

How Image Processing Will Change the Future?

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ABSTRACT

Image processing technology was developed in the 1960's. Image processing is the technology that performs an operation on an image to improve its picture quality and to get some useful information from picture. In this technology, image is used as input and also get as in the form of output. This technology controls or manipulate image to achieve better quality than older one or derive data from image and support another task. With the help internet technical revolution being called as industry 4.0. With the help of industry 4.0, image processing getting more flexible and accurate with the future. Future of image processing will give shape to new technology and new business models.

INTRODUCTION

Image processing is an process which convert image into digital form and get some useful information. It is an any form of signal processing. Image processing also tells us difference how we see things and how technology see things. Image processing technology makes machines more self-sufficient. Image processing mostly used in medical field. In medical field machines need to get more accurate for quality results. As in current situation image processing will get use in almost every field. Image processing get good picture quality that's why image processing is also called as picture processing. It helps to improve picture for human understanding and also extracts information for machine or computer interpretation. In the early, when image processing was developed it has only aim to improve the picture quality. It is useful technique for human beings to improve the visual effect of people. In the early, image processing technique was used for geometric correction, noise removal, etc.

Image restoration, enhancement, encoding and compression consider in the process of image processing. The first successful application was the American Jet Propulsion. The toolbox supports image processing operations on a different images. This image processing toolbox supports images which are created with wide range of devices, including with digital cameras, images sent by satellites, microscope images and many other scientific instruments. It also supports images with a number of specialized file formats.

IMAGE PROCESSING TECHNIQUE

Image processing comes in the rapidly growing technologies. With these rapid growth image processing technique is useful and in-demand technology from most of the industries. Image processing technique seems to be growing every year.

Image processing technique comes with three steps:

- Importing the image.
- Analysing and transformation or alteration the photograph
- Output in which results can be altered image or report that is based on image analysis.

Image processing consists of two types:

- 1) Analogue image processing &
- 2) Digital image processing

Analogue image processing used in hard copies such as printouts and photographs. Digital processing used in manipulation of digital form of images with the help of computers.

Along with rapid growth image processing collects major advantages in most technical areas including biometric sensing, remote sensing, facial recognition, virtual reality, computer vision, medical technology and many others.

In image processing technique, four types images are there for operations : Intensity images, Binary images, Indexed images and RGB images.

Intensity image is data matrix whose values represents intensities with some ranges.

Binary image is a logical array of 0's and 1's.

Indexed image consist with data matrix, X and color map matrix.

RGB image is true-color image.

PHASES OF IMAGE PROCESSING

The fundamental steps in any typical Digital Image Processing pipeline are as follows:

1. Image Acquisition

Image acquisition converts optical image into an numerical data with the help of computer. The image which captured with a camera is digitized using an analogue-to-digital converter for further processing in a computer. Image Acquisition is mostly used in cameras.

2. Image Enhancement

In this step, the acquired image is manipulated to meet the requirements of the specific task for which the image will be used. Such techniques are primarily aimed at highlighting the hidden or important details in an image, like contrast and brightness adjustment, etc. Image enhancement is highly subjective in nature.

3. Image Restoration

Image restoration id different from image enhancement. Image restoration makes photo more pleasing to the observer. It recovers the resolution loss in image. This step deals with improving the appearance of an image and is an objective operation since the degradation of an image can be attributed to a mathematical or probabilistic model. For example, removing noise or blur from images. It is mostly used in medical imaging, astronomical imaging, forensic science.

4. Color Image Processing

It is a mathematical model known as color space. It is used to characterized the colors as per intensity values.

This step is only aims to handle the processing of colored photographs (RGB or RGBA images), such that, operation of color correction or color modeling in images. It is mostly used in coloured monitors

and video cameras. Printing devices also used these processing for better quality.

5. Wavelets and Multi-Resolution Processing

On the basis of image processing wavelets transformation pefomed on two dimensional image. These processing is aplicable for image data processing and also scanning.

6. Image Compression

Before Image Compression, larger images or videos are set for the processing. Image Compression transmit data in efficient form. It concerns data by minimizing the number of bits. It is used in television broadcasting.

