Discrete Mathematics Using Image Processing

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Abstract : ***In this paper, we proposed a various mathematical operations using image processing technique in MATLAB software. The mathematical operations used are union, intersection, complement, relative complement, absolute complement, linear combination, and other basic operations like addition, subtraction, multiplication and division. In this system we explained and done all basic operations with images using image processing technique and also combined the image processing and machine vision technique based on various mathematical theory such as algebra, set, etc., which as wide applications like object detection, background subtraction, edge detection, feature extraction of an object.***

Keywords — Mathematics, Image processing, object detection.

I. INTRODUCTION

Discrete arithmetic is an essential for image processing machine vision, computer vision application .Also, discrete arithmetic incorporates numerical rationale, set hypothesis, arithmetical structure, combinatorial arithmetic, chart hypothesis and basic number hypothesis. Be that as it may, set variable based math hypothesis is the center substance of discrete arithmetic set hypothesis. So as to improve set variable based math hypothesis' learning impact and ace its application, sets essential activity tries in picture handling and set variable based math connected test in machine vision are proposed. Trial plans of essential picture preparing activities, machine vision uses of object recognition and apparatus parameter estimation utilizing set variable based math hypothesis are proposed in this paper.

II. EXISTING SYSTEM

In the existing system, they explained the discrete mathematics using image processing only and also explained the machine vision concepts with this technique. Then, solving mathematical operations like addition, subtraction, division, multiplication, differentiation, integration etc., with numbers only Using MATLAB software. In other existing papers explained only sets, algebra, etc., using numbers in MATLAB.

III. PROPOSED SYSTEM

In the proposed system, we explained and done experiments of all basics, set, algebra operations of mathematics using image processing like union, intersection, complement, erode operation, binary operation, and all basic operations and also we develop the machine vision concepts . The image processing, computer vision, machine vision with mathematics plays vital role in security and surveillance .Based on these operations for object detection, feature extraction of an object, parameter of an object, background subtraction as an wide application .

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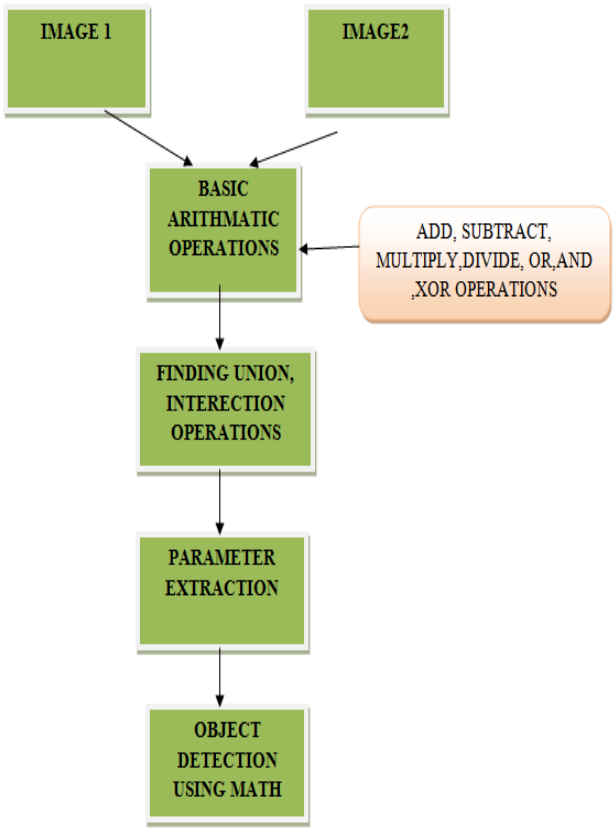
IV. BLOCK DIAGRAM



V. EXPERIMENTAL ANALYSIS

The experimental analysis includes the mathematical operations using images. The basic operations uses the gray conversion of both the colour images which is RGB format and convert into gray level then operations becomes to process easily. Depends upon the scenario binary conversion is also necessary after gray conversion. MATLAB software makes very easy to solve the basic operations using images because of some predefined functions which as follows:

TABLE 1

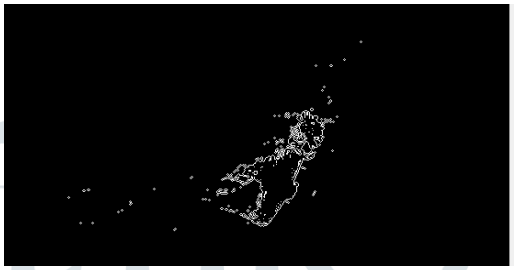
SL.NO.	OPERATION	COMMAND
1.	Addition	imadd
2.	Subtraction	imsubstract
3.	Multiplication	immultiply
4.	Division	imdivide
5.	OR	bitor
6.	AND	bitand
7.	XOR	bitxor

Then, some basic operations results are shown below:

