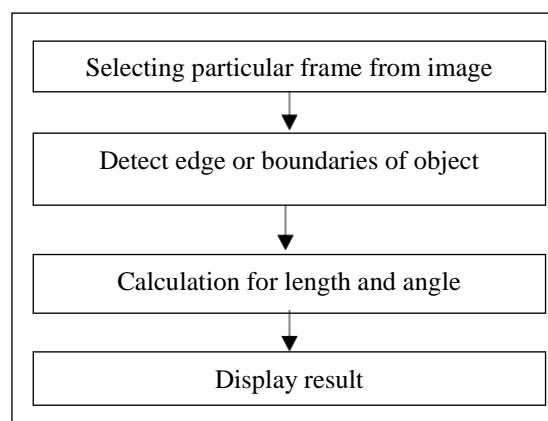


Fig:2 Working Steps Block Diagram

Proposed system can select the image from frame of image or video. Selected image can perform image processing operations such as Edge detection. Edge detection process can gives region of interest. That is angle and length of penetration. Calculated angle and length of penetration can be displayed as result.

V. Methodology Used for angle

a) Load Image

Selecting particular frame from the images or videos & Detecting edge of object from image.



Fig: 3. Braze Drill Bit

b) Extract the region of interest

Feature extraction is the process, where an initial set of raw variables of image are reduced and accurate and complete image is formed.



Fig: 4 Region Extraction

Image thresholding is simplest method of image segmentation .from grayscale image, thresholding can be used to create binary image.

c) Threshold the image

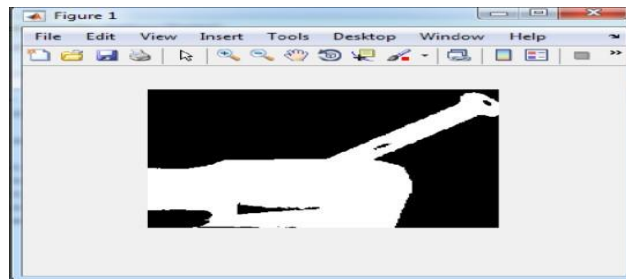


Fig:5 Image Thresholding

d) Trace the Boundaries

Boundary tracing can help to decide boundaries of object



Fig:6 boundary tracing

e) Find the angle of intersection

Angle = 139.337° ($180^\circ - 139.337^\circ = 40.663^\circ$)

f) Find the Point of Intersection

Intersection = $(295.1, 78.5)$

g) Plot the Result:



Fig:7 angle and point of insertion

VI. Methodology Used for Length

a) Load image



Fig:8 length of tool

b) Extract the Region of Interest

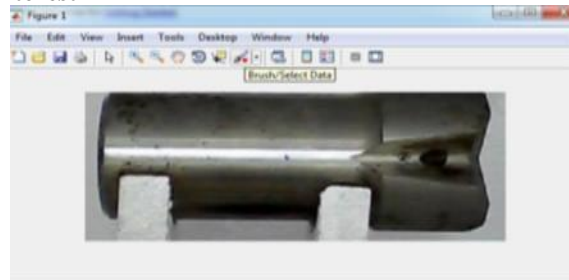


Fig :9 region of extraction

c) Convert image (Gray)

