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OPPORTUNITIES TO USE IMAGE PROCESSING TECHNOLOGY IN QUALITY-BASED PRACTICES

Abstract: *The rapid development of technology in the present day has increased the need for automation systems. The principal philosophy in developed systems is to allow for detecting the intended matter shortly. To achieve this, technologies are developed by resting on quality-based matters. One of them is image processing technology. It is understood in studies we have conducted on domestic and foreign literatures that image processing technology has become increasingly widespread in different sectors and made extremely big positive contributions to quality practices. Its basis is that image processing technology practices produce solutions widespread in every area depending on computer and offer them to the benefit of mankind. In image processing particularly in recent years, it has been attempted to achieve operations that human visual system performs in computer environment. Image processing methods developed for this purpose involve many operations such as obtaining image, its digitization, segmentation, improvement, classification, recording and re-calling. In this paper, the rationale and process of image processing technology will be explained, application of this method on quality-based classification of machine manufacturing will be explained on examples. How this application will be performed in machine manufacturing will be put forward with details.*

Keywords: *Image, Processing, Quality, Practices*

1. INTRODUCTION

Image processing is a different processing from the “signal processing” which is a study regarding the data, after being caught and the assessment and evaluation process, being transformed so that it could be read in a different device or being transferred from an electronic environment to a different one [1]. Images consist from the different contents of an image source

aimed at a particular target. Such images are the images ultrasound, electron microscopy and computer themed. The preliminary preparation stage applied to the images for the image processing decreases the noises on them. For this, processes including low, medium and high levels are applied to images. In the low-leveled processes, reality of the input and output images is procured with filtering. And in the medium-leveled processes, recognition and classification of the objects in the images are realized with the

partition and recognition processes. High-level processes include the analysis of the images in the recognition of the objects in the images. Also with the objects in images being analyzed within the computer environment, image content of the objects in images becomes detailed. With this detailing phase, image processing becomes finalized

Image processing technology of our day finding a use in almost every area rather brings the analysis, comprehension, decoding and expressing properties of this technology into prominence. Especially it finding an application area in the quality-based studies generalizes its use with its structure that meets the needs of the people. John Berger's work "Ways of Seeing" starts with "Seeing comes before talking." When we look around, we see that there are lots of images reaching and affecting us. Everything that our eyes see mobile or immobile is received as images. These images, aside from natural images, may very well be ones presented to us as posters, billboards, architectural projects, drawings and designs in virtual environments created with digital technics in digital environments. Individuals that bear different ways of seeing from this point of view want to, even are obliged to, work with one another compared to the past. This circumstance made working in the world where digital images take place mandatory for us.

Images relayed to digital environments with various technics, the drawings and designs produced with the help of various software in virtual environments are named as the digital images. As can be understood from the name, digital images are the images expressed with numbers. They were created using the binary number system, the base of the computer, and expressed with BIT's.

Whilst defining an object, length, width and height parameters are used. While creating these parameters, its place

in the outer space is also paid attention to. These processes in mathematics are executed with the coordinate system. The place of the object is expressed with the x, y, z parameters that show the coordinates. Also in defining an object in plane, on a map or a photo; and in defining an image on a machine project, only the width and length parameters with its most common form are given. The object and the image we define in this circumstance are named as 2B.

Images we define as digital images take up the basis of the computer graphics. These images which are used effectively for the last thirty years came from the wireframe images to today's filled and equipped ones. Thus it became an indispensable vessel used in every aspect of designment. Digitizing of the images is not limited only to 2B today, also 3B (Three Dimensional) entered the designment process of new technologies. And development process and results of this circumstance must also be handled. This general explanation makes us reach the conclusion that procuring the image in image processing is the priority.

2. IMAGE TYPES

When taken a general look to the image processing technology, it can be seen that digital images are obtained by using 3 types of image types. These are; vector, raster and render.

Vector images are the images based on mathematical formulas. For in every instance there is formula renewal, these images keep intact in every dimension and in each one gives a clear display. As such, there are rather preferred in animations. They are images based on micro drawings created by using the drawing technics. They can also be referred as the images that come alive with the combination of point, line and textures. What is essential in vector images are the shapes of point,

line and curve. For the study principle is based on the coordinate system, 3B images can be obtained if the height parameters are added to the drawing or to the design along with the length and width parameters. Thus modelling process is given go after figuring the mass of the drawing or design out. Vector images or graphics are used to prepare the 2B drawing and 3B modelling, and to define this prepared model with planes.

Raster images are images based on pixels and are expressed with numbers, yet are absent of the mathematical formulas that work in the background. As such, raster images lose to keep intact in the scaling procedures pursuant to their pixel numbers and formats. Digital camera images, images taken from the scanner into the screen, mobile or immobile images saved with video camera are so called raster images.

Building blocks of a raster image relayed to a digital environment are the pixels. Pixel is the smallest quadratic element composing a digital image. Within these pixels, color info regarding the image takes place. The quality of the image is related to the number of pixels and thus to the color info that pixels bear. Increasing the number of pixels increases the image quality and vice versa. As pursuant to the pixel number, like the image quality, how much space the image takes up increases and decreases directly proportionally. Space, that said the file size, that images with many pixels take up is much and vice versa.

