Evaluation of the Intensity Distribution by Image Processing

A.A. Mohammed , R.Jabur

Department of Engiering , University of Technology

Abstract

Image processing is an important source for the image analytical in order to get variable parameters such as the intensity .In present work it has been found a relation between the tensity and number of pixel in the image , and from this relation we have got in this paper the intensity distribution in the photo picture. One of the an important sources of image is the remote sensing technique. The development relation that we have got is a numerical analysis added to the remote sensing field .

Introduction

The information of remote sensing image is acquired by detecting and measuring intensity changes that the object imposes on the surrounding filed , it should be an electromagnetic acquisition , or potential field that could include an electromagnetic field emitted or reflected by the object . The term "remote sensing" is most common used in connection with electromagnetic techniques of information acquisition (1).

The radiation emitted, reflected or scattered from abady generates a radiant flux density in the surrounding space which contains information of the properties. To measure the properties of this radiation ,a collector is used followed by a detector. In the IR, visible and UV regions, The collector is usually a lens or a reflecting surface which focuses the intercepted energy onto the detector. Detection then occurs by transforming the electromagnetic energy into another form of energy such as heat, electric current and number of pixel which has been used in this article in order to evaluate the gray level distribution (2) .

Detection

There are different types of detectors available may be divided into two broad classes, namely THERMAL DETECTORS and PHOTO or QUANTUM DETECTORS. The thermal detectors utilize material with a temperature. dependent property when incident radiation is absorbed, the temperature of the device increases and the produces measurable physical change. The photo detectors are semiconductors which electrical properties may be altered it respond only to photons with an energy equal to or greater than the energy gap. between these states and consequently have along wavelength or short frequency. The photoconductive detectors the photo generated carriers an increase in the conductivity of the device if constant bias current is passed through the detector, there will be a corresponding decrease in the output voltage. The photovoltaic detectors or photodiodes and junction detectors. The simplest consists junction between n_ type and p_ type regions of the same material which known as homo junction detector (3) .

To evaluate the detecting ability, we must know the characteristics of the electrical noise in the output of the detector if we divide the (r m s) voltage of the noise by the responsively (volts per watt), we can obtain the noise equivalent power (NEP) of the detector. The detector that produces greater output has greater responsively. The reciprocal of the noise equivalent input is called THE DETECTVITY. it is a right side up measure of the detecting ability. Also we can say that the detective is the signal of noise ratio when (1 Watt) radiant intensity incident on detector having a sensitive area ($1Cm^2$) and the noise is measured with an electrical bandwidth of (1Hz) (4) .There is a relation between the intensity of the incident radiant in above area (1Cm2) and the number of pixels distributed in the such area . In other hand we can use the number of pixels as the band width of the signal (5).

Expermintal

By using image processing technique we divide the image plane to number of squares depending on a gray levels distribution , of

course each square has a number of pixels depending on the degree of gray level (if in is black of white).

It has been taken the number of pixel in such area of a thermal image as shown in photo(1) , which give the behavior of the intensity value for different brightness, to study the effect of the intensity that detected by computing the variety of the intensity in the image plane depending on the number of pixel . By taking a small (window) area about (25X25) pixel and calculate the relation ship between the intensity and the distribution of pixel in x-direction. Then applying it on an area with high brightness and study the relation ship between number of pixel and the x-pixel coordinate.

In the other hand we take an area (25X25) with high darkness and study also the relationship between the intensity and number of pixel with X-pixel coordinate.

At last we took an area (50X50) pixel which contain the two above area and study the relationship between the intensity (the number of pixel) with X-pixel coordinate.

Resulte and Discution

Fig (1) & Fig (2) show the behavior of intensity distribution in brightness and darkness area respectively, Fig (3) shows the intensity for both areas together. The Fig (4,5,6)show the behavior of the relationship between the number of pixel a long the x-direction , the peak values of each case (brightness or darkness) for intensity curve are less than no. pixel carve but the peak value of intensity (brightness or darkness) is about 1/3 peak value of no-pixel curve and the explain for this relation is when the area include wide range the absolute value of no-pixel is more than the value of the peak .

So it found that when we use the value of no-pixel (for brightness region)to evaluate the contrast of the image (V) by applying the relation [1] :

$$V = I_{max} - I_{min} / I_{max} + I_{min} \quad \ldots\ldots\ldots\ldots\ldots\ldots [1]$$

Where I_{max} is the maximum intensity

I_{min} is the minimum intensity

And substitute the no-pixel instate of I it found :

$$V = [(\text{no-pixel})_{max} - (\text{no-pixel})_{min}] / [(\text{no-pixel})_{max} + (\text{no-pixel})_{min}]$$

...[2] for brightness

The same thing applying for darkness ..

Conculution

By analyzing the results that got above we can say :

1- The value of (V) contrast it gave us the behavior of the intensity that distributed for a photo .

