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Coding of Still Pictures

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Joint Bi-level Image Experts Group

JPEG
Joint Photographic Experts Group

TITLE: **JasPer Software Reference Manual (Version 1.700.0) (Last Revised: 2003-02-09)**

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Michael D. Adams

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Contents

1 Introduction **1**
- 1.1 Motivation Behind JasPer . . . 1
- 1.2 What is JasPer? . . . 1
- 1.3 Software License . . . 2
- 1.4 Other Sources of Information on JasPer . . . 2
- 1.5 Origin of the Name . . . 2

2 JasPer Software **3**
- 2.1 Version Identification . . . 3
- 2.2 Obtaining the Software . . . 3
- 2.3 Extracting the Software . . . 3
- 2.4 Building the Software . . . 4
  - 2.4.1 Build Process for UNIX (or UNIX-Like) Systems . . . 5
  - 2.4.2 Build Process for Microsoft Visual C Studio under Microsoft Windows . . . 6
  - 2.4.3 Dependencies on Other Software . . . 6
- 2.5 Reporting Bugs . . . 7

3 JasPer Library **9**
- 3.1 Introduction . . . 9
- 3.2 Core Code . . . 10
- 3.3 Codec Drivers . . . 10
- 3.4 Image Model . . . 11
- 3.5 JasPer Header Files . . . 12
- 3.6 Initializing the Library . . . 12
- 3.7 Memory Allocation . . . 13
- 3.8 Adding Support for a New Image Format . . . 13

4 Application Programs **15**
- 4.1 Introduction . . . 15
- 4.2 The jasper Command . . . 15
- 4.3 The imgcmp Command . . . 17
- 4.4 The imginfo Command . . . 18
- 4.5 The jiv Command . . . 18

5 Codecs **21**
  - 5.0.1 BMP Codec . . . 21
  - 5.0.2 JP2 Codec . . . 21
  - 5.0.3 JPC Codec . . . 21

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https://standards.iteh.ai/catalog/standards/iso/a281eb22-ee02-4775-a04e-27402e9f7448/iso-iec-15444-5-2015

5.0.4 JPG Codec 24
5.0.5 PGX Codec 24
5.0.6 MIF Codec 25
5.0.7 PNM Codec 25
5.0.8 RAS Codec 25

A Software License **27**

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Document Preview

ISO/IEC 15444-5:2015
https://standards.iteh.ai/catalog/standards/iso/a281eb22-ee02-4773-a04c-27402e9f7448/iso-iec-15444-5-2015

List of Figures

3.1 Software structure. 9
3.2 Image model. (a) An image with *N* components. (b) Individual component. 11
3.3 Alignment of components on the reference grid. 12

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https://standards.iteh.ai/catalog/standards/iso/a281eb22-ee02-4773-a04c-27402e9f7448/iso-iec-15444-5-2015

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Chapter 1

Introduction

1.1 Motivation Behind JasPer

Digital imagery is used in many of today's computer software applications. Consequently, software modules that facilitate the handling of such data are often needed. Almost any application program that deals with images must address the problem of image interchange and import/export. That is, a means must exist for moving image data between an application and its external environment. Moreover, applications must often be capable of rendering an image for display on a particular output device (such as a monitor or printer) with reasonably accurate color/tone reproduction.

Although image import/export and rendering are very basic functionalities, they are often not easily implemented. Usually, an image is represented in a coded format (such as JPEG-2000 JP2 [8] or JPEG [2]). Since coding formats are frequently quite complex, the import/export of image data can be a daunting task. Rendering an image in such a way as to accurately reproduce color/tone requires a color management scheme of some sort. Unfortunately, developing an effective color management engine can require considerable effort.

A search for a solution to the above problems led to the development of the JasPer software. The remainder of this document provides a detailed description of the this software.

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1.2 What is JasPer?

