الجامعة المستنصرية

كلية العلوم

قسم:الحاسوب

عنوان التقرير

Digital images

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لمادة**معالجة صور**

Abstract

Digital images are easy to manipulate and edit due to availability of powerful image processing and editing software. Nowadays, it is possible to add or remove important features from an image without leaving any obvious traces of tampering. As digital cameras and video cameras replace their analog counterparts, the need for authenticating digital images, validating their content, and detecting forgeries will only increase. Detection of malicious manipulation with digital images (digital forgeries) is the topic of this paper. In particular, we focus on detection of a special type of digital forgery – the copy-move attack in which a part of the image is copied and pasted somewhere else in the image with the intent to cover an important image feature. In this paper, we investigate the problem of detecting the copy-move forgery and describe an efficient and reliable detection method. The method may successfully detect the forged part even when the copied area is enhanced/retouched to merge it with the background and when the forged image is saved in a lossy format, such as JPEG.

Introduction

Digital image is a representation of a real image as a set of numbers that

can be stored and handled by a digital computer. In order to translate the image into numbers, it is divided into small areas called pixels (picture elements). For each pixel, the imaging device records a number, or a small set of numbers, that describe some property of this pixel, such as its brightness (the intensity of the light) or its color. The numbers are arranged in an array of rows and columns that correspond to the vertical and horizontal positions of the pixels in the image

Digital image have several basic characteristics. One is the type of the

image. **For example**, a black and white image records only the intensity of the light falling on the pixels. A color image can have three colors, normally RGB (red, green, blue) or four colors, CMYK (Cyan, Magenta, yellow, black). RGB images are usually used in computer monitors and scanners, while CMYK images are used in color printers. There are also non-optical images such as ultrasound or X-ray in which the intensity of sound or X-rays is recorded. In range images, the distance of the pixel from the observer is recorded. Resolution is expressed in the number of pixels per inch (ppi). A higher resolution gives a more detailed image. A computer monitor typically has a resolution of 100 ppi, while a

printer has a resolution ranging from 300 ppi to more than 1440 ppi. This is why an image looks much better in print than on a monitor.

Resolution of a Digital Image

Size of a digital image are its total number of pixels, expressed as megapixels and this size is the resolution of the image. But why is the total number of pixels a measure of "resolution"? The reason is that more pixels over a fixed field of view equals higher resolution. For instance, if the field of view is 20 feet across, a 3 megapixel camera will be resolving that view at 102 pixels per foot. If that same shot was taken with an 18 mp camera it would be resolving that view at 259 pixels per foot, 2.5 times more resolution than a 3 mp camera.

Quality of a Digital Image

The resolution of a digital image is one of several factors that determine the quality of a digital photo. There are four main factors that work together to create digital photo quality:

1. The quality of the recording device (camera's optics & sensor, scanner's sensor).
2. The size (in pixels) of the digital image.
3. The digital format it is stored in (lossless vs lossy compression).
4. The technical proficiency and the "eye" of the photographer.

These factors all work together and it's why we can't overly generalize. This is especially true when it comes to printing digital photos and why there is so much discussion about how many pixels per inch are required to achieve "photographic quality." An 16 Mp photo taken with an inexpensive compact camera at high ISO and stored as a moderately compressed JPEG and then printed at 300 pixels per inch is going to look a lot worse than an 16 Mp photo taken with a high quality digital SLR, stored as a TIF or low compressed JPEG and printed at 200 pixels per inch.

Advantages of digital image

1. The processing of images is faster and more cost-effective. One needs less time for processing, as well as less film and other photographing equipment.

2. It is more ecological to process images. No processing or fixing chemicals are needed to take and process digital images. However, printing inks are essential when printing digital images

3. When shooting a digital image, one can immidiately see if the image is good or not.

4. By changing the image format and resolution, the image can be used in a number of media

Disadvantages of digital image

1. Misuse of copyright is now easier than it earlier was. For instance, images can be copied from the Internet just by clicking the mouse a couple of times.

2. The value of the image will get worse? This has not necessarily happened everywhere. Images held in image banks still have reasonably good prices, inspite of the fact that downloading images through the net is fast and easy. The profitableness of digital photography has increased the number of images and photography in general.

3. Work has become more technical, which may not be a disadvantage for everyone.

4. A digital file of a certain size cannot be enlargened with a good quality anymore. For instance, a good poster cannot be made of an image file of 500 kb. However, it is easy to make an image smaller.

Difference between digital image and remotely sensed optical imagery

A digital image is an image store in digital form. This means a parameterization based on quantified parameters, e.g. colored pixels with a specified color map, or a vectorization after the image is segmented into areas, which belong together.

Remotely sensed optical imagery is a completely different story: Here the topic is the recognition of patterns or properties in "digital images". So while a "digital image" is an object, the "remotely sensed optical imagery" is a process or method.

Digital Image Formats

By far the three most widely used digital image formats on the computers and mobile devices are GIF, PNG and JPEG.

GIF examples: The original, 8-bit "clip-art" file format, static GIFs are now almost extinct, replaced by PNG. Animated GIFs are still going strong and their presence on the Web is widespread.

JPEG example: The go-to format for displaying photographic images. Provides file compression while still maintaining high-quality display.

PNG examples: For static "clip-art", PNG is superior to GIF and has almost completely replaced it. 24-bit, alpha channel and transparency, good compression.

Before images can appear on a computer or mobile device screen they must be put into a digital format that the device's operating system recognizes and can render to the screen.

Type of digital image

- Binary images
- Gray-scale images
- Color images
- Multispectral images
- Black and White Images

References

- www.bbc.co.uk/bitesize/topics
- www.mathworks.com/matlabcentral
- http://www.rideau-info.com/photos
- http://livecode.byu.edu/
- www.javatpoint.com
- http://dl.acm.org/doi/abs
- http://citeseerx.ist.psu.edu/viewdoc/summary