# CONTENTS

*Preface*  
vii  

*Acknowledgments*  
xiii  

## Introduction  
Technologies of Testimony and Distant Witnessing  

### 1 What Should Algorithms Have to Do with Ethics?  
17  

### 2 Computation That (De)humanizes: From “Bare Data” to Human Life  
42  

### 3 David Boder and the Origins of Computational Analysis of Survivor Testimonies  
79  

**Digital Project**  
Two Methods of Counter-indexing the “Gray Zone”: N-Grams and Semantic Triplets  
123  

*With Anna Bonazzi and Lizhou Fan*  

### 4 Through the Lens of Big Data: A Macroanalysis of the USC Shoah Foundation’s Visual History Archive  
147  

### 5 The Haunted Voice: On the Ethics of Close and Distant Listening  
191  

**Digital Project**  
232  

*With Michelle Lee*  

For general queries, contact info@press.princeton.edu
6 Algorithmic Close Reading: Analyzing Vectors of Agency in Holocaust Testimonies

With Lizhou Fan

DIGITAL PROJECT
Mala Zimetbaum and the Creation of a Testimonial Ensemble

7 Cultural Memory Machines and the Futures of Testimony

With Rachel Deblinger

Notes

Index
INTRODUCTION

Technologies of Testimony and Distant Witnessing

Shortly after the death of Auschwitz survivor and president of the Illinois Holocaust Museum and Education Center, Fritzie Fritzshall, on June 19, 2021, I decided to spend some time talking with Fritzshall through the USC Shoah Foundation’s Dimension in Testimony project (Figure 0.1). I logged into the IWitness platform from my home computer and decided to ask her a number of questions. Periodically shifting in the chair in which she sat, her head shook slightly back and forth; she evidenced a welcoming smile and changed the position of her hands and fingers ever so slightly, as if she was waiting for me to begin. I started with a simple “Hello, how are you?,” to which she responded, “I am fine.” I then asked her why she did this project. She responded by saying that although “it opens a wound” each time she tells her story, she feels an “obligation to teach” and “leave my story behind so the next generation can learn from me [about] what I have gone through.”

When I ask her how she arrived in Auschwitz, she recounts a detailed and horrific story of being deported in a locked train with starving and sick people struggling to breathe, mothers holding dead and dying infants, and the overwhelming stench of human waste spilling over in the boxcar. The story ends with her arrival in Auschwitz, where she describes the last time she saw her mother. On the selection platform, she says that she told her mother to stand in a different line from her, anticipating that it would save them both from certain punishment. Later, she found out that her mother was sent immediately to her death, and she wonders: “Did I send my mother to the gas chambers? I don’t know. Would she have lived? I don’t know. I don’t know.” Hesitantly, I mustered the courage to ask: “Do you really think you sent your mother to her death?” The answer played does not seem quite right since it is about her mother’s courage and care of her children in the ghetto and the boxcar. So, I rephrase my question: “Why did you tell your
mother to stand in the other line?” She responds by describing the brutal punishments she saw on the platform of women being hit with rifle butts and slapped around. Clasping and opening her hands, she continues by saying: “The fear was there and you just wanted to do what they asked you to do so you wouldn’t be punished. So, I remember standing with my mother in this line, I remember motioning to her and telling her to go into the next line, I don’t remember anything else. I don’t remember any conversation, I don’t remember a goodbye, I don’t remember . . . I don’t remember.”

While speaking about the same traumatic event, her two answers provide different accounts of her memory and are delivered in markedly different voices. In fact, the words alone in the final quotation do not indicate anything about the creakiness of her voice, her tone of almost pleading with me to understand her, the hesitant pursing of her lips, or her labored breathing. The quoted transcript omits the fact that the single ellipsis represents a pause of almost ten seconds in duration. It also obscures the fundamental phonetic differences of the last two expressions of “I don’t remember,” the second of which is uttered as she chokes up and can barely express the words, perhaps in disbelief at her own lack of memory.
I decided to shift my questions to ask her if she had recorded a testimony with the USC Shoah Foundation or if she had recorded any testimony previously. To both questions, she gives the same answer: “The project we’re doing here I think is amazing. I think technology is great and I love it. I think it’s a great project.” It turns out that this answer is played often for questions related to recording technologies and even to questions about whether she considers herself to be a “hologram” or “AI.” When I try to test the system’s illusion of immediacy and presence by asking “What do you think of the world today?” and “What do you think the world will look like in 100 years from now?,” I get the same answer: “I don’t know when you’re talking to me but I hope that it is better now,” evidencing the fact that our interaction is still fundamentally bound to the time-kernel of its moment of recording. When I go further by asking “do you have any questions for me?,” she responds by reminding me: “I’m actually a recording so I can’t answer that question.”