(a) Input image

(b) Gray scale

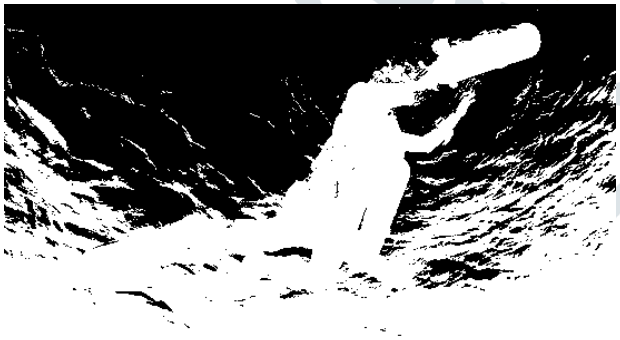
(e) Absolute complement



(f) Relative complement

(g) Absloute difference

(h) Linear combination



(h) Complement

Fig. 2 Example of mathematical operations using image processing

Machine vision is a significant part of fake insight improvement, which is generally utilized in the mechanical utilization of the machine to supplant the human eye to distinguish, judge and identify the object. With the new condition of savvy assembling and testing, machine vision has grown quickly as of late. Including modern camera, photoelectric sensor, focal point, light source, fixed section, sequential construction system, and so forth. Mechanical machine vision object recognition process: picture procurement, feature extraction, edge identification, location calculation etc., By using this mathematical operations the edge detection, parameter extraction, object detection can easily performed this is exactly machine vision with mathematics. The following are the results which is shown below:

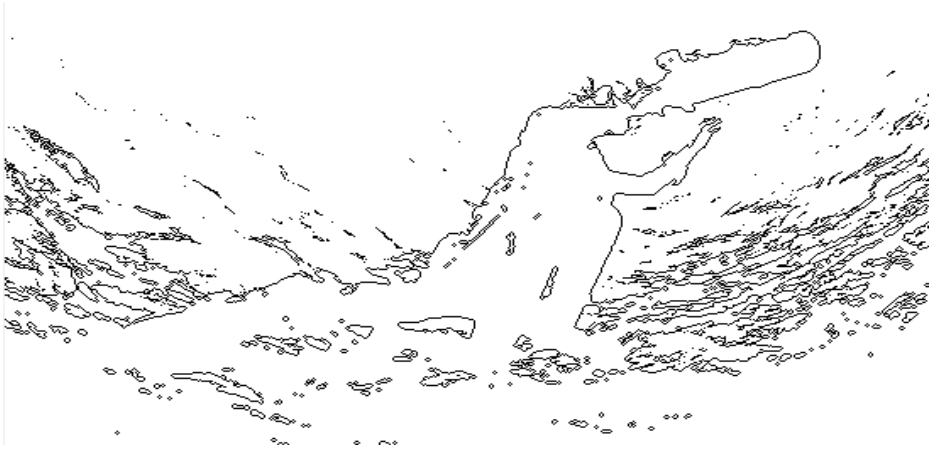


Fig. 3 Edge Detection

Fig. 4 Erode operation (Morphological operation)

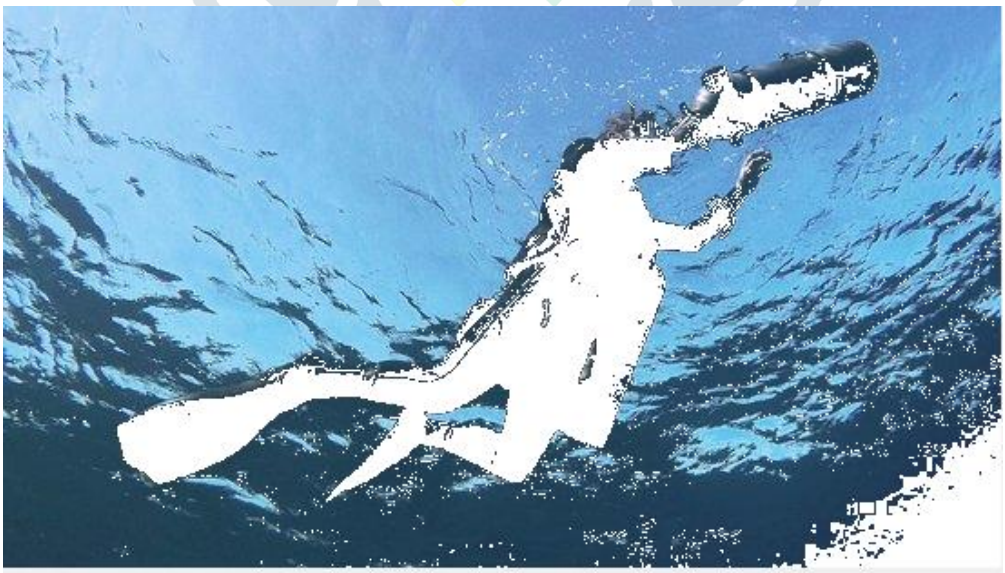


Fig. 5 Parameter extraction of an object

The above the results show the edge detection , then morphological operation that is erode operation and third one is parameter extraction of any object which is used for computer vision application ,machine vision etc., These results are get from the basic operations using image processing which is shown in Fig. 2 and other basic operations like add ,subtract ,divide, multiply etc.,

VI. CONCLUSION

Computer vision and machine vision is increasingly more mainstream in industry. Joining the application case of machine vision with discrete science, would be functional abilities .Using the discrete mathematics with image processing approach leads to computer and machine vision application

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