IM – An Imaging Tool:
Image Representation, Storage, Capture and Processing

ANTONIO SCURI

Tecgraf/PUC-Rio – Laboratório de Computação Gráfica/Pontifícia Universidade Católica do Rio de Janeiro, Caixa Postal 38097, 22453-900 Rio de Janeiro, RJ, Brasil
scuri@tecgraf.puc-rio.br

Abstract. IM is a toolkit for Digital Imaging. It provides support for image capture, several image file formats and many image processing operations. Image representation includes scientific data types and attributes. Animation, video and volumes are supported as image sequences. The main goal of the library is to provide a simple API and abstraction of images for scientific applications. IM is free software, can be used for public and commercial applications.

1. Introduction

IM is based on 4 concepts: Image Representation, Storage, Processing and Capture. Image Visualization is a task that it is left for a graphics library.

Image Representation describes the image model and its details: which color systems are going to be used, which data types, how the data is organized in memory and how other image characteristics are managed.

Image Storage describes the file format model. Image Capture describes how to obtain an image from a device. And Image Processing describes the processing operations.

There are multiple ways to implement these concepts. There is no common definition in the literature, although there is a standard called Programmer's Imaging Kernel System [2]. PIKS is a very complete and also very complex standard, so it is difficult to implement and not popular.

2. Implementation

In IM only four parameters define the raw image data: width, height, color mode and data type. The data types are a subset of the standard C data types. The color mode is a combination of the color space and some additional flags. Images can be converted from one representation to another.

The most popular file formats are supported: TIFF, BMP, PNG, JPEG, GIF and AVI. Image metadata is supported by using generic name based attributes with variable data types.

Currently, Image Capture is implemented only in Windows. It is independent of the other libraries and can capture from more than one source at the same time.

About a hundred Image Processing operations are available, including geometric, arithmetic, histogram and convolution operations.

The toolkit API is written in C. The core library source code is implemented in C++ and it is very portable, it can be compiled in Windows and UNIX with no modifications. New image processing operations can be implemented in C or in C++.

More details about the architecture and a comparison with other libraries can be found in [1].

3. Conclusions and Future Work

There is a need for something easier to implement and understand in Imaging. The available free libraries are sometimes close, sometimes very far from “easier”.

IM is an unexplored solution and proposed as a simple and clean one. It is another Imaging tool with a different approach to the many possibilities in the area. Its organization was designed so it can be used for teaching Imaging concepts. But to became a real solution it needs to be evaluated by a larger number of users.

For the future we intend to complete the support for Linux specific libraries, add some scientific file formats and improve the image processing library.

Acknowledgements

Thanks to all the people who once worked in the library. This work was developed at Tecgraf/PUC-Rio by means of the partnership with PETROBRAS/CENPES.

References

[1] A. Scuri, *IM – An Imaging Tool*, July 2004. http://www.tecgraf.puc-rio.br/im/.

[2] PIKS - Programmer's Imaging Kernel System, ISO/IEC 12087, 1994.