But when I rephrase the question to be “Do you think this is the future of Holocaust testimony?,” I receive a somewhat surprising answer: “I don’t think I remember things accurately. I don’t think anybody that’s lived as long as I have, three hundred years at this point. . . . No, I don’t. I have certain pictures that are in my mind and certain facts that I am really sure of but certain things, did it really happen, is it a memory, did I really see it, do I remember it . . . no, I’m not sure that I remember every single thing that happened during that particular time.” She smiles as she says three hundred years, perhaps signaling to us that she knows we are both participating in the same illusion, but surely also hoping that she will live on, far into the distant future, through the technology to transmit her testimony. The desired infallibility of digital technology is in tension with the fallibility, finiteness, and contingency of human memory. And even though the answer does not quite fit the question asked, her words reveal the imbrication of the promises of technology with what might be considered the “necropolitics” of the digital archive.1 While Achille Mbembe uses the latter term to refer to the sovereign’s power over life and death, the necropolitics of the digital archive points to the ways in which the testimonial archive is not only a record of whose lives are preserved and in what modality (and whose lives are not or could never be) but also, more generally, who and what is in the database, who and what is searchable, and who and what can be heard beyond the facticity of death.

Of course, I was never “talking to” or “interviewing” Fritzshall. Instead, I was providing data to an automatic speech recognition tool that interpreted my words into text before the platform, running a set of natural language processing and
machine-learning algorithms, matched the best, prerecorded answer to what it decided was the intended meaning of my question. And yet the illusion of immediacy is compelling. She shifts in her chair, blinks her eyes, and moves her hands, seemingly waiting for me to pose more questions, as if to say: Here I am, ready to listen and engage with you. But what does it mean for the algorithm to “hear,” “listen,” and “interpret” my speech? Has the ethical obligation of the listener to be open to the testimony of the other shifted to an obligation of the algorithm to be open to my questions? We need to ask: Is there an ethics behind the decision-making of this algorithm? Or more generally, what are the ethics of any algorithmic engagement with a digital archive?

Dimensions in Testimony is a project of “distant witnessing” that raises fundamental questions of what it means for an ethics of testimony to intersect with an ethics of the algorithm. Starting in 2014, the USC Shoah Foundation, in partnership with the USC Institute for Creative Technologies, began to record survivors for this interactive form of volumetrically captured testimony. Initially (although somewhat erroneously) described as “holograms,” the testimonies were recorded in a special studio to capture the survivor in 360 degrees in order to allow for three-dimensional projection and interaction. Available both through a web interface and in physical installations across the world in museums, several dozen Jewish Holocaust survivors have been recorded to date, as well as one survivor of the Nanjing Massacre, two liberators, and one war crimes prosecutor. Often asked over a thousand questions, the answers given by the interviewees are marked up and become part of a machine-learning system to allow the general public to pose questions interactively in real time. Unlike audiovisual testimonies that play linearly in a fixed fashion, each interaction with an interviewee in Dimensions in Testimony is a new experience, contingent upon the questions posed by the user, the system’s parsing of the user’s speech, and the calculations of the machine-learning algorithm that determine what clip is the most appropriate answer to play.

