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Research on Automatic Image Identify System Based on VC++

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Abstract: It introduces the design and application of an automatic image identifying system. Through image processing technique, such as the image color turns to grey process, the image reduce miscellaneous bits process and the image enhanced process, the magnetic crack image on missile could be showed on computer clearly and is easy to be judged automatically by identifying and contrast technique.

Key words: Image information, magnetic crack, automatic identifying, VC++

INTRODUCTION

Missile is something for the war industry. The quality of missile is directly related with the safe of the people who operating it and other aspects. As the most important part of war industry, cracks and other bugs are always found on missile during check up, so some kinds of casualties such as exploded chamber would be happened during launch. And then people would be hurt and property lost. Although pipelining exploring of missile for war industry department has come true, it is still need workers to explore the blemish magnetism trace, so workers feel very tired. And fluorescence only can be seen in darkroom, the working condition is very bad, so failing to report the crack and miscarriage of justice are easy occur, it is harmful for the safe of missile. So, it is urgent to solve these problems.

As a way of no damage examination, fluorescence magnetism powder exploring wound is widely used in the world at present. Now digital image processing technique is widely used in no damage examination and it is one of the most convenient ways of crack detecting. It plays an important role in quality controlling (Zhang and Yi, 2006; Zhang and Huo, 2009; Zhang*et al*., 2009).

In this study, it introduces the design and development of an automatic image identifying system based on fluorescence magnetism powder exploring wound with no damage for missile. It is developed by Visual C++.

INTRODUCTION OF THE SYSTEM

The automatic image identifying system includes four parts. Image information is gained by image information collecting part. In real use, the original image got by the system is not perfect, for example, the quality of the original image is not so good because of noise?illumination,and etc. So the image is needed to be processed in advance to be suitable for characteristic pick up. After picking up the characteristic of the image, we can judge it and export the result. (Zhou and Li, 2005)(http://jxcad.com.cn/read.php?tid=9302)(http://www.docin.com/p-479429276.html). The flow is as Fig. 1.

THE MODELS OF THE SYSTEM

Image read model: The collected images should be processed to be more suitable to contrast, so that the measure and judge accuracy of the system can be improved. The opening calculates and closing calculates methods are used to process the measuring image.

We need get the image data before analyzing and processing image information. The data include the width, height, the color of every pixel dot. Every file has its own format, the system uses BMP format file. There are four functions in image read model, such as open, save as, reload, close.

Image characteristic pick up model: Before extracting the image character, it is necessary to process the image, such as grey degree change? image two values change?image enhance?smooth and filter?sharp?adjust and etc. Then the character of the image can be easily extracted. Using threshold value division method and figure extracting method, the information extracted from the target image can be used in the mode identify, namely through the images of crack on missile, the changes of the geometry dimension of the specify place and the characters of gray degree grade can be extracted. Then the image is detected according to the parameters we have (Zhang and Huo, 2009).

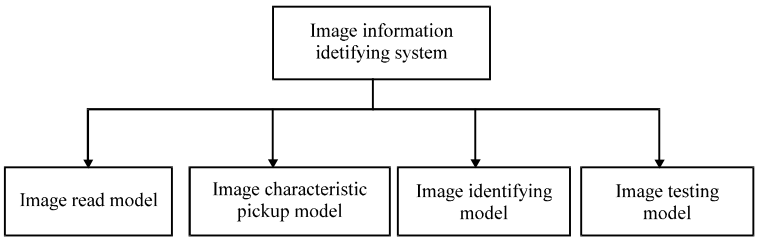

Fig. 1: Image information identifying system function

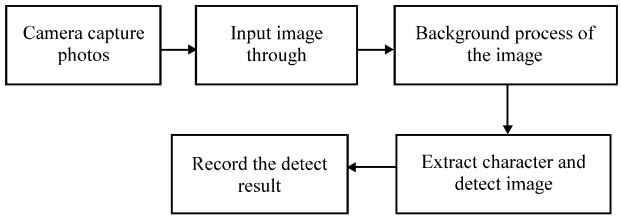

Fig. 2: The flow chart of the image information identify model

Borderline track method can describe the geometry shape more accurately than that of figure extracting method.

