preface

This book is a slightly revised version of my doctoral thesis, submitted at the University of Munich in March 2024. It contributes to the emerging field of *Digital Humanities* (DH), with a particular focus on *Digital Art History* (DAH). As such, *firstly*, it integrates the theoretical frameworks of computer science and the humanities, applying and critically evaluating their respective methodologies. In doing so, I aim to provide guidance on how to approach historical research questions computationally while also illustrating how these approaches can be leveraged effectively for the benefit of data-driven inquiries into the past. I do this by way of example, i.e., by analyzing the historical embedding of the human figure through the 'artificial eye' of computational methodologies. However, the techniques, concepts, and frameworks presented here are designed to be adaptable to similarly oriented tasks. *Secondly*, given the interdisciplinary nature of this work, the selected approaches are presented in mathematical notation where necessary—but detailed mathematical explanations are minimized to improve readability, except, of course, in cases where novel methods or additional mathematical context are required.

With that in mind, I provide two recommendations for reading this book: (i) Sections with a high level of mathematical content can generally be skipped without affecting the overall understanding of the arguments. Feel free to omit them. (ii) Because I prefer a dense style of writing, this book is not intended to be read in one sitting but, rather, incrementally. Each chapter tackles one aspect of a longer, more complex pipeline that, in its entirety, offers a (hopefully) coherent framework for approaching historical inquiries by digital means. I encourage readers to take their time, reflecting on each chapter's findings before moving on

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to the next, as the concepts and methodologies build up gradually. For ease of reference, abbreviations are reintroduced in each chapter, as are bibliographic references, being repeated in full at the first mention.

Parts of this book have been adapted, either verbatim or in modified form, from articles I have published in journals or abstracts presented at conferences. **CHAPTER III** is primarily based on my article "Poses of People in Art: A Data Set for Human Pose Estimation in Digital Art History" (2024; *ACM Journal on Computing and Cultural Heritage* 17.4, co-authored with Ricarda Vollmer). Large sections of **CHAPTER IV** are taken from my paper "Semi-supervised Human Pose Estimation in Art-historical Images" (2022; *MM '22: The 30th ACM International Conference on Multimedia*, co-authored with Matthias Springstein, Christian Althaus, and Ralph Ewerth). **CHAPTERS IV**, **V**, and **VI** contain fragments of the conference abstracts "My Body is a Cage: Human Pose Estimation und Retrieval in kunsthistorischen Inventaren" (2024; *10. Tagung des Verbands Digital Humanities im deutschsprachigen Raum, DHd 2024*) and "Man as Point Figure: Human Pose Retrieval in Art History" (2024; *Annual International Conference of the Alliance of Digital Humanities Organizations, DH 2024*). Additionally, these chapters draw on fragments from my article "Assemblies of Points: Strategies to Art-historical Human Pose Estimation and Retrieval" (2025; *Digital Humanities Quarterly* [forthcoming]). Other publications, although not directly relevant to this book, contributed to the broader research context:

(i) "The Dissimilar in the Similar: An Attribute-guided Approach to the Subject-specific Classification of Art-historical Objects" (2020; *50. Jahrestagung der Gesellschaft für Informatik, INFORMATIK 2020*, co-authored with Matthias Springstein, Javad Rahnama, Eyke Hüllermeier, Ralph Ewerth, and Hubertus Kohle);

(ii) "iART: A Search Engine for Art-historical Images to Support Research in the Humanities" (2021; *MM '21: The 29th ACM International Conference on Multimedia*, co-authored with Mat-

thias Springstein, Javad Rahnama, Eyke Hüllermeier, Hubertus Kohle, and Ralph Ewerth);

(iii) "iART. Eine Suchmaschine zur Unterstützung von bildorientierten Forschungsprozessen" (2022; *8. Tagung des Verbands Digital Humanities im deutschsprachigen Raum, DHd 2022*, co-authored with Matthias Springstein, Javad Rahnama, Hubertus Kohle, Ralph Ewerth, and Eyke Hüllermeier);

(iv) "Visual Narratives: Large-scale Hierarchical Classification of Art-historical Images" (2024; *IEEE Winter Conference on Applications of Computer Vision, WACV 2024*, co-authored with Matthias Springstein, Javad Rahnama, Julian Stalter, Maximilian Kristen, Eric Müller-Budack, and Ralph Ewerth).

A note on citation practices: where non-English quotations are translated into English, the original text is given in the footnote. Full citations are given the first time a source is referenced; shortened citations are used thereafter unless further clarification is needed. For online resources, persistent identifiers such as DOIs are given where available; where no persistent identifier is provided, the URL is given, together with the date of access. In **CHAPTERS IV**, **V**, and **VI**, several image tableaux are included, e.g., to illustrate the visual specifics of data sets. These images are obtained from Wikimedia Commons and are in the public domain, as indicated in the captions. However, given their large number, I deemed it unnecessary and impractical to cite each one with a URL.

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