While the technologies upon which the project are built were only developed recently, it is not fortuitous that it launched at a time in which a profound generational shift is occurring: the last surviving witnesses of the Holocaust are passing away. It is no surprise that numerous museums and educational centers have developed interactive apps, virtual reality projects, and augmented reality experiences to foster forms of digital Holocaust memory. At the same time, the final recordings of eyewitness testimonies—including the USC Shoah Foundation’s “Last Chance Testimony Collection” initiative, its Dimensions in Testimony proj-
ect, and the “Forever Project” backed by the UK National Holocaust Museum—are being undertaken with great urgency. Most of the survivors of camps who are still able to tell their stories are in their mid to late 90s. Some lack the physical and mental stamina to sit for hours and recount the horrors of their childhood and early adult years. Holocaust testimony is shifting from experiential narratives of embodied memories to archived histories mediated by digital interfaces, databases, and algorithms. From the moment I logged onto the IWitness platform, my interaction with Fritzie Fritzshall was entirely mediated by technology, from clicking on the microphone icon to ask my question—and the automatic speech recognition tool that subsequently parsed the question into tokens for natural language processing—to the machine-learning algorithm that decided on the best match from the database of video clips and the video playback in my browser-based interface. The algorithmic layers between the user interface and the recorded archival content play an absolutely critical role in constituting the testimony and conditioning what an ethical engagement with the witness and the archive can be. These algorithmic layers are a central part of what we probe in this book.

Before we do so, we need to look back at the history of the genre of Holocaust testimony to gain a broader perspective on the significance of the changing media and technologies for both constituting and interacting with testimonial archives. As a genre of attestation to the destruction of the Jewish communities of Europe, Holocaust testimony—in the form of diaries, letters, photographs, narrative documentation, and collection building—began almost immediately after Nazi Germany invaded Poland in September of 1939. Following the establishment of Jewish ghettos in the early 1940s, secret archives were founded in Bialystok, Kovno, Lodz, Vilna, and Warsaw, where victims documented the catastrophe unfolding around them. Started by Emanuel Ringelblum in November of 1940, the Oyneg Shabes archive in the Warsaw ghetto was the most extensive and collected a trove of documents, including letters, diaries, clippings from the Jewish press, cultural and literary artifacts, posters, and ephemera of everyday life. As the ghetto was evacuated and came under siege, the archive was buried in milk canisters under the city in the summer of 1942 and spring of 1943. Not unlike the precariousness and hopefulness of a message in a bottle, the archive—with its diversity of voices—was intended to be sent, as it were, to the future. After the war, it was partially salvaged when it was rediscovered and excavated in 1946. The technology of the milk cannister enabled an intentional form of witnessing in which testimonial inscriptions were preserved, stored, and transmitted beyond human mortality.
Collection efforts by historical commissions and documentation centers began before the war was over in Polish cities liberated by the red army and expanded throughout Europe in the immediate aftermath of the war, especially in Germany, Austria, Italy, and France. According to Laura Jockusch, “The survivor documentarians . . . pioneered the development of victim-focused Holocaust historiography . . . [using sources that] reflect the life stories, experiences, and self-perceptions of their creators, [such] as diaries, letters, autobiographies, and memoirs, along with testimony drawn from survivors’ memories.” In addition to documenting information about displaced people (family background, addresses, languages, nationality), the historical commissions developed questionnaires to collect information about family separations, displacements, the fate of families, time in camps, liberation, and surviving family members.

As a complement (or perhaps antidote) to the silent news reel footage of liberated camps, the first audio interviews with Holocaust survivors were recorded in 1946 by a man named David Boder. Trained as a psychologist and linguist, he developed his own interview methodology to document and understand the traumatic impact of the Pan-European catastrophe. Using a wire recorder, Boder interviewed about 120 displaced people, mostly Jewish survivors of concentration camps, in displaced persons camps in Germany, Italy, France, and Switzerland. Survivors were interviewed in nine languages, with the goal of translating and disseminating the testimonies across the Anglophone world. As dialogically mediated, first-person narratives wrought with emotion, Boder considered the interviews to be a new form of “literature.” This is because they represented forms of narrative characterized by a range of linguistic choices, emplotment decisions, storytelling devices, and translation effects. According to Boder, the “verbatim recorded narratives” not only demanded the development of an “art of listening” but also necessitated the development of mixed methodologies—qualitative and quantitative, humanistic and proto-computational—to analyze the traumatic language and emotional content.

