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Distant Viewing

Computational Exploration of Digital Images

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Glossary

We have written this text to reach readers coming from a variety of different fields. Many of the key terms we use have slightly different meanings and traditions of usage across communities. When we first mention a term within the text, we provide our definition. Here we also aggregate definitions of important terms.

Annotation: Annotations are structured data produced by computer vision algorithms. Examples include dominant colors, predicted categories, bounding boxes, and embeddings.

Computation: Computation is the use of a computer to perform structured calculations and algorithms. Computations include the application of predictive models, production of summary statistics, and the creation of data visualizations.

Computer vision: The interdisciplinary field of computer vision focuses on how computers automatically produce ways of understanding digital images. Most tasks in computer vision are oriented around algorithms that mimic the human visual system. Tasks include detecting and identifying objects, categorizing motion, and describing an image's context.

Data science: The interdisciplinary field of data science addresses the challenges of collecting, understanding, and presenting structured and unstructured data from a variety of domains and contexts.

Deep learning: Deep learning algorithms learn a sequence of transformations that progressively transform an input—often an image or textual document—into numeric forms that offer increasingly higher-level representations of the information stored in the input.

Digital humanities: The interdisciplinary field of digital humanities (DH) addresses the use of computational techniques to research questions in the

humanities as well as the humanistic inquiry of computational techniques themselves.

Digital image: A digital representation of an image as a rectangular array of numeric pixel intensities. Grayscale images are given as a single array; color images are described as three arrays that capture the red, green, and blue pixel intensities.

Distant viewing: The application of computer vision methods to the computational analysis of digital images. We provide a theory of the method in chapter 1 and a methodological description of distant viewing—described by the four parts of *annotating*, *organizing*, *exploring*, and *communicating*—in chapter 2.

Image embedding: An image embedding presents a way to map any image to a fixed sequence of numbers. The meaning of these numbers is given only in relationship to the embeddings of other images; similar images will have similar embeddings.

Machine learning: The field of machine learning studies the use of algorithms that have been adaptively and automatically constructed using data.

Photography: Any attempt to create a reproduction of a recording of light is considered photography. Our definition includes physical still photography, digital photography, digital scans, and moving images.

Pixel: The smallest addressable component of a digital display is called a pixel. The pixels of color displays tend to contain three subpixels, one each for red, blue, and green light. The same term is used to refer to the corresponding numeric elements of a digital image as stored on a computer. These digital pixels can be created by sensors in a digital camera.

Region segmentation: The process of region segmentation is a task in computer vision that attempts to describe the objects or materials that correspond to every pixel in a digital image.

Shot boundary detection: Within the study of moving images, the process of algorithmically breaking up a sequence of frames into shots is known as shot boundary detection.

Visual culture: Visual culture consists of the expression of culture through any form of visual media, including art, still photography, television, and film.

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