2- There are relation between the intensity distribution (geometrical optics theory) in the image plane and the image processing techniques .This relation give us a wide scientific work to fine more information between the two scientific fields.

References

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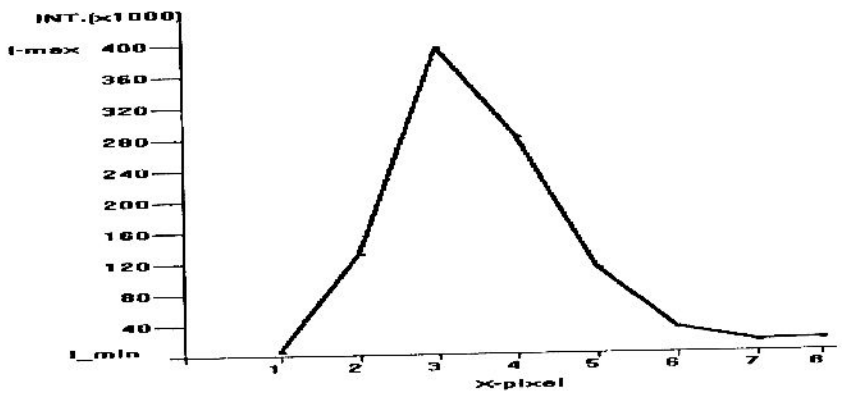


Fig.(1) Relationship between intensity and X-pixel coordinate (brightness area)

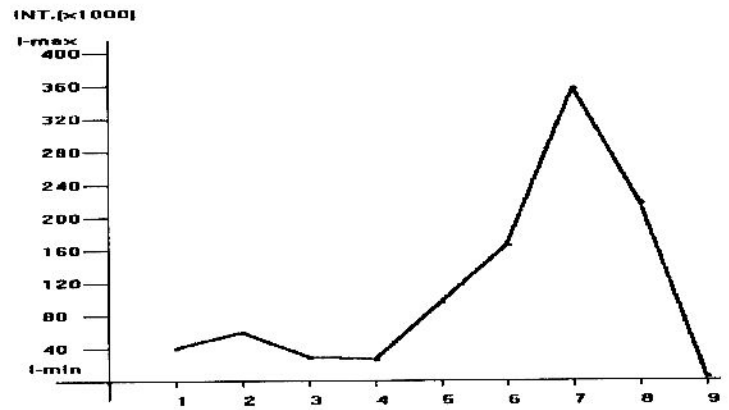


Fig.(2) Relationship between intensity and X-pixel coordinate (darkness area)

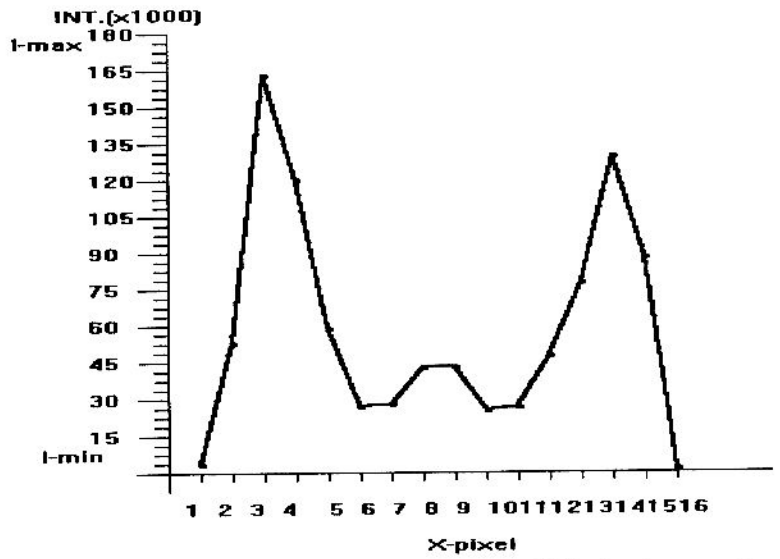


Fig.(3)Relationship between intensity and X-pixel coordinate (darkness and brightness area)

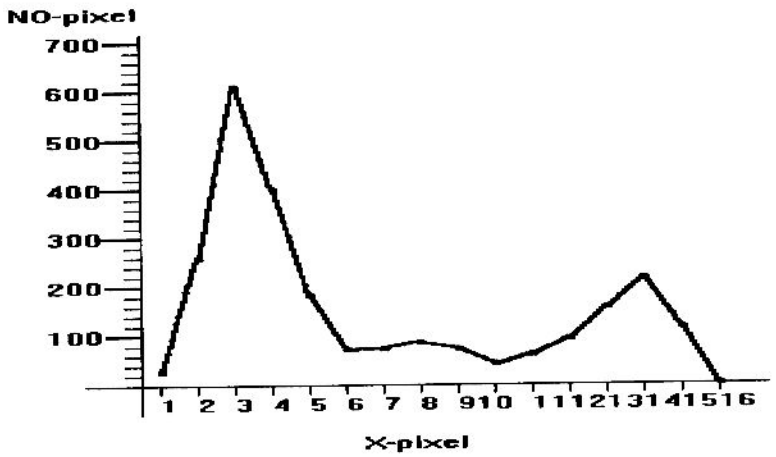


Fig.(4)Relationship between NO.PIXEL(a cumulated) and X-pixel coordinate (darkness and brightness area)