In the years that followed, formalized institutions of Holocaust memory were founded in the United States, Europe, and Israel. Holocaust survivor testimony became the centerpiece of their collecting initiatives. Many of the early testimonies in Yad Vashem’s collection were written down or recorded before it was formally established in 1953. Today, Yad Vashem has an archive of more than 131,000 testimonies across various media formats (of which about 36,000 are recorded voices and/or video). The Holocaust Survivors Film Project and the
Video Archive for Holocaust Testimonies at Yale (which later became integrated into the Fortunoff Archive) began recording audiovisual interviews in 1979, guided initially by the collaboration between television personality Laurel Vlock and child survivor and psychiatrist Dori Laub. Today, the archive has more than 4,400 testimonies and consists of some 10,000 hours of video footage. It is not coincidental, as Annette Wieviorka points out, that the impulse to record audiovisual testimonies in the late 1970s and early 1980s was spurred by televisual realities that returned to the immediacy of first-person accounts by survivors at the 1961 trial of Adolf Eichmann. These broadcasts and recordings set the stage for the public impact of the television miniseries Holocaust (1979), Claude Lanzmann’s monumental film of witnessing, Shoah (1985), and the global reception of Steven Spielberg’s Schindler’s List (1993). Founded in the wake of Schindler’s List, the Survivors of the Shoah Visual History Foundation (which later became the USC Shoah Foundation Visual History Archive) began interviewing survivors in 1994. Today, with some 55,000 video testimonies, in over forty languages, the more than 120,000 hours of testimony comprise the largest such archive in the world.

To preserve this content and make it globally accessible on the web, archives and libraries have undertaken multiple processes of media migration and digitization, each of which has changed how the testimonies are heard, accessed, and searched. Boder’s analog wire recordings were transferred to reel-to-reel tape by the Library of Congress and later recorded on U-matic or VHS tape. In 1999, the Paul V. Galvin Library at the Illinois Institute of Technology (IIT) obtained copies of the recordings as Digital Audio Tape (DAT) files, and those DAT copies were transferred to WAV files in 2007–2008. They were encoded as digital flash files and are now playable as WAV files on the IIT website. The interviews are searchable by way of the extensive Text Encoding Initiative (TEI) mark-up created by the IIT team. When Yale’s Fortunoff Archive began recording testimonies in 1979, they were recorded on 3/4-inch U-matic videocassettes, before being transferred to VHS, and now digital streaming formats. The Shoah Foundation began recording testimonies in 1994 on thirty-minute Beta SP videotapes. In the early 2000s, the 235,000 tapes were digitized as Motion JPEG 2000 digital files, the industry standard for preservation. According to Stephen Smith, the former executive director of the USC Shoah Foundation, an “ethic of data integrity” informs the Foundation’s commitment to “bit level preservation . . . of every byte of data (for its own sake).” The eight petabytes of data are stored on Oracle StorageTek SL8500 machines, which are checked nightly for any errors. Maintained by USC’s Information Technologies data center, painstaking
preservation systems are used to protect and regularly backup all of the data to within one bit per five terabytes of data. In certain ways, this commitment to the fidelity of both the digital files and the system’s hardware—networked, backed-up, distributed, and mirrored—underscores how the archive aims to be a transgenerational refuge or asylum for the survivors’ testimonies. The ethics of archiving are deeply rooted in ensuring a future for the testimonies to be heard.

During these critical decades of recording, archive creation, and media preservation, the testimony of Holocaust survivors was subject to much discussion and debate. Some historians asked if testimonies, many of which were collected decades after the events, were “factual” enough to be admitted as evidence into the historical record, especially if these testimonies contained inaccuracies; on the other hand, psychoanalysts like Laub argued that first-person testimonies were less about evaluating their historical accuracy and more about their role as documents of emotional realities, traumatic experiences, and epistemological frameworks—in other words, subjective ways of knowing, experiencing, and narrating. Although certain Holocaust historians such as Raul Hilberg and Lucy Dawidowicz distanced themselves from the use of first-person testimony, others such as Christopher Browning, Jan Gross, and Omer Bartov have shown how survivor testimony can be critical for historical work, especially when few or no other sources are available. In his acclaimed study of the Starachowice slave-labor camps, Browning used nearly three hundred eyewitness accounts, spanning 1945 through 2008, as nearly all other evidence about the camps was destroyed. While survivor accounts, according to Browning, are often recognized for their “authenticity” (as they are drawn from the wellsprings of memory), they can also be problematic for historians because the memories may, for instance, become mixed with “iconic Holocaust tropes” in popular culture. Nevertheless, Browning argues that it is possible for first-person accounts to be squared with “factual accuracy” to get at a “core memory” of the events, even if they—like all historical sources—do not provide “perfect evidence.” Instead, they open up spaces of evaluation and judgment for historical work to take place.

