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SM

LABORATORY WORK #2

Digital processing of images.

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Laboratory work #1

1 Purpose of the laboratory

Study processing of vectorial images, bitmap images, and animations.

2 Laboratory Work Requirements

Study the technology of vectorial processing. Study the technology of raster processing. Study the technology of animated images.

Practical part:

- Show image on the screen.
- Display the histogram of the image.
- Adjusting of color and contrast of image.
- Change of color of image.
- Scaling of image.

3 Laboratory work implementation

3.1 Vector graphics

Vector graphics use 2D point located polygons to represent images in computer graphics. Each of these points has a definite position on the x- and y-axes of the work plane and determines the direction of the path; further, each path may have properties, including such values as stroke color, shape, curve, thickness, and fill. Vector graphics are commonly found today in the SVG, EPS and PDF graphic file formats and are completely different from the more common raster graphics file formats of JPEG, PNG and MPEG4. Standards The World Wide Web Consortium (W3C) standard for vector graphics is Scalable Vector Graphics (SVG). The standard is complex and has been relatively slow to be established at least in part owing to commercial interests. Many web browsers now have some support for rendering SVG data, but full implementations of the standard are still comparatively rare.

In recent years, SVG has become a significant format that is completely independent of the resolution of the rendering device, typically a printer or display monitor. SVG files are essentially printable text that describes both straight and curved paths, as well as other attributes. Wikipedia prefers SVG for images such as simple maps, line illustrations, coats of arms, and flags, which generally are not like photographs or other continuous-tone images. Rendering SVG requires conversion to raster format at a resolution appropriate for the current task. SVG is also a format for animated graphics.

There is also a version of SVG for mobile phones. In particular, the specific format for mobile phones is called SVGT (SVG Tiny version). These images can count links and also exploit anti-aliasing. They can also be displayed as wallpaper.

3.2 Raster graphics

In computer graphics, a raster graphics or bitmap image is a dot matrix data structure, representing a generally rectangular grid of pixels, or points of color, viewable via a monitor, paper, or other display medium. Raster images are stored in image files with varying formats.

A bitmap, a single-bit raster, corresponds bit-for-bit with an image displayed on a screen, generally in the same format used for storage in the display's video memory, or maybe as a device-independent bitmap. A raster is technically characterized by the width and height of the image in pixels and by the number of bits per pixel (or color depth, which determines the number of colors it can represent).

The printing and prepress industries know raster graphics as contones (from "continuous tones"). The opposite to contones is "line work", usually implemented as vector graphics in digital systems.[4] Vector images can be rasterized, and raster images vectorized, by software. In both cases some information is lost, although vectorizing can also restore some information back to machine readability, as happens in optical character recognition.

3.3 Graphic animation

raphic animation is a variation of stop motion (and possibly more conceptually associated with traditional flat cel animation and paper drawing animation, but still technically qualifying as stop motion) consisting of the animation of photographs (in whole or in parts) and other non-drawn flat visual graphic material, such as newspaper and magazine clippings.

In its simplest form, Graphic "animation" can take the form of the animation camera merely panning up and down and/or across individual photographs, one at a time, (filmed frame-by-frame, and hence, "animated") without changing the photographs from frame to frame. But once the photos (or "graphics") are also moved from frame to frame, more exciting montages of movement can be produced, such as on Los Angeles animator Mike Jittlov's 1977 short film, Animato. Graphic animation can be (and often is) combined with other forms of animation including direct manipulation animation and traditional cel animation.

Examples are Frank Mouris' 1973 Oscar-winning short film Frank Film, and Charles Braverman's Condensed Cream of the Beatles (1974),[1] originally produced for Geraldo Rivera's late night TV show of the time, Goodbye America.

3.4 Implementation

The laboratory work is implemented in Java for android. The application generates histogram of camera input in realtime. The application has 1 activity and it consists of:

- a) SurfaceView - Where the camera is located and the histogram plot.
- b) HistogramView - Custom View that plots a histogram based on input image.