7. Morphological Processing

Image components that are useful in the representation and description of shape need to be extracted for further processing or downstream tasks. Morphological Processing provides the tools (which are essentially mathematical operations) to accomplish this. With the use of morphological processing, dilation adds pixels to boundary of an object or an image. It laso uses for removing small objects and lines from picture.

8. Image Segmentation

Image segmentation is the operation partitionate image into multiple segments. It makes image more meaningful and easier for analyzing. Image segmentation allows for computers to put attention on the more important parts of the image, discarding the rest, which enables automated systems to have improved performance. Image segmentation used in content based image retrieval, machine vision and traffic control system.

9. Representation and Description

Before this step image segmentation process comes in action in image processing, where the task for representation is to decide whether the segmented region should be depicted as a boundary or a complete region. Description deals with extracting attributes that result in some quantitative information of interest or are basic for differentiating one class of objects from another. Image representation and description today used in face detection. It can tell us shape of the face, distance between eyes.

10. Object Detection and Recognition

After the objects are segmented from an image and the representation and description phases are complete, the automated system needs to assign a label to the object—to let the human users know what object has been detected, for example, “ any vehicle” or “person and object”, etc.

ADVANTAGES OF IMAGE PROCESSING

1) Nowadays, Image processing technique uses for image correction, sharpening images. Under this user can do dynamically high range edits. All these process improves picture quality of an image.

2) In the current time, image processing is most used in medical field. In the medical field, image processing used for scanning such as X-ray, Medical CT, PET scan and many more. Diagnostics process has so much improved because of image processing techniques.

3) Computer vision is one of the well-known application of image processing technique. Computer vision use mostly in automatic cars and Drones. Computer vision can detect nearby obstacle. It is also use for path recognition. This technique is so much useful and expensive. With these computer vision image processing can also be used in agriculture field.

4) Image processing technique is also used for pattern recognition. In the pattern recognition, machine learning and AI is also involved.

5) Video Processing is another successful application of image processing technique. It is basically speedy and quick movement of images. With the help of image processing, video editing becomes easier. Image processing helps in noise removal, frame rate conversation, detail enhancement and more.

6) With the help of image processing, most editing apps provide filters. Filter can change the nature of an image. Filters are interesting application of image processing these days.

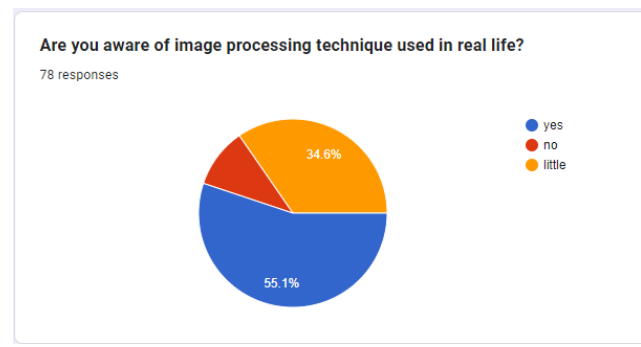
7) Any desired format of images can be available by the process of image processing such as

photonegative. Any desired density and contrast can be changed by the use of pixels available in the image.

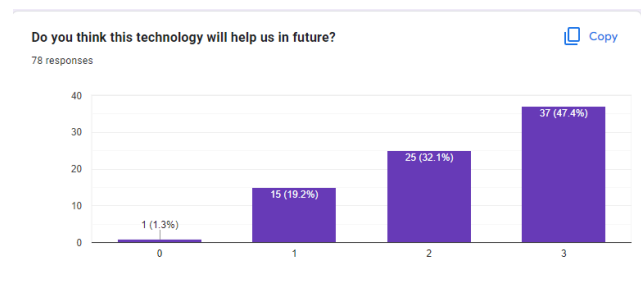
8) Image processing allows for easy electronic transmission of images. Although for human interpretation, image processing improves quality of images.

FIGURES AND SURVEY RESULTS

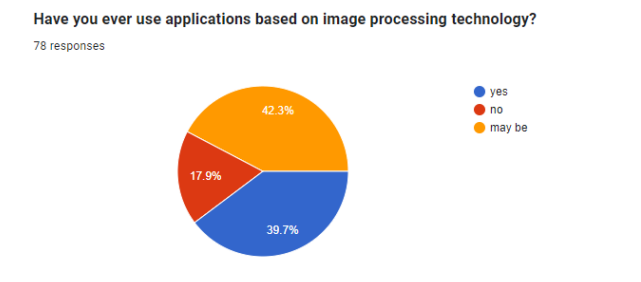
1. Are you aware of image processing used in real life?