Derived from the Latin word testimonium, meaning “evidence, proof, witness, attestation,” the root testis refers to a witness or to someone who attests, especially as a third party (or terstis) in a trial or court of law. Witnesses deliver testimony of something known, observed, or experienced in light of having been present at the event to which they are testifying. When testimony is evaluated by a judge or a historian, the ability to verify the testimony’s factual accuracy and reliability
remains paramount. However, as we argue in the analyses that follow, testimony need not be evaluated—certainly not exclusively—for strict factuality or the extent to which it accurately represents the reality of the past. Testimony is a widely variant form of narrative performance in which a survivor makes subjective choices about how to voice personal experiences of trauma. At its core, testimony is a narrative form of emplotment with an implicit promise to be truthful. It is presented and preserved as an act of truth-telling for others to hear, see, or read. Thus the dialogical process of telling and listening is just as important as the language describing the reality of experiences.

Connecting the dialogical aspects of interview-guided testimony to trans-generational responsibility, Geoffrey Hartman, one of the founders and original project directors of the Yale Fortunoff Archive, distilled what he considered to be the ethical dimension of video testimony: the “duty to listen and to restore a dialogue.” For Hartman, video testimony offers an “optic” for non-survivors to mediate the geographic, temporal, experiential, and psychological distance that they (or, we) have with respect to the events of the Holocaust. This mediation happens initially through the relationship between the interviewer and the survivor and, after that, through the generations of viewers who contribute to the creation of an “affective community” of witnesses to the witnesses. For Hartman, the specific media technology of the audiovisual recording documents an ethical encounter between interviewer and survivor, which becomes, through each act of watching, an ethical encounter between viewer and survivor. In this sense, testimony functions as a performative embodiment of Martin Buber’s “Ich-du” (I-you) relationship, in which we—the non-survivors—enter into a “contract” through acts of listening, bearing witness, hearing, and being heard. Survivors, Laub writes, have a need to be heard, to tell their stories to a listener who is actively present for the other, listening to both silence and speech, trauma and survivorship. “The unlistened-to story,” as in Primo Levi’s recurring nightmare in *Survival in Auschwitz*, is a trauma akin to reexperiencing the event itself.

Because bearing witness is a dialogical appeal that needs a listener, Hartman will explicitly situate it within a framework derived from the philosopher of relational ethics, Emmanuel Levinas. It is the philosophy of Levinas, perhaps more than any other, that has informed much postwar scholarship on the Holocaust related to ethics as obligation and responsibility to the other. In survivor testimony, the physical face of the other—the traumatized, wounded face of the survivor—enters into a relationship of proximity, vulnerability, and closeness with the listener’s own face. For Levinas, ethics is defined by an intersubjective
relationship with and responsibility for the other. He considers it a first philos-
ophy, prior to the establishment of identity, origin, or any attempt to ground being.
For Hartman, Laub, and many others, the ethics of testimony rests upon the
presence of a relational listener: “Here I am,” ready to listen attentively; I am all
ears, standing open and ready to be summoned to this infinite demand, to this
injunction to “hear.”

But what, specifically, constitutes an “ethics of response for secondary
witnesses—interviewers, oral historians, and commentators,” as Dominick
LaCapra has asked? And, more pointedly for our contemporary situation, what
might an “ethics of response” mean for us—the tertiary witnesses—whose acts
of witnessing are mediated by computer interfaces, algorithms, and databases?

We consider the survivor to be the primary witness, the interviewer to be the
secondary witness, and all of us listening to the testimonies via forms of digital
mediation and computation to be tertiary or distant witnesses. I will use the term
“distant witnessing” to refer to this subject position. The question is: How can we
develop an ethics of witnessing in a world in which our temporal relationship to
the voices of the dead is becoming more and more distant, but our ability to call
up vast amounts of information from the digital archive is becoming more and
more instantaneous?