3.5 Screenshots

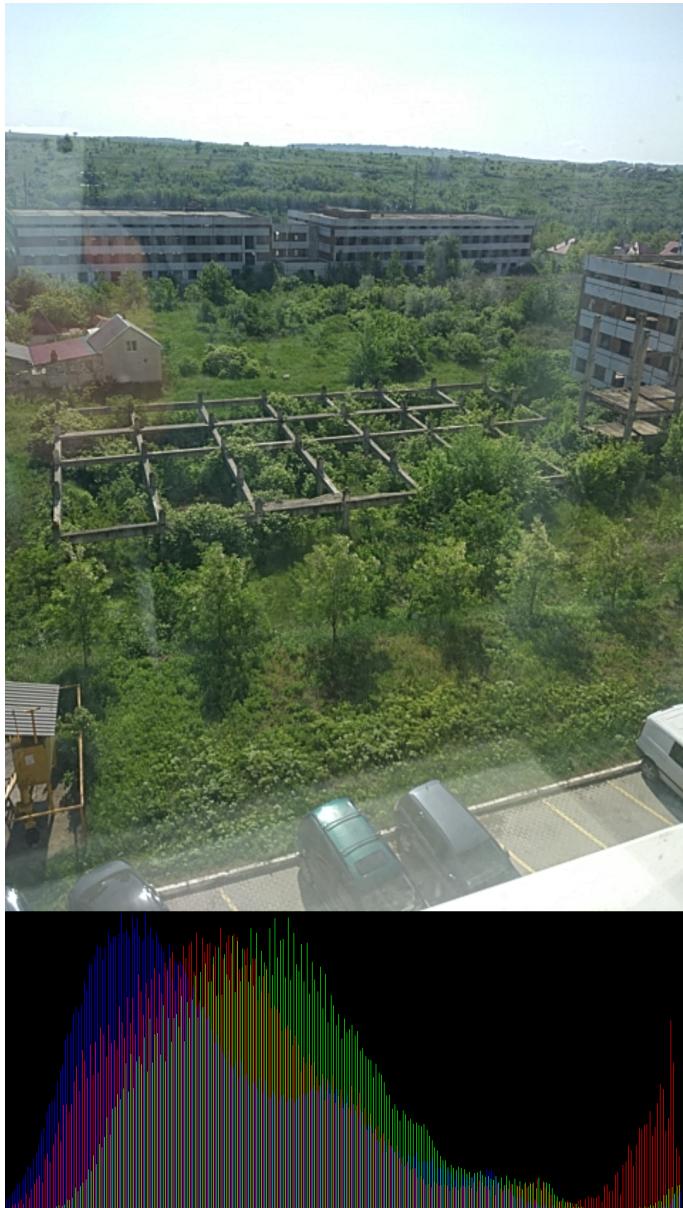


(a)Image example.

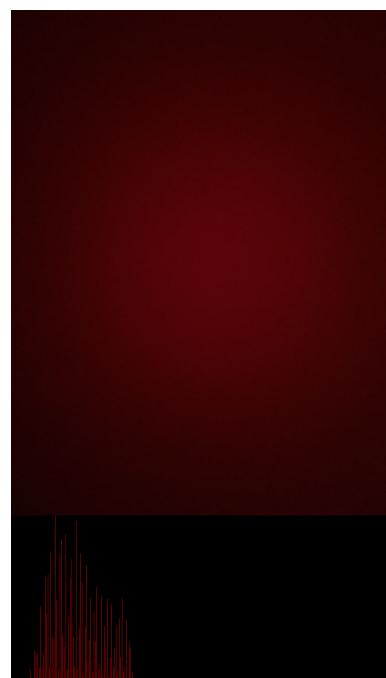


(b)Image example.

Figure 3.1 – Examples 1



(a) Image example.



(b) Image example.

Figure 3.2 – Examples 2

Conclusions

In this laboratory we studied different types of images. We saw the principle of working of vector images and rasterized ones. We also analyzed images as signals and constructed their histogram.