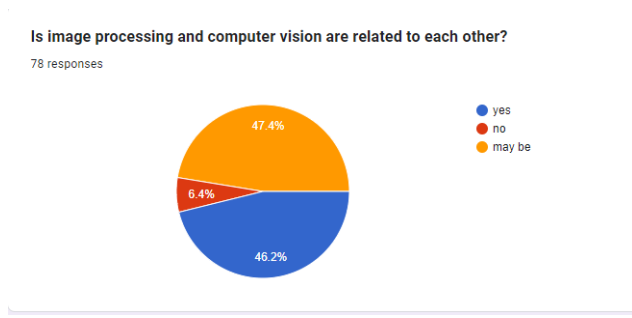
2. Do you think this technology will help us in future?



3. Have you ever use applications based on image processing techniques?

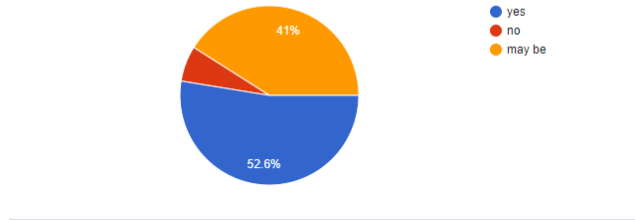


4. Is image processing and computer vision are related to each other?

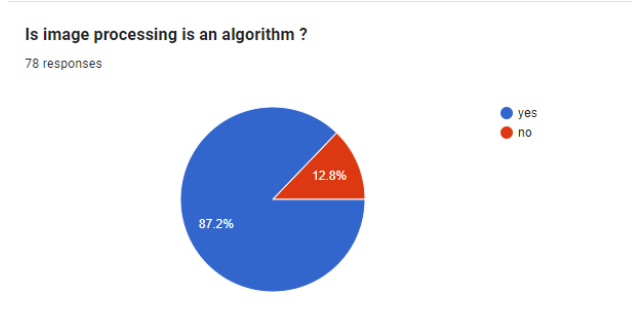


Is image processing is part of an AI?

78 responses



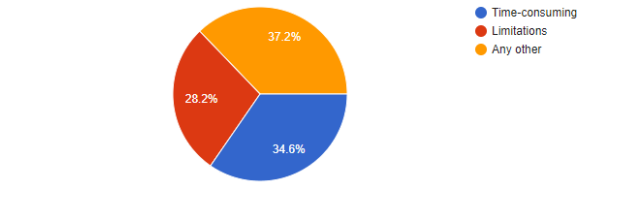
5. Is image processing is an algorithm?



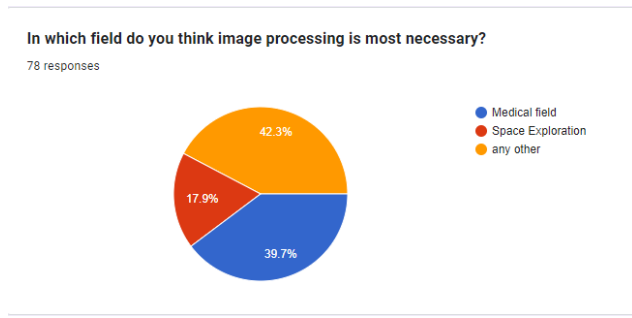
8. Disadvantage of image processing?

Disadvantage of image processing ?

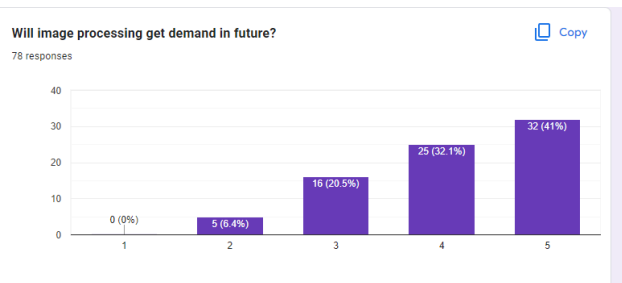
78 responses



6. In which field do you think image processing is most necessary?



9. Will image processing get demand in future?



DESCRIPTIVE STATISTICS

Discriptive statistics is a means of describing features from a data set by generating summaries about data samples.