Although many viewers will continue to engage with video testimony in
ways that reflect the ethics of relationality and empathy central to its initial
creation, the recording of Holocaust testimony is reaching an end. As we
approach the threshold of a generational shift in which living witnesses will
have passed away, the character of the ethical relationship between survivor
and listener is also changing: going forward, that relationship will be largely
mediated by digital technologies, information architectures, and algorithms.
Concretely speaking, this means search boxes, web interfaces, databases,
query languages, mark-up and encoding protocols, speech recognition, natural
language processing, visualizations, and a wide range of algorithmic methods
and tools for reading, listening, creation, and analysis. Because the digital ar-
chive is structured, accessed, and interpreted by computational technologies
and algorithmic methods, the futures of Holocaust memory and history
will be shaped increasingly through these technologies and methods. Our re-
lationship to the voices of the dead will be mediated through forms of distant
witnessing, some of which already exist and others of which will emerge in the
future. Not only do the scale and complexity of the digital records far exceed
our human cognitive and empathetic capacities for listening, reading, and in-
terpreting, but new questions about the future of authenticity and digital
provenance have also taken center stage in light of the possibilities unleashed by generative AI.

While this book focuses primarily on digital archives of survivor testimony, the mass digitization of artifacts and documents related to all aspects of the history and memory of the Holocaust is well underway. We might mention, in passing, some of the collecting and digitization efforts at other major museums and archives, for instance: the fifty million records in the International Tracing Service archive that reference the fates of 17.5 million people at the Arolsen Archives; the millions of individuals and life stories in Yad Vashem’s Central Database of Shoah Victims’ Names; the US Holocaust Memorial Museum’s encyclopedias and databases of more than 44,000 concentration camps, ghettos, forced labor camps, detention centers, and other sites of persecution between 1933 and 1945. And these figures do not even include the millions of documents, artifacts, photographs, films, and books that are steadily becoming digitized in each of these archives and museums, or new database projects such as those carried out under the aegis of the Claims Conference. Beyond these institutional projects, we might mention the global investigatory work of Yahad-In Unum, an international human rights and educational organization that has documented—through forensic evidence, witness interviews, survivor testimonies, and digital maps—more than three thousand execution sites of Jews in Ukraine, Russia, Belarus, and the Baltic countries between 1941 and 1944. The mass digitization of documentation represents the condition of possibility for newly emergent fields of research at the intersection of digital humanities, memory studies, public history, and the computational and social sciences.

While it may have made sense at one time to argue that the Holocaust was “an event without witnesses” to make a point about the destructiveness of the genocidal will and the inability to assume an outside frame of reference during the event, the Holocaust is clearly an event with hundreds of thousands of witnesses who have contributed and helped to produce a staggering amount of testimonial evidence, documents, and data sources. In addition to recording and stewarding these testimonies, these institutional archives have also produced new data and documentary evidence about the Holocaust, especially through the critically important mark-up and encoding of testimonies, the creation of extensive metadata scaffoldings, and the production of new documentary databases. Today, computational forms of analysis can work in tandem with documentary, historical, and social analyses to produce new frames of reference and perspectives to examine evidence, patterns, relationships, narratives, motives, micro- and macro-level events, and more.
Even though the records and testimonies of the Holocaust have been (and continue to be) digitized on a massive scale, the use of computational methods and digital humanities tools for analysis is still in its early stages in the field of Holocaust studies. This may be because of a justified concern over replicating the violence caused by certain forms of quantification and the use of technologies that have the potential to dehumanize. Computation and quantification seem to present humanists with a “limit” on responsible modes of interpretation and representation.46 Although not referencing computation specifically, LaCapra raised the question as to whether “there is something inappropriate about modes of representation which in their very style or manner of address tend to overly objectify, smooth over, or obliterate the nature and impact of the events they treat.”47 This could happen, he warns, through “excessive objectification, purely formal analysis, and narrative harmonization”—all of which are potentialities of computation.

But, as we argue in this book, computational technologies and algorithmic methods do not necessarily lead to objectification, reduction, or simplification. These technologies and methods are not inherently unsuitable, but they do raise fundamental epistemological, aesthetic, and ethical questions, not unlike the questions raised several decades ago about appropriate and inappropriate modes of historical emplotment.49 Inspired by Saul Friedländer who sought to develop “an integrative and integrated history” of the Holocaust to express the convergence of distinct elements, perspectives, and experiences, we are proposing an integrated methodology composed of computational and humanistic approaches to analyzing testimony. Such a methodology allows us to move between macro, meso, and micro scales of analysis, reflecting the size and complexity of the documentation in the archives. At the same time, because digital archives are now the primary access points and storage systems for testimony, integrated methodologies can yield new reading and listening practices as well as critical modes of engagement with the archive.