Image identifying model: By comparing the geometry dimension change of the target image with grey degree grade, the crack on the missile can be start to checked and judged.

According to the image data we get and a lot tests, we find the edge of the crack become smoother and more regular after the image is processed by threshold value division. The shape of the crack is more near to a rectangle or eclipse. The length of the crack usually is about 10 cm. So, we can use the morphologic character of the rectangle to identify the crack on the missile.

The Stat. mode identify method is used to identify the target image. The purpose of the Stat. mode identify method is to determine the sort of known swatches. Stat. mode identify mode base on the decision-making theory. The basic model is to do a lot statistic and analysis of the images, find the disciplinarian, extract the characters that reflect the essential characteristic of the image and then to identify the image.

The figure of Stat. mode identify is as Fig. 2. The first part is to sort the un-sorted image; the second part is analyzing part, namely establish a judge function and a judge rule for the sorted image swatches (learn well-regulated), so that the unsorted image can be sorted. Because the inputted images need to be numeric, there will be some errors. Also, because of the asymmetric illumination?noise in the environment and etc., the quality of the image can be shattered. The images need to be pretreatment. After pretreatment the characters of the images can be extracted, then judged and sorted, at last identified. In order to sort, the image swatches are needed. The last step of Fig. 1 is the learning and training part. According to some rules and using the training image swatches to name or learn some judge rules, the training swatches need to be tested one by one to observe if there are some errors or not. If there are some errors, the judge rule needs to be improved until they are satisfied.

Image detect model: Tag the exceptional image and statistic the last detect result and then output the result. According to the result, the missionary will check the corresponding missile and then find the cracked cannonball, so that weigh the quality of the corresponding missionary.

THE IMPLEMENT AND THE RESULT

Image characteristic pick up model: The basic way of image grey algorithm is to add a weight to each RGB data of the pixel and then sum them. After the grey processing, the pixel of the image has only one data- that is the grey data. The big or small of the data determines the bright or dark degree.

Figure 3 is the result before grey processing. Figure 4 is the result after grey processing.

Two value of image is to divide the pixels of image into two colors: black and white. Figure 5 is the image before two value processing. Figure 6 is the image after two value processing.