Are you aware of image processing techniques used in real life?	
Mean	1.539473684
Standard Error	0.075951946
Median	1
Mode	1

Standard Deviation	0.662133712
Sample Variance	0.438421053
Kurtosis	-0.371715644
Skewness	0.842087287
Range	2
Minimum	1
Maximum	3
Sum	117
Count	76

Do you think this technology will help us in future?	
Mean	1.75
Standard Error	0.093892436
Median	2
Mode	1
Standard Deviation	0.818535277
Sample Variance	0.67
Kurtosis	-0.751328539
Skewness	0.646083669
Range	3
Minimum	1
Maximum	4
Sum	133
Count	76

Have you ever use applications based on image processing in real life?	
Mean	1.736842105
Standard Error	0.084538834
Median	2
Mode	1
Standard Deviation	0.736992466
Sample Variance	0.543157895
Kurtosis	-1.020179648
Skewness	0.463375558
Range	2
Minimum	1
Maximum	3
Sum	132
Count	76
Is image processing and	

computer vision are related to each other?	
Mean	1.6
Standard Error	0.071028481
Median	2
Mode	1
Standard Deviation	0.615124685
Sample Variance	0.378378378
Kurtosis	-0.603392042
Skewness	0.501067809
Range	2
Minimum	1
Maximum	3
Sum	120
Count	75

Is image processing is an algorithm?	
Mean	1.131578947
Standard Error	0.039032624
Median	1
Mode	1
Standard Deviation	0.340278524
Sample Variance	0.115789474
Kurtosis	3.024805628
Skewness	2.223933349
Range	1
Minimum	1
Maximum	2
Sum	86
Count	76

In which field do you think image processing is most necessary?	
Mean	1.786666667
Standard Error	0.085515571
Median	2
Mode	2
Standard Deviation	0.740586571
Sample Variance	0.548468468
Kurtosis	-1.084526087
Skewness	0.365856572
Range	2
Minimum	1
Maximum	3

Sum	134
Count	75

Is iamge processing is part of an AI?	
Mean	1.539473684
Standard Error	0.071182467
Median	1
Mode	1
Standard Deviation	0.620554364
Sample Variance	0.385087719
Kurtosis	-0.441995228
Skewness	0.706273504
Range	2
Minimum	1
Maximum	3
Sum	117
Count	76

Disadvantages of image processing?	
Mean	1.934210526
Standard Error	0.092405526
Median	2
Mode	1
Standard Deviation	0.805572696
Sample Variance	0.648947368
Kurtosis	-1.444869213
Skewness	0.121221086
Range	2
Minimum	1
Maximum	3
Sum	147
Count	76

Will image processing get demand in future?	
Mean	1.921052632
Standard Error	0.107218678
Median	2
Mode	1
Standard Deviation	0.934710763
Sample Variance	0.873684211
Kurtosis	-0.549653685

Skewness	0.663299827
Range	3
Minimum	1
Maximum	4
Sum	146
Count	76

FUTURE SCOPE

As per current growth of image processing in the industry, future of image processing seems to be bright and strong. With these rapid growth, image processing will come up with functions of security and surveillance missions. In the military department, Satellite imaging and military applications concluded as future trends image processing. Advances in mobile technology and space exploration will help in the improvement of image processing systems. Due to advances in image processing, we can see millions of robots in the upcoming future. Graphics data is increasingly important application in image processing. The future of image processing applications in satellite will see unprecedented demand. With increasing advances in image processing techniques, visual system of human beings can be replicated. The usefulness of this technique has more application in the upcoming industries.

CONCLUSION

As per reports, Almost all the fields use image processing techniques. Image processing most demanding in medical field right now. Image processing is growing day by day with the future in industry. Image processing technology will include in every industry in the future. Image processing is growing as successful technology in the industry. Almost every industry is came across this technology. Image processing will change the future with the change of technology.

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