

Research Paper on Testing of Gear Error using MATLAB

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Abstract— In this paper gear Measurement has been carried out by focusing two features of gear image object. The problems are to measure the gear features of gear image object, in the sense the measurement of the Area of the gear image object and as well the teeth of the gear will be counted. We have used MATLAB tool and development code which overcome these problems and measured the area as well as teeth of the gear image object counted. To accomplish this task we have measured five different gear image objects area and counted the teeth by using image processing. The experimental results and statistics have been shown in this paper.

Key words: Gear, Measurement, Image Processing

I. INTRODUCTION

Computer science image processing technology is gradually become a part of our daily life as it continues to get excellent results while promoting the technological advancement and development. As the key role of technology that presents gear size and measurement and guides to do research and develop more advanced computer technologies, such as DSP (digital signal processing) technology, and DIP (digital image processing) technology. We will measure the image object features easily by using these technologies. [1]

The measurement is essential task to limit the gear at specific size. By using image processing the fundamental work has been carried out to measure two things which are its most important features.

- To measure the Area of the gear image object
- To count the number of teeth in gear image object.

In this regard we have converted the original gear image object into grayscale, and then gray scale of original gear image goes from steps to count the teeth of the gear. It means by using programming code, we measure the gear teeth in respect of teeth counted through image processing.

II. LITERATURE REVIEW

The gears are used in machinery and we know that gear transmissions can be used to alter a machine motion property, although it ensures the modification in the motion through linear and rotary development of gear. It is an old technology and gear transmission was invented having complexity [6].

In light of gear teeth count and to measure the area of the gear object complexity of transmission. The geometry is used to measure the gear transmissions for commercial vehicles [2]. Here it presents a technical exposure of gear basics.

III. BLOCK DIAGRAM

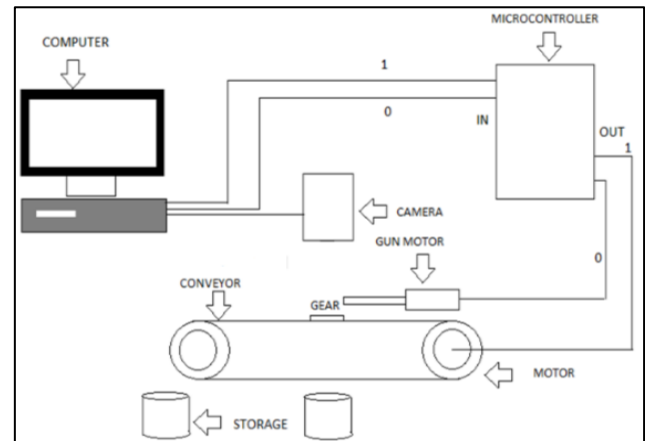


Fig. 1: Block Diagram

A. Working

We have developed MATLAB code by using image processing, read the image original gear object and converted original gear object into GRAY scale image, and then calculated the threshold value of GRAY scale image and by using threshold value we have converted the GRAY scale image into binary image. After this process it has removed small objects from the binary image, to overcome the holes of the object it has filled the holes of binary image object, then calculated the surface of binary image of gear object, showing the area of gear object here it is measured.

The code has sequenced in this way, it has measured the properties of the image object regions, after that we have convex the polygon which are in regions, finally it is converted into regions of interest to the regions mask through which it has been highlighted the region with red and yellow lines which indicates the teeth region of a gear object.

Obviously through this process it has measured the gear object area and counted the teeth by using the MATLAB tool, the five different gear objects measured by changing the name of the gear object in same developed code. It is shown in experimental work figures.

The results are shown in results section in which we have found the Outer diameter (Addendum diameter), Inner Diameter (Dedendum diameter), PCD, Module, Number of teeth and tooth height of a gear image object and counted the teeth.

IV. FLOWCHART

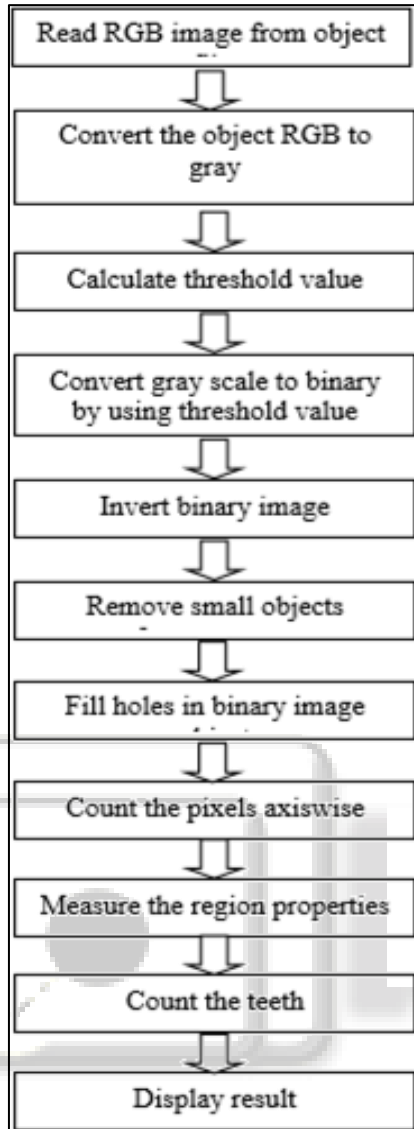


Fig. 2: Flowchart

V. ADVANTAGES

- Less expensive
- High reliability
- Reduces manpower
- It consumes power but can be balanced by use of superior quality material.
- Fully automation is possible to reduce more time for inspection

VI. DISADVANTAGES

- Complex Matlab program is involved.
- Matlab skilled operator is required.
- Different program is need to prepare for different sizes of gear.
- Gear parameter detection is fully dependent on light conditions while testing is being performed thus need to provide standard light conditions and height of camera

VII. FUTURE SCOPE

- Applicable in nut, gear manufacturing industries.
- Applicable in quality control departments in industries, etc
- Can be applied in gear manufacturing unit.
- Used in automobile industry
- Total error checking is done
- Used in both small scale industries as well as the large scale industries
- Its outcome can be utilized properly to a great executed in mechanical field as well as the automobile field.

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