A REPORT ON

Latest Development in Image Processing and Applications

Prepared for-

Dr. Raj Kumar Gupta

Assistant Professor

Physics Department

Prepared By-

Naman Chokhani 2017B3A70726P

Birla Institute of Technology and Science, Pilani

Pilani Campus

21 February 2021

ABSTRACT

This report discusses the various aspects and developments of image processing in the current day. It highlights the broad usages and various applications of image processing in our day-to-day life as well as on an industrial scale. The purpose of this report is to gather some insight into the latest development in image processing and its applications. Further, the report mentions some of the future developments in image processing that'd further be quite beneficial in various fields and aspects.

INTRODUCTION

Image processing is a method of performing some operations on an image, for enhancing the image or for getting some information from that image. It is a type of signal processing in which input is an image and output may be an image or characteristics/features associated with that image. Nowadays, image processing is among rapidly growing technologies. It forms a core research area within engineering and computer science disciplines too.

The field of digital image processing has experienced continuous and significant innovation and development in recent years. The usefulness of this technology is apparent in many different spheres right from medicine to remote sensing. The advances and wide availability of image processing hardware have further enhanced the usefulness of image processing.

Image processing is a technology that is used in many places in daily life. The image processing methods have become widespread along with the acceleration of computer technologies. Today, image processing is used in many environments such as education, health, defense industry and industrial areas. Successful results are obtained in application areas such as fault diagnosis and condition monitoring using image processing methods.

Many operations can be performed namely, noise reduction, image enhancement, image registration, geometric transformations, segmenting images, and image processing in 3D.

Image processing is a key technology in automotive production. The human eye alone can no longer cope with the most demanding quality control challenges. Gigantic image processing solutions are becoming ever more sophisticated. This report gives an insight to what possibilities today's industrial image processing manufacturers are opening up and how various industries are benefiting.

DISCUSSIONS

At the assembly line these days, at the production process attention is focused on low material and energy consumption. In addition, 100% inspection has replaced random sampling. Because with the faultless product demanded today, random sampling cannot keep up anymore. For some time now it has not been custom to insert samples into the measuring machine. Image processing has taken over the lion's share in automation and quality control.

Machine vision systems measure, inspect, count, and direct the robot-gripper to the desired position. Compared to the past, the quantity is increasing, but the production time should not get slower. With the newest camera and software technology, image processing is offering a big advantage.

Here are some digital image processing applications.

- Image restoration and sharpening
- Medical field
- Transmission and encoding
- Pattern recognition
- Remote sensing
- Video processing
- Color processing
- Machine/Robot vision

Some current trends in image processing are:

- Automatic image enhancement and restoration
- Automatic object segmentation
- Automatic object detection, classification and recognition
- Steganography
- Image Inpainting
- Text recognition and Information extraction

CONCLUSIONS

Image processing is used in many applications. It is widespread in all the areas of sciences and technology and even in medicine. New intelligent, digital species created entirely by research scientists in various nations of the world will include advances in image processing applications. Due to advances in image processing and related technologies, there will be millions and millions of robots in the world in a few decades time, transforming the way the world is managed. Advances in image processing and artificial intelligence will involve spoken commands, anticipating the information requirements of governments, translating languages, recognizing and tracking people and things, diagnosing medical conditions, performing surgery, reprogramming defects in human DNA, and automatic driving all forms of transport. With the increasing power and sophistication of modern computing, the concept of computation can go beyond the present limits and in the future, image processing technology will advance and the visual system of man can be replicated. The future trend in remote sensing will be towards improved sensors that record the same scene in many spectral channels. Graphics data is becoming increasingly important in image processing applications. The future image processing applications of satellite-based imaging range from planetary exploration to surveillance applications.

References

https://www.sciencepubco.com/index.php/ijet/article/view/11357

https://sisu.ut.ee/imageprocessing/book/1

https://www.quora.com/What-are-the-applications-of-image-processing

https://www.sciencepubco.com/index.php/ijet/article/view/11357

https://www.qualitymag.com/articles/93412-the-future-of-image-processing

https://www.quora.com/What-are-the-current-trends-in-image-processing