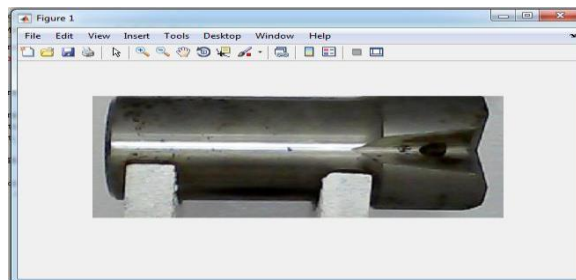


Fig :10 Converted image

d) Edge detection

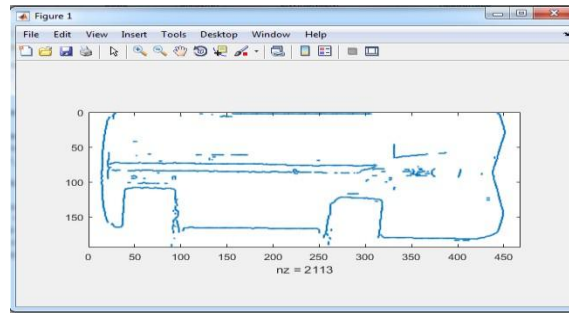


Fig:11 edge of length

e) Multiplication Factor and Result

Length mm=(Y*25.923)/96 Result=73.7185

VII Outputingui for length and angle

a) Output for length

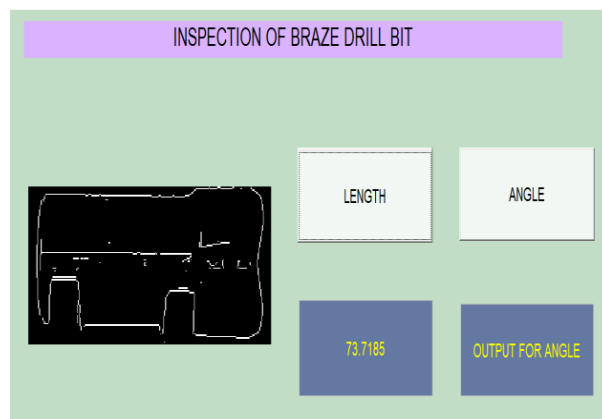


Fig:12 output for length

c) Calculation of Angle

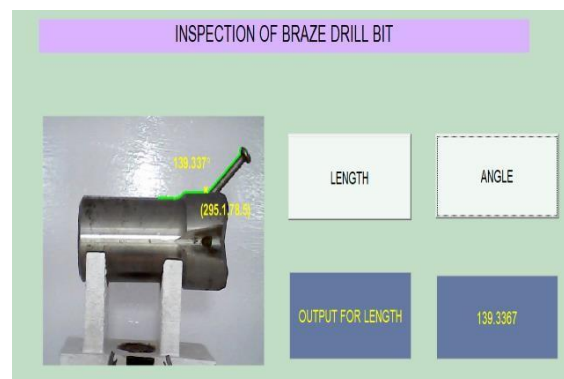


Fig :13 Angle calculation

Above window directly shows Length and Angle of bit in result by clicking Length and Angle push button as showing in above is 73.7185mm and 139.337o.

VIII Result Comparison by Both Methods

Sr.	Output by Industry Method		Output by Image Processing	
	Length	Angle	Length	Angle
1.	73.6	40.2	73.718	40.366
2.	73.7	40.7	73.718	40.934
3.	73.9	40.3	73.988	40.399
4.	73.7	40.5	73.715	39.549

Proposed system calculated length and angles of four holes of a braze drill bit.

IX. Conclusion

The aim of proposed system is to find dimensions of tool with good accuracy. A lot of research carried by different researcher doing research in images processing, there is scope to apply image processing techniques for quality control of industrial product.

The image processing techniques are very powerful tool for automatic, fast and easier defect detection and quality control of various types of products. Algorithm is proposed for real time quality monitoring of manufactured product. This proposed system can replace manual inspection of industrial product. Result will indicate product is defective or non-defective

References

- [1] Prof. Vaibhav S. Kamble. (2017) Geometrical inspection of braze drill bit by image processing. International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 04 Issue: 04 | Apr -2017 www.irjet.net p-ISSN:2395-0072
- [2] Venkataramaiah. P.(2012). Measurement of drill tool wear through image processing. Research Paper: Venkataramaiah et al., 2012: Pp.116- 119.
- [3] E. R. Davies. (1998). Automated Visual Inspection. Machine Vision, 2nd ed, Academic Press.
- [4] Tae-Hyeon Kim, Tai-Hoon Cho, Young Shik Moon, & Sung-Han Park. (1999). Visual inspectionsystemfortheclassificationofsolder joints. Pattern Recognition-PR , 32, 4, 565-575. [http://dx.doi.org/10.1016/S0031-3203\(98\)00103-4](http://dx.doi.org/10.1016/S0031-3203(98)00103-4)
- [5] R. J. Hunsicker, J. Patten, A. Ledford, C. Ferman, &M. Allen. (1994). Automatic Vision Inspection and Measurement System for External Screw Threads. Journal of Manufacturing Systems, 13, 370-383. [http://dx.doi.org/10.1016/0278-6125\(94\)P2586-4](http://dx.doi.org/10.1016/0278-6125(94)P2586-4)
- [6] J. J. Hunter, J. Graham, & C. J. Taylor. (1995). User Programmable Visual Inspection. Image and Vision Computing, 13, 623-628. [http://dx.doi.org/10.1016/0262-8856\(95\)97287-V](http://dx.doi.org/10.1016/0262-8856(95)97287-V)
- [7] Zeng Zhou, Li Zhuang Ma, & Zheng Zuoyong. (2010). Extracting PCB components based on color distribution of highlight areas. Computer Science and information System / ComSIS, 7, 1, 13-30.