To do this, we need to proceed from the position that computational methods are not neutral, value-free, or objective. While they may sometimes help us discover or verify facts, these methods do interpretative and discursive work, which allows us to imagine possibilities, test hypotheses, change the scale of analysis, and represent knowledge in new ways. As architectural historian Paul Jaskot has pointed out, digital humanities scholars have developed and applied computational methods to expand our understanding of traditional sources by modeling contexts, bringing together new data, and scaling up interpretations in ways that explore new research questions.50 Some of the pioneering work,
for example, at the nexus of digital mapping, 3D visualization, and data-driven research has been led by the collective associated with the “Geographies of the Holocaust” project. They use the measurements derived from Historical Geographic Information Systems (H-GIS) in ways that foreground probability, uncertainty, and qualitative visualization rather than objectivist forms of mapping.\textsuperscript{51} Their research humanizes the victims and expands our understanding of historical dynamics by moving between macro-level systems at the continental scale to cities, ghettos, blocks, and individual experiences articulated in testimonial narratives.\textsuperscript{52}

Advances in related fields such as computational linguistics, natural language processing, and machine learning have opened up new methods for mining and analyzing large textual corpora and promise to have a transformative impact on how scholars, archivists, and librarians work with digitized historical records.\textsuperscript{53} Under the broad leadership of organizations such as the European Holocaust Research Infrastructure (EHRI) working in collaboration with the Common Language Resources and Technology Infrastructure (CLARIN), robust digital infrastructures are emerging to support transnational Holocaust research and education. Their goals are to provide access to archival materials, facilitate interoperability, preserve collections, and share resources and knowledge. As documented by CLARIN, a number of institutions have already developed technical pipelines, workflows, and datasets for transforming oral history interviews into interoperable research data.\textsuperscript{54} Focusing mostly on language technologies, the research includes standardized text mark-up and annotation, text encoding, text summarization, transcription and translation, voice and text alignment, interface development, and semantic and spatial search. For example, in partnership with the Yale Fortunoff Archive, the USC Shoah Foundation, and the USHMM, Gábor Tóth has used computational linguistics and text mining tools to identify recurrent experiences in testimonial fragments across these three corpora. His project, “Let Them Speak,” offers a new, searchable interface for identifying shared experiences and showing how “the experience of the Drowned can be rendered through the pieces of collective suffering.”\textsuperscript{55} Employing data mining and natural language processing, Tóth created a custom search interface that allows users to explore 2,681 testimonies attuned to recurrent linguistic features in the transcripts and their underlying linguistic networks.

Using empirical data and systematic analyses, researchers have also used quantitative methods from the social, political, and computational sciences to analyze historical phenomena related to the events of the Holocaust.\textsuperscript{56}
Yad Vashem has developed a comprehensive Holocaust deportation database, which includes quantitative information and source materials about every transport organized by the Nazis. The data—arranged by individual transports, dates, number of people deported, number of survivors, nationality, the route taken, agencies involved, and, when available, gender and age breakdown—are now being used to advance social science research in Holocaust studies.

And yet, I do not think we should ignore any lingering uncertainty or skepticism that we may feel when it comes to using digital technologies, quantitative methodologies, algorithms, or computational tools to study the Holocaust. After all, we have to depart from the knowledge that technologies and methods of calculative reasoning shaped the foundation of the social engineering policies of dehumanization that gave rise to the Holocaust. As Zygmunt Bauman famously argued, bureaucratic forms of rationality, coupled with technologies of quantification and abstraction, were deeply linked to the modern management of society that formed one of the conditions of possibility for the Holocaust. When those forces—the product of modern science, modern technology, and modern forms of state power—came together with racialized forms of instrumental reason driven by biostatistics, bureaucratic distanciation, and hierarchical quantification, the result was social engineering, eugenics, and eventually genocide. Bureaucratic operations, Bauman argued, substituted “technical for moral responsibility,” allowing people to be dealt with as railway “cargo” and human beings to be “reduced . . . to pure, quality-free measurements.”

