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Standard Terminology for Digital and Multimedia Evidence Examination¹

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^{ε1} NOTE—Format correction was editorially applied to the definition of ‘resolution’ in April 2019.

1. Scope

1.1 This is a compilation of terms and corresponding definitions used in the examination of digital and multimedia evidence to include the areas of computer forensics, image analysis, video analysis, forensic audio, and facial identification.

1.2 Legal or scientific terms that generally are understood or defined adequately in other readily available sources may not be included.

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ANSI/NIST Standards:²

[ANSI/NIST-ITL 1-2011 Data Format for the Interchange of Fingerprint, Facial, and Other Biometric Information](#)

[NIST SP 800-86 Guide to Integrating Forensic Techniques into Incident Response](#)

[NIST SP 800-88 Guidelines for Media Sanitization](#)

2.2 IEEE Standards:³

[IEEE 100-2000 The Authoritative Dictionary of IEEE Standards Terms, 7th Edition](#)

2.3 ISO Standards:⁴

[ISO/IEC 10918-1:1994 Information Technology — Digital Compression and Coding of Continuous-Tone Still Images: Requirements and Guidelines](#)

3. Significance and Use

3.1 This terminology includes general as well as discipline-specific definitions as they apply across the spectrum of image analysis, computer forensics, video analysis, forensic audio, and facial identification.

4. Terminology: Terms and Definitions

4.1 Definitions:

achievable resolution, resolving power, n —the measure of imaging system’s practical limit to distinguish between separate adjacent elements, typically by imaging a known reference standard.

acquisition, n —*in computer forensics*, the process of using an access interface to read digital data from a digital source and to create a destination object.

ad hoc image, n —see **uncontrolled image**.

allocated space, allocated storage, n —*in computer forensics*, the portions of storage that are assigned or reserved for active instructions or for data.

IEEE 100-2000, (C) 610.10-1994w

anthropometric analysis, n —*in facial identification*, an explicit measurement of landmarks on a face and a comparison of these measurements between two samples.

anti-forensics, n —the application of a process to modify, conceal or destroy information to inhibit or prevent the effectiveness of forensic science examinations.

archive image, n —*in computer forensics*, a **bit stream** duplicate of data placed on media that is suitable for long-term storage.

¹ This terminology is under the jurisdiction of ASTM Committee E30 on Forensic Sciences and is the direct responsibility of Subcommittee E30.12 on Digital and Multimedia Evidence.

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² Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, <http://www.nist.gov>.

³ Available from Institute of Electrical and Electronics Engineers, Inc. (IEEE), 445 Hoes Ln., Piscataway, NJ 08854, <http://www.ieee.org>.

⁴ Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.

artifact, *n*—a by-product, artificial feature, or change resulting from human activity or a technical process. (Compare **noise**.)

DISCUSSION—Examples include speckles in a scanned picture, “blocking” in compressed images, distortion in over-saturated audio, and the automatic creation of temporary files due to normal usage of a computer.

aspect ratio, *n*—the ratio of the width to the height of a rectangle, such as an image, a pixel, or an active video frame.

attempt, *n*—*in facial identification*, a submission of a single set of biometric samples to a biometric system for identification or verification. (Compare **biometric search**.)

audio enhancement, *n*—the processing and filtering of audio recordings to improve the signal quality and intelligibility of the signals of interest, such as speech, by attenuating noise or otherwise increasing the signal-to-noise ratio.

backlight, *n*—*in facial identification*, a light source placed behind a subject in a controlled capture that reduces background shadows.

backlit, *adj*—a characteristic of a subject or an object that is illuminated from behind.

batch mode search, *n*—*in facial identification*, a mode of searching records in an automated system in which a group of probes are simultaneously or sequentially launched.

batch search mode, *n*—see **batch mode search**.

binning, *n*—*in facial identification*, (1) any technique used by a facial recognition (FR) system to organize or optimize searching based upon some piece(s) of metadata; (2) the process of parsing (examining) or classifying data to accelerate or improve biometric matching.

biometric search, *n*—the submission of a biometric reference as a probe against a biometric system for identification (one-to-many) or verification (one-to-one). (Compare **attempt**.)

bit stream, *n*—a continuous stream of bits transmitted over a channel with no separators between the character groups.

IEEE 100-2000, (C) 610.7-1995, 610.10-1994w

bit stream duplicate, *n*—*in computer forensics*, an exact, bit-for-bit reproduction of all data objects independent of any physical media upon which that data is stored. (Compare **copy**.)

cache, *n*—*in computer forensics*, a temporary storage area set aside on a processor, in memory, or in a filesystem to keep frequently needed data readily available, designed to speed up processing and improve performance.

candidate list, *n*—*in facial identification*, a rank ordered list generated from a facial recognition search.

capture, *n*—(1) the process of recording data such as an image, video sequence, or audio stream; (2) *in facial identification*, the process of collecting a biometric sample from an individual via a sensor.

capture, *v*—to record data, such as an image, video sequence, audio stream, or biometric sample to digital storage, often by means of a sensor.

capture card, frame grabber, *n*—a piece of computer hardware that accepts an analog or digital signal and outputs the signal as digital data.

capture device, *n*—device used in the recording of data.

carve, *v*—*in computer forensics*, to extract a portion of data for the purpose of analysis.

certification authority, *n*—(1) *in computer forensics*, a trusted third party entity that issues digital certificates certifying the ownership of a public key by the subject named in the certificate, and trusted by both entities engaged in a digital transaction; (2) *in facial identification*, a body that issues biometric documents and certifies that the data stored on the documents are genuine.

clarification, *n*—see **enhancement**.

clarify, *n*—see **enhance**.

clean room, clean chamber, positive air flow cabinet, *n*—to the extent possible, a limited particulate environment.

