# Distant Viewing

## Computational Exploration of Digital Images

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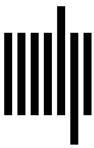

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# Conclusion

In the introduction, we opened with our experience building the digital project *Photogrammar* and explained how this project motivated our book. We released a third iteration of *Photogrammar* in 2021, which can be found at photogrammar.org. In addition to an updated map, timeline, and other ways to explore the archival metadata, the new site now includes a recommendation based on visual search using the methods presented in chapter 6. After more than a decade of work, we can present to visitors a way of visually exploring this important archive of documentary photography. The years spent on *Photogrammar* led to this book guided by two questions: How do computer vision algorithms view images and what information and evidence do they offer?

To answer these questions, we presented a theoretical framework for *distant viewing*, the application of computer vision methods to the computational analysis of digital images. We drew on semiotics, media studies, and visual culture theory to offer a critical understanding and a theoretical framework for how computer vision functions as a way of viewing and mode of communication in chapter 1. We demonstrated how the theory has guided us to a method for computationally working with digital images in chapter 2. Answering the question, What is this an image of?, is complex. Distant viewing asks us to slow down and ask pressing questions about how algorithms are designed with certain ways of seeing and then how they encode and decode messages from images. The theory and method hold us accountable to the ways of seeing and viewing through algorithms while offering a way to explore images in exciting ways.

We have offered four examples of how the method of distant viewing can be applied to different research questions. The applications focused on our own research interests in twentieth-century visual culture in the United

States and, in chapter 6, the public digital humanities. Each chapter discussed the careful decision making behind which ways we decided to view using computer vision algorithms. The applications built in complexity to demonstrate how everything from the seemingly straightforward annotations such as color in chapter 3 to 2048-dimensional neural network embeddings in chapter 6 involves nuanced decisions. We addressed the kinds of evidence algorithms can produce and demonstrated how interrupting the algorithmic results is informed by understanding the context of the data as well. The process of decoding messages from digital images is a series of human decisions supported by algorithms. The method—annotating with computer vision, organizing metadata, exploring the results, and communicating the findings—asks us to pause at key moments to think carefully about exactly what we are encoding and decoding. While we focused on digital images such as photography and TV, the method and theory presented can be applied to the study of any collection of digital images, which we hope others will do in the near future.

The affordances provided by computer vision are likely still in the early stages, and there is far more material available from both print and born-digital collections than have been studied so far. We have only begun to scratch the surface of what is possible in terms of building connections across institutions and domains of expertise. These connections allow us to imagine a world where algorithms and computations are not solely defined by the needs of for-profit technologies and surveillance organizations. We have had, for example, the great privilege of working with organizations like the Library of Congress, who are looking instead to put distant viewing in service of access to cultural heritage. What might be possible when we think about how our computational world might be in the service of a broader public good? As we do this work, toggling between out-of-the-box and custom algorithms will require a reconfiguration of who it as the table in developing computer vision. What ways of seeing do we want to build? What are the stakes? Who is affected? What can we learn? These are questions that distant viewing asks us to pause and address.

We hope that this work serves as a starting point for continued scholarship on the theory and application of distant viewing. As described in the sections at the end of this text, we have made several datasets available for readers to replicate and extend the explorations described in the preceding chapters. Readers interested in applying distant viewing to their own

collections of digital images can make use of the distant viewing toolkit, open-source software that we have created and maintain.[1] Links and tutorials are available on the book's website. We now conclude with four provocations for future work that we think will be particularly fruitful.

First, we hope to see more computer vision tools explicitly designed for and guided by humanistic inquiry become available. As we have mentioned throughout, large private corporations currently produce the most popular software. Despite their origin, we have seen many examples of how these tools can be used to explore visual messages. At the same time, there is a lot of lost potential for applications that do not line up with industry needs. For example, we saw how the analysis in chapter 5 required building a custom shot-break detector. We need a broad and diverse range of people breaking, building, and reimagining computer vision.

Second, more work needs to be done exploring the possibilities of working with material that is under copyright. We made efforts in this book to include work on freely available data in the public domain in the United States, where copyright law is often shaped by for-profit corporations. However, this focus significantly reduces the available materials of study, particularly within film and television studies. Therefore, we had to work with material under copyright in chapter 5's study of television. It is possible that computer vision could help solve its own problem in this domain. Many annotations could be considered a form of transformative use under US copyright law.[2] Putting these pieces together requires more work on creating strong annotations, building tools, and working closely with scholars from a variety of domains.

Third, we hope to see more interdisciplinary collaborations such as ours working in this space. The challenges of applying computer vision to the study of digital images transcend traditional boundaries. Core questions require engaging with scholarship from engineering, the sciences, the social sciences, the humanities, law, and the arts. As we have seen, the computational exploration of images is a rewarding but challenging task. To extend existing work and realize the full potential of distant viewing, we need more people willing to work at the intersection(s) of these existing spaces. We have no doubt those collaborations will offer new methods and theories that will guide the future of our computational world.

Finally, distant viewing has the potential to intervene in current discussions about the role of algorithms in society. As computer vision algorithms

are deployed by governments and companies, how and what these algorithms see is becoming a pressing issue with high stakes. Our theory of distant viewing disrupts the myth of "neutrality" through algorithms. We are accountable to the ways of seeing that algorithms encode and decode. We must think more capaciously and carefully about why and when we use algorithms. Computer vision reflects our priorities and the computational visual world we seek to build, and we are all accountable to the impact of distant viewing.


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