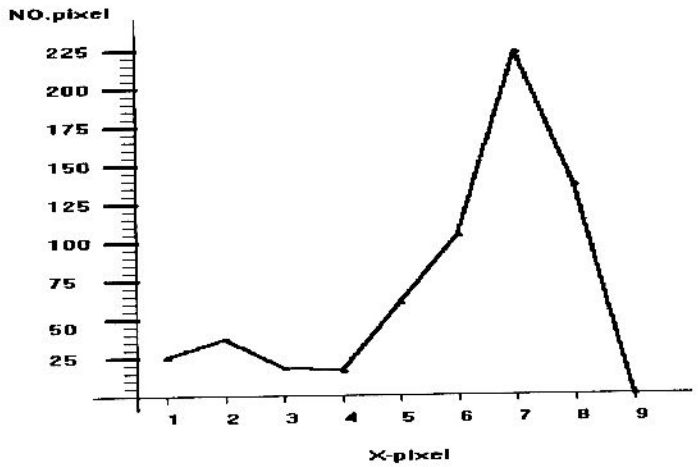


Fig.(5)Relationship between No-pixel and X-pixel coordinate (darkness area)

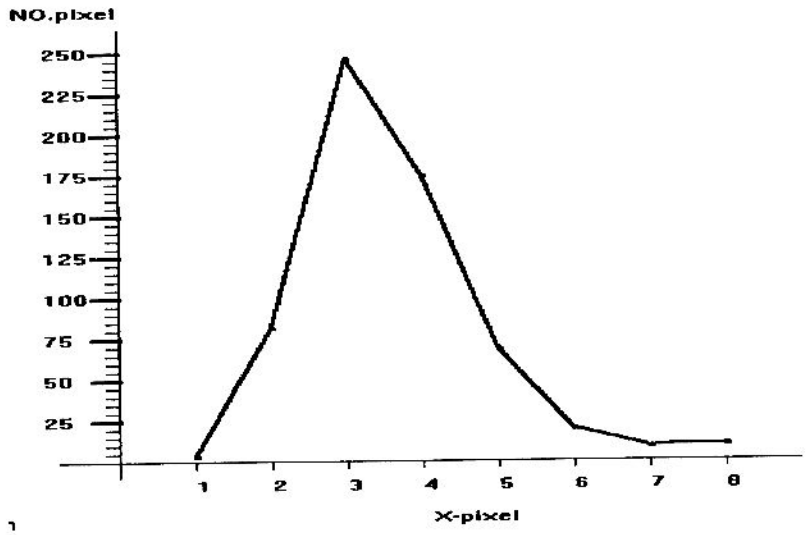
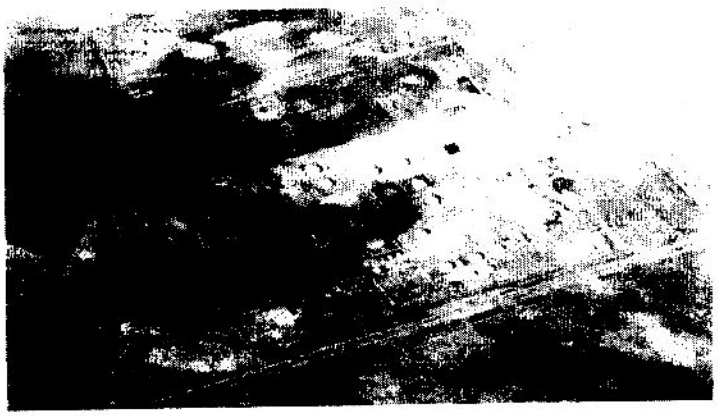


Fig.(6)Relationship between No- pixel and X-pixel coordinate (brightness area)



Photo(1) An image of remote sensing technique (1998)

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حساب توزيع الشدة باستخدام المعالجة الصورية

عبدالرزاق عبدالسلام محمد ، رازي جبر
قسم هندسة الليزر والبصريات الالكترونية ، الجامعة التكنولوجية

الخلاصة

تعتبر المعالجة الصورية واحدة من المصادر المهمة للتحليل الصوري، حيث من خلالها نحصل على معامل معيارية عديدة مثل الشدة . تم في هذا البحث إيجاد علاقة بين الشدة و عدد البكسلات (pixels) في الصورة . ومن هذه العلاقة تم الحصول على توزيع الشدة في الصورة الفوتوغرافية. إن من احد المصادر المهمة للصورة هو تقنية التحسس النائي، حيث تم الحصول على علاقة متطورة للتحليل الرقمي ترفد مجال التحسس النائي.