DISCUSSION—For example, requirements would follow ISO 5 or Class 100 standard for air quality.

clear, *v*—*in computer forensics*, to overwrite storage space on a medium with non-sensitive data, which may include overwriting not only the logical storage location of files, but may include all addressable locations. **NIST SP 800-88**

cluster, *n*—*in computer forensics*, a group of contiguous sectors on storage media, typically the smallest unit of allocation in a filesystem.

codec, *n*—an algorithm to encode and decode digital data, typically to reduce the amount of data for transmission or storage.

DISCUSSION—A codec is not a storage format, but may be required to interpret stored data.

cognitive image analysis, *n*—*in image and video analysis*, a process used to extract visual information from an image by human evaluation.

color range, *n*—see **gamut**.

composite video signal, *n*—a single analog video signal that combines a base-band luminance signal with color information by modulating a subcarrier with chroma signals, typically using one of the National Television System Committee (NTSC), Phase Alternating Line (PAL), or Sequential Color with Memory (SECAM) systems.

compression, *n*—a process to reduce the size of a data file or stream while attempting to retain the original semantic meaning of that data.

compression ratio, *n*—the ratio of the size of the data before compression to that of after compression.

computer forensics, *n*—the scientific examination, analysis, or evaluation of digital evidence in legal matters.

controlled image, *n*—*in facial identification*, a photographic image captured in accordance with facial identification (FI) or facial recognition (FR) standards or guidelines (for example, a driver’s license photo).

copy, *v*—to reproduce information with some level of accuracy.
DISCUSSION—Depending on the process used, copying might result in the loss of data. (Compare **bit stream duplicate**.)

data, *n*—information in analog or digital form that can be transmitted or processed.

data file, *n*—a file consisting of stored data (that is, text, numbers, graphics, etc.) as compared to a program file of commands and instructions for a digital device.

deblur, *v*—to restore an image by attempting to reverse degradation caused by blur.

deinterlace, *v*—to separate an interlaced video frame into its two discrete fields.

digital device, *n*—electronic equipment which can create, process or store digital data.

digital evidence, *n*—information of probative value that is stored or transmitted in binary form.

digital image, *n*—*in image analysis*, a photographic image that is represented by discrete numerical values organized in a two-dimensional array.

Focal Encyclopedia of Photography⁵

digital object, *n*—a collection of logically related information.

digital source, *n*—a container of digital data that can be acquired by an acquisition tool.

digital video recorder, DVR, *n*—a stand-alone embedded system or a computer-based system for recording video and, optionally, audio data.

directory, *n*—*in computer forensics*, an object or structure used to group files together within a filesystem.

directory listing, *n*—*in computer forensics*, a list of files and, optionally, file properties contained within a filesystem.

download, *v*—(1) *in audio, image, and video analysis*, to retrieve audio, video, image, or transactional data from a recording device (for example, DVR system); (2) *in computer forensics*, to receive data from another digital source.

dynamic range, *n*—(1) *in image analysis*, the difference between the brightest highlight and darkest value that a sensor can detect and record in a single image; (2) *in audio and video analysis*, the ratio of the strongest (undistorted) signal to that of the weakest (discernible) signal in a unit or system as expressed in decibels (dB); (3) a way of stating the maximum signal-to-noise ratio.

enhance, *v*—*in audio, image, and video analysis*, to improve the perceptual recognition or quality of a signal of interest.

enhancement, *n*—*in audio, image, and video analysis*, the process of improving the perceptual recognition or quality of a signal of interest.

enroll, *v*—to capture a biometric sample, extract the relevant features, convert them to a template, and use it to form a reference for matching.

DISCUSSION—Enrollment most often is performed to populate a gallery, but it can also refer to the creation of a probe.

examiner, *n*—*in facial identification*, an individual whose role it is to perform a **facial examination**.

export, *n*—see **download** (1).

extraction, *n*—any method of exporting data from a source.

face detection, *n*—*in facial identification*, the automated determination of the presence of human faces in digital images.

face recognition, *n*—*in facial identification*, (1) *by automated systems*, the automated searching of a facial image as a probe in a facial recognition system (one-to-many), typically resulting in a group (candidate list) of facial images being returned to a human operator in ranked order based on system-evaluated similarity; (2) *by humans*, the mental process by which an observer identifies a person as being one they have seen before.

facial comparison, *n*—*in facial identification*, a manual process to identify similarities or dissimilarities between two (or more) facial images or facial image(s) and a live subject for the purpose of determining if they represent the same person or different person.

facial examination, *n*—*in facial identification*, a formal systematic **facial comparison**.

facial identification, FI, *n*—the discipline of image-based comparisons of human facial features.

facial mapping, *n*—the process of landmarking defined anthropological points.

facial recognition, FR, *n*—see **face recognition**.

facial review, *n*—*in facial identification*, an adjudication of a **candidate list**.

feature, *n*—*in facial identification and image analysis*, an observable class or individual characteristic.

field, *n*—*in video analysis*, a set of odd or even scan lines comprising one half of an interlaced video frame.

DISCUSSION—For interlaced video, the scanning pattern is divided into two sets of spaced lines (odd and even) that are displayed sequentially. Each set of lines is called a field, and the interlaced set of the two sets of lines is a frame.

file, *n*—*in computer forensics*, a collection of information logically grouped into a single object and referenced by an identifier, such as a filename.

file format, *n*—*in computer forensics*, a standard structure by which data is organized in a file for a specific purpose.

⁵ *Focal Encyclopedia of Photography*, 3rd edition, Richard D. Zakia and Leslie Stroebel, Eds., Focal Press, 1996.