Not unlike the operations of certain algorithms, bureaucracy, according to Bauman, “is programmed to seek the optimal solution. It is programmed to measure the optimum in such terms as would not distinguish between one human object and another, or between human and inhuman objects. What matters is the efficiency and lowering of costs of their processing.” To the extent that science achieved its aim of becoming “value-free,” it became, in the process, “morally blind and speechless,” replacing the previous authority of religion and ethics with a “cult of rationality.” The technological instruments it spawned—grounded in calculation, bureaucracy, and distanciation—were unable to prevent the crimes of the state and, instead, became complicit with them. Today, we are, once again, living in a moment in which science, in concert with industry and big tech, sometimes claims (quite dubiously and erroneously) that algorithms are objective or that rationalist calculations are value-free, even as AI reshapes the idea of the human. The risk of technology becoming morally blind, speechless, and complicit is still very much with us.
We must thus urgently ask: How can we use technology without replicating the violence of objectivist logics? How can computation and algorithms be morally engaged and able to speak in ways that humanize others, serve to bear witness to past crimes, and help inform reparative approaches to historical injustices? As we endeavor to answer these questions, Bauman may have given us an indication of a possible way forward that is not an either-or choice. In his Amalfi Prize Lecture of 1990, he concludes by citing the admonitions of computer scientist Joseph Weizenbaum and calling for “a new ethics, an ethics of distance and distant consequences, an ethics commensurable with the uncannily extended spatial and temporal range of the effects of technological action.” Although Bauman does not give any further explanation of what this may entail, he helps us identify the problem in a way that offers a sense of possibilities: “a new ethics” would have to be responsive to distance and address how technologies of distance enable new kinds of actions, mediations, and responsibilities. As we will see, an ethics of distant witnessing goes hand-in-hand with the need to imagine an ethics of the algorithm.

As technologies of calculation, decision-making, and prediction, algorithms are all too often disassociated from human experiences of time, space, and intersubjective relationality precisely because they can be deployed anywhere, at any time, and in virtually any context. Far from being outside of history and society, algorithms and, more broadly, computational methods and quantitative thinking, need to be understood as deeply embedded, culturally contingent forms of power with a dialectical potential to humanize as well as dehumanize. They give rise to ways of knowing the world and constituting realities that could be—and, we argue, should be—yoked to an ethical framework enabled by human judgment and guided by values that are life-affirming. If there is to be a new ethics, human judgment must not be relinquished, overcome, or outsourced to algorithmic forms of decision-making. Instead, algorithms can function as heuristics with which to discover, devise, investigate, invent, compose, reflect, and, ultimately, humanize—provided algorithmic decision-making is guided by ethics as its first priority. Concretely, this means fostering human dignity, plurality, attentiveness, and care.

It would not be an exaggeration to say that we are in the midst of a paradigm shift in which digital technologies, algorithmic processes, and computational tools will soon mediate and structure our access to and knowledge of all historical events, not just the Holocaust, and to the dead more generally. What might it mean to bring together a new epistemology—guided and informed by algorithms—for the creation and analysis of testimony, on the one hand, and an ethics—guided and informed by testimony—for the development and deployment of algorithms,
on the other? The risks and dangers of datafication, the logic of objectivism, and instrumental reason loom large and have deep historical roots. Throughout this book, we will confront them dialectically, demonstrating both the humanizing possibilities and the dehumanizing perils of technology. If there is to be an ethics of testimony after the passing of the generation of eyewitnesses, it will be constituted, we argue, by forms of distant witnessing guided by what we are calling an ethics of the algorithm. And so, it is with algorithms that we must begin.
access, ethics of, 336, 342
acoustic database, 224
active speech, 263–64, 265, 271, 279, 284
actor-network theory, 258–59
Adjective-Verb Quotient (Boder), 116, 118–19, 377n93
administrative documents, 53, 56, 57–59
affect. See expressivity
African Origins Database, 74, 368n85
Agamben, Giorgio, 50–51, 67, 354n27, 367n68, 389n66
agency: of algorithms, 19–20, 26; concept of, 258–59, 400n8; ethical, 26–33; Kimmelmann's interest in, 137, 139–46; voice as, 235
agency, expressions of: acts of resistance, 274–79, 290–97; analysis of (see semantic triplets); classification of, 102, 263–66, 269–72; concept of, 260; Mala Zimetbaum testimony, 309–20; network analysis, 260–61, 266–74, 279–83, 299; omission from indexing, 169, 259
AIDS Memorial. See National AIDS Memorial
AIDS Memorial project on Instagram, 412n65
Alexa (