In simple terms, JasPer is a software tool kit for the handling of image data. The software provides a means for representing images, and facilitates the manipulation of image data, as well as the import/export of such data in numerous formats (e.g., JPEG-2000 JP2 [8], JPEG [2], PNM [4], BMP [12], Sun Rasterfile [13], and PGX [9]). The import functionality supports the auto-detection (i.e., automatic determination) of the image format, eliminating the need to explicitly identify the format of coded input data. A simple color management engine is also provided in order to allow the accurate representation of color. Partial support is included for the ICC color profile file format [7], an industry standard for specifying color.

The JasPer software consists of a library and several application programs. The code is written in the C programming language [3, 11]. This language was chosen primarily due to the availability of C development environments for most of today's computing platforms. At present, JasPer consists of approximately 40K lines of code. Although written in C, the JasPer library can be easily integrated into applications written in the C++ programming language as well.

1.3 Software License

JasPer software development is based on an open-source model. A copy of the software license can be found in Appendix A.

1.4 Other Sources of Information on JasPer

For more information about the JasPer software, please visit the following web pages:

- JasPer Project Home Page (i.e., http://www.ece.uvic.ca/~mdadams/jasper)
- JasPer Software Announcements Group (i.e., http://groups.yahoo.com/group/jasper-announce)

  By joining this group, one can easily obtain up-to-date information about the JasPer Project in a timely fashion. The associated mailing list is used to announce new releases of the software and disseminate other important information about JasPer.
- JasPer Software Discussion Group (i.e., http://groups.yahoo.com/group/jasper-discussion).

For more information about the JasPer software and JPEG-2000 standard, the reader is referred to [6, 5].

1.5 Origin of the Name

The JasPer software is named, in part, after Jasper National Park, the largest national park in the Canadian Rockies with 10,878 square kilometres of mountain wilderness. As it happens, jasper is also the name of an opaque cryptocrystalline variety of quartz used for ornamentation or as a gemstone—hence, the implication that the software is precious (i.e., like a gemstone). Lastly, the name "jasper" was also chosen because it contains a letter "J" followed subsequently by a letter "P", not unlike the abbreviation "JP" that is associated with the JPEG-2000 standard.

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Chapter 2

JasPer Software

2.1 Version Identification

As the JasPer software continues to evolve over time, it is important to be able to identify particular releases of the software. Every release of the JasPer software is named by a version identifier. A version identifier is comprised of three integers separated by dots. In order, the three integers correspond to the major, minor, and micro version numbers for the software. For example, the version identifier "1.500.0" corresponds to a major version of 1, a minor version of 500, and a micro version of 0. In instances where the micro version is zero, the version identifier may be truncated after the minor version number. For example, the version identifier "1.500" is completely valid and simply an abbreviation for "1.500.0".

Given two different releases of the JasPer software, one can easily determine which one is more recent by comparing the version identifiers, as follows: 1) if the major version numbers differ, the release with the higher major version number is newer; 2) if the major version numbers are equal and the minor version numbers differ, the release with the higher minor version number is newer; or 3) if the major version numbers are equal and the minor version numbers are equal, the release with the higher micro version is newer.

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2.2 Obtaining the Software

The latest version of the JasPer software can be downloaded from the following locations:

- JasPer Project Home Page (i.e., `http://www.ece.uvic.ca/~mdadams/jasper`)
- JPEG Web Site Software Page (i.e., `http://www.jpeg.org/software`)

2.3 Extracting the Software

The JasPer software is distributed in the form of a Zip file. Therefore, in order to extract the contents of this file, a program capable of handling Zip archives is required. Such software is readily available for many different computing platforms, and can be obtained from:

- Info-Zip Web Site (i.e., `http://www.info-zip.org`). Unzip software for many different computing platforms (e.g., UNIX, DOS, MacOS, etc.).
- WinZip Web Site (i.e., `http://www.winzip.com`). Zip/Unzip software for Microsoft Windows.