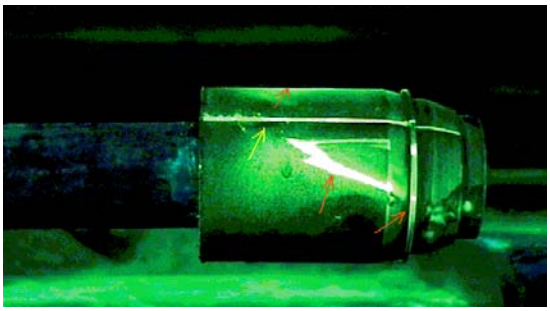

Fig. 3: image before grey processing

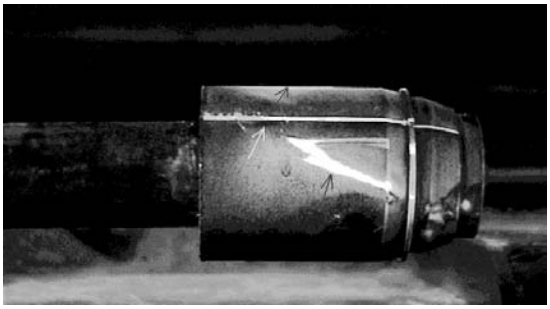

Fig. 4: image after grey processing

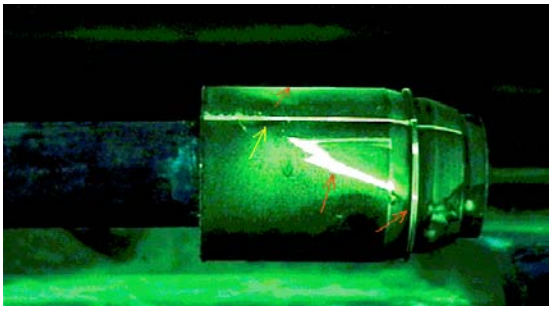

Fig. 5: Image before two value processing

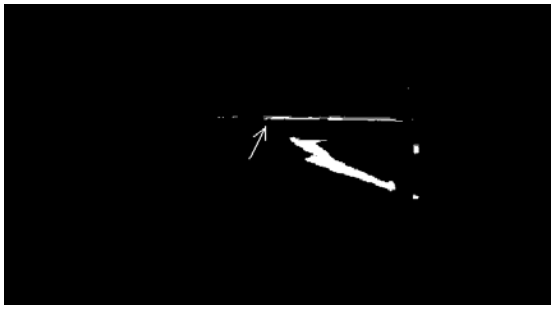

Fig. 6: Image after two value processing

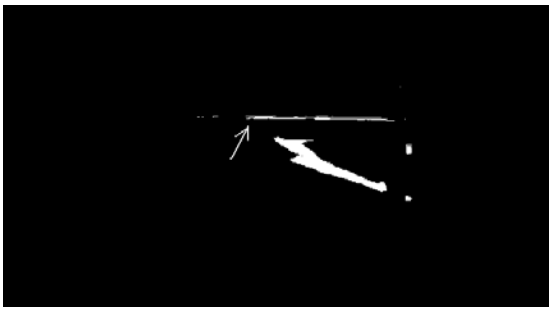

Fig. 7: Image before sharp processing

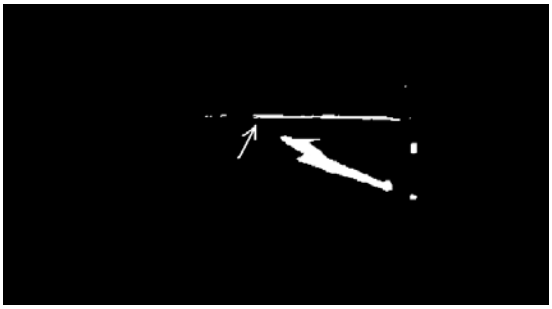

Fig. 8: Image after sharp processing

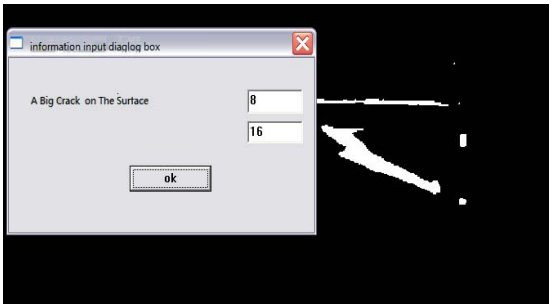

Fig. 9: Image characteristic pick up

Sharp processing is to protruding the detail of the image or to enhance the vague detail. This kind of vague is not because of wrong operation, but because the solid way of getting special image. Figure 7 is the image before sharp processing. Figure 8 is the image after sharp processing.

Image characteristic pick up using image border following or image outline pick up method. Fig. 9 is the result.

The implement of the image identify model: The arithmetic of the image identify model is that when you scan the first row of the segment which has 1, deposit the

numbers of 1 of every segment and create a pointer. During the scan of the following rows, booking the length when it meets the segment p which have 1. First, if the segment p does not connect with all of the last segments which have 1, create a counter and count the length of the p into this counter. Second, if the segment p connects with all of the last segments which have 1, count the length of the p into the counter of p. Move the pointer from q to p. Third, if the segment p connects with some of the last segments q1\q2....., then add the number of the counter of q1\q2…… and the length of p with the counter of q1. And then move the pointer to p. After scan all the image counters, the number in the counter is the corresponding area. If the area is within the 10×10, it is a crack.

First, according to a lot image data, using air bubble method, the length and the width scope character of the image crack can be gained. The programming sentences are as following:

```
for(i=rectnew.top ;i<rectnew.bottom ;i++)
{       for(j=rectnew.left ;j<rectnew.right ;j++)
{
//calculate the mapping coordinate
i_src=rectnew.top+int((i-rectnew.top )/hscale);
j_src=rectnew.left+int((j-rectnew.left )/wscale);
//maping the corresponding pels dots
lpSrc=(unsigned char *)lpDIBBits + lLineBytes * i_src + j_src;
lpDst = (char *)lpNewDIBBits + lLineBytes * i + j;
*lpDst=*lpSrc;
        }
        }
```

Second, according to the images which need to be detected, gain the length and width of the crack of the image to be judged. The programming sentences are as following:

```
w = (int) ::DIBWidth((char *)lpDIB);
h = (int) ::DIBHeight((char *)lpDIB);
dw = (w+3)/4*4; //calculate the numbers of bytes of every rows of the image
```

Last, compare the images to be identified with the length and width of the crack character that is extracted by a lot tests. The programming sentences are as following:

```
for(i=0;i<h;i++)
{
       for(j=0;j<w;j++)
        {
        sum=0;
//keep the gray degree values of the pels of the four frame of the image
if( j<((tem_w-1)/2) || j>(w-(tem_w+1)/2) || i<((tem_h-1)/2) || i>(h-(tem_h+1)/2) )
       (newbuf+i*dw+j)=*(oldbuf+i*dw+j);
//according to the template processing the other pels
else
{
//use dot (i,j)as the center of the template
for(m=i-((tem_h-1)/2);m<=i+((tem_h-1)/2);m++) {          for(n=j-((tem_w-1)/2);n<=j+((tem_w-1)/2);n++)
//use dot (i,j) as the center, multiply the pels within as big as the templet with the coefficient of the corresponding area of the templet and then linearity superposition
sum+=*(oldbuf+m*dw+n)*
tem[(m-i+((tem_h-1)/2))*tem_w+n-j+((tem_w-1)/2)];
        }
//multiply the result with the total temple coefficient
```

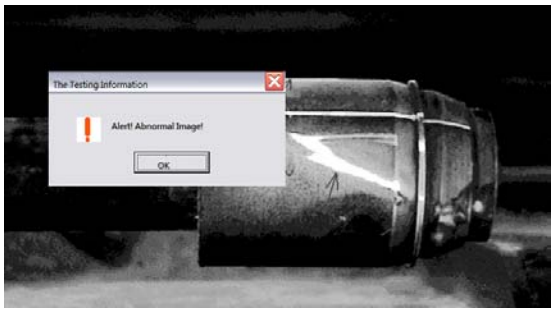

Fig. 10: The identifying image

```
sum=(int)sum*xishu;
        //calculate the absolute value
sum = fabs(sum);
//if smaller than 0, force evaluate to 0
if(sum<0)
sum=0;
//if bigger than 255,force evaluate to 255
if(sum>255)
        sum=255;
        // put the result to the new corresponding area of the bitmap
        *(newbuf+i*dw+j)=sum;
                        }
        }
       }
```

The running result of the image identify model is as the following Fig. 10.

After analyzing and testing for many times, the appropriate data of the parameters are gained. Then after you operate to identify the target image, most of images with errors can be identified and then prompt an alert. Missionary identify that again and then determine if there are some real cracks in the image or not.

CONCLUSION

It introduces the design and implement of an automatic image identifying system based on VC++. Through the computer aid collecting, image processing, identify, the cracks on the missile can be judged easily, so the usual problems in industry could be solved quickly and safely. The productivity is improved. The research improves the use of image processing technology in the area of nondestructive detection. It can also be used in other research area, such as cultural relic image processing technology.

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