First edition
2005-11-01

Photography — Psychophysical experimental methods for estimating image quality —

Part 1: Overview of psychophysical elements

Photographie — Méthodes psychophysiques expérimentales pour estimer la qualité d'image —

Partie 1: Aperçu général des éléments psychophysiques

Reference number
ISO 20462-1:2005(E)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 20462-1 was prepared by Technical Committee ISO/TC 42, *Photography*.

ISO 20462 consists of the following parts, under the general title *Photography — Psychophysical experimental methods for estimating image quality*:

— *Part 1: Overview of psychophysical elements*

— *Part 2: Triplet comparison method*

— *Part 3: Quality ruler method*

Introduction

There are many circumstances under which it is desirable to quantify image quality in a standardized fashion that facilitates interpretation of results within a given experiment and/or comparison of results between different experiments. Such information can be of value in assessing the performance of different capture or display devices, image processing algorithms, etc. under various conditions. There are a number of psychometric methods described in the literature, such as paired comparison, rank ordering, categorical sort, and magnitude estimation, which might be considered as candidates for experimentally measuring image quality. Several textbooks[1] [3] [4] [5] [9] [12] have reviewed these and other methods and have discussed associated data reduction techniques, which usually are based upon the approach of Thurstone[11] or analogous reasoning. However, the choice of the best method for a particular application may be difficult to make, and interpretation of the rating scales produced by the numerical analyses is frequently ambiguous. Furthermore, none of the commonly used techniques provides an efficient mechanism for calibration of the results against a standardised numerical scale or associated physical references, which is desirable when results of different experiments are to be compared or integrated. The value of new calibrated psychometric methods in developing comprehensive models of imaging system quality has been demonstrated in a recent work[6] that contains more detailed discussions of many of the informative topics superficially considered herein.

The three parts of ISO 20462 address the need for documented means of determining image quality in a calibrated fashion. Part 1 provides an overview of practical psychophysics; specific experimental methods and associated data reduction techniques are described in Part 2 (triplet comparison method[8] [10]) and Part 3 (quality ruler method[6]). Informative Annex A aids in identifying the better choice between the two alternative methods of Parts 2 to 3, which are complementary and together are sufficient to span a wide range of applications. It is the intent of these methods to produce results that are not merely directional in nature, but are expressed in terms of relative or fixed scales that are calibrated in just noticeable differences (JNDs), so that the significance of experimentally measured stimulus differences is readily ascertained.