CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
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Project Number
J1325

Project Title
Iris Analysis: Monochrome or Contrast?

Abstract

Objectives/Goals
My goal is to find an alternative way to recognize the different iris patterns in each eye. Inside every eye, there is a special swirling, colored pattern that makes every one of us unique and different from the other. Among grayscale, monochrome, infrared, and contrast, I chose monochrome and contrast as the two color scheme I will then compare.

Methods/Materials
To start the experiment, I gathered a few usable images that showed the texture and color of an iris pattern. I found two high resolution pictures of a hazel and a blue iris. To change the color scheme, I opened Microsoft Word #C drawing, and found a section that listed the different colors such as grayscale, washout, monochrome and contrast. Then, I created a template chart to make different sections for easier counting of pixels. Afterwards, I downloaded a free image editing program called GIMP. I used that to count the differnt color pixels in each section of the area from the Template chart. I recorded and analyzed the data on Microsoft Excel. This procedure can be used to collect and analyze iris patterns.
Materials include: computers, microsoft word, microsoft excel, GIMP, and two high resolution images of irises.

Results
The monochrome blue iris image, on average had 73% black pixels and 27% white pixels, while the monochrome hazel image had 79% black pixels and 21% white pixels. The blue iris contrast image had 53% black pixels, 12% blue pixels, 21% aqua pixels and 14% white pixels in total. The hazel iris contrast image had 39% black pixels, 43% red pixels, 10% yellow pixels and 8% white pixels.
The average standard deviation of the hazel and blue monochrome image of black pixels is 381and 344 for white pixels. The hazel and blue contrast images had a 156 average of standard deviation for black pixels, 364 for dark colored pixels, 144 for light colored pixels, and 199 for white pixels.

Conclusions/Discussion
The data collected support my hypothesis because contrast images provides a better resolution for iris pattern analysis and includes many ranges of colors that can be used for the finding of a even more accurate distinguish between irises.
Uncontrollable factors that might effect this experiment include the light of the camera lens reflecting through the eyes. The upper eyelid in the hazel iris image disrupts the fullness of the iris. Sometimes, eyelashes are also reflected through the iris causing a bit of difference in results.

Summary Statement
This project is to compare the two color (monochrome and contrast) and see which one is better for iris pattern analysis.

Help Received