To express the image, color is of importance. Color is one of most vital pieces of visual expression and is one of the fundamentals of the digital image processing. The color plays both enrich the design and help us gain illusion images. Also with shading, 2B images are given the effect to look like a 3B image. Color models are used to define the colors in an image. In printing, CMYK (Cyan, Magenta, Yellow, and Key) and in screen

mod, RGB (Red, Green, and Blue) color models are used. In the RGB model, apart from the three main colors, colors are obtained with the mixture of these colors and the colors in CMYK model with the act of absorption and projection. Color info that each pixel in RGB color modelling possesses is expressed with one of the colors R, G, B or with the mixture of some proportions of these colors. This proportion ranges between 0-100 and digitally between 0-255. That said the equivalence of 0% is the digit 0, the equivalence of 100% is the digit 255.

The work of art that emerges as the final phase of the design or the finalized shape of the product in a computer environment is the render image. In that, it is the 2B drawing image of the work or product. These images are raster images and can be altered upon to manifest its alternative manufacture and can be used to catch a glimpse of the design from different angles. Render images are the ones often used in the architecture, industrial design, fine arts and the ones to express the final phase of designing. It's used to turn back from modelling into the 2B drawing image. Also it's named as the longest portion of the design by the users. Rendering process may go up from few minutes to few hours pursuant to the complex geometric shape of the model and the speed of the computer in use. During the process, every point on the image is processed one by one. An efficient computer and an efficient color light info are needed. How much the given light and the appointed equipment resemble the reality is understood with the occurring digital drawing image. This image is made to become more convenient to the purpose with the image processing technics. Another advantage of the render image is that it spares the designer the swarm and chaos of the papers. The rendering process is still done with the obtained colorful pencils, yet even with the slightest change the expenditure goes up and the time

becomes lost. Light and material settings are done to make the image acquired in the wake of 3B modelling resemble the real thing more. In the event that the desired image and color are not obtained in the wake of rendering, the result can be changed by making some adjustments with the help of the digital image processing techniques.

3. DIGITAL IMAGE PROCESSING

The technical definition of the digital image processing is the act of bringing out the data obtained in the wake of the identification and detecting of the image that the digital environment carries out. Obtaining the image, reproduction, modification, filtering, coloring, making changes to the color settings, lighting, texture designation, manufacture of texture and shading are the fundamental techniques of the image processing.

Digital image processing can also be defined as the modifications done upon photos, pictures, videos or 3M models in a digital environment. Executed programs whilst conducting these procedures are named as the image processing software. Mathematical formulas and equations take up the basis of the digital image processing. These equations are Laplace Theory ve Fourier transforms.

4. QUALITY-BASED IMPLEMENTATIONS OF THE DIGITAL IMAGE

Image processing also helps to increase the quality, gain time, practicality, give birth to new job units pursuant to the area it's used. Generally in the quality-based implementations of the digital images.

- 1) Determining of the dimensional aspects,
- 2) Classification according to the color quality criteria,
- 3) Analysis of the images,
- 4) Examining of the images,
- 5) Determining of the surface modifications

Processes take place. Ying-dong *et al.* [2] carried out the instant measurement of the size of the spray deposit used for giving shape to the material by executing image processing techniques during the process. Shaping processes with spray is the spraying of the particles partaking in the liquid metal with a gas of high speed. Generally to measure the residue amounts accurately, image processing algorithm is used

In measuring the residue amounts, normal CCD camera was used. In the image acquired with system camera, it was designed to be three phased as cleaning of the noises, edge detection and the deposit length measurement

Bellaire *et al.* [3] used object recognition for reconstruct by benefitting from the color values in the images. This study presents the two and three dimensional object recognition system with the info obtained from colorful images. In acquiring the info regarding the edge and color distribution partaking in the colorful images, an image-based model that contacts to the identified image point was used. In different studies that matches the real image data obtained with the interpretation of the image with the result values and that adjusts these to one another, image features are determined with the label use and edges in the images become determined due via this label

Separation of the object edges and sides in terms of type is done with the correct and proper usage of the location estimation. When interpreting the images as 3B, grey color values of the image is used. Obtaining images to examine the

underwater displaying is reached via a special camera. With the processing of the images taken underwater, Negahdaripour *et al.* [4] realized the three dimensional reconstruct.

Underwater images are reached with acoustic cameras. Underwater sonar system together with a planar grid was used in the measurement of the direction and distance of the objects whose images have been received. Planar grid is also used in the calibration of the underwater camera.

Labeling of the image makes the selection of the objects in the image and them to be told apart possible. With labeling, unwanted areas upon the image are eliminated. Thus quality studies gain velocity. Also with the labeling, objects divide into detailed pixels and upon which modification of the objects borders with proper environs is rendered doable.

On the other side, with the reference points given form upon the image, obtainment of the point cloud of the targeted object can be carried out. By benefitting from these point clouds, producing solid models and even reproducing the CNC codes of these solid models is doable.

Also in the object recognition and deciding processes, image processing systems that work in sync with image sensors manage to realize lots of quality based procedures, by taking part in robot

structures, without the need of a human. Today this technology reached the technologic extends that enable the quality be followed upon internet. Thanks to the required software in this aspect, image processing techniques being able to inspect the quality based procedure instantly even at a very remote place, then being able to give out the needed warnings put forth the extend it reached today.

5. RESULTS

Today it's unarguably accepted that computers are beneficial and indispensable equipments when used fruitfully and in tally with the purpose. Computers both render the quality to be realized way it's imagined possible and all its phases until its constructing in the real world be inspected.

In this regard, knowing how to use the image processing techniques in the quality based implementations well, but making use of these techniques in the digital environment without capitalizing it in a scientific, artistic, conceptual environment affects the outcome of the quality. Within the same context, just envisioning a conceptual background well enough without knowing the image processing techniques will not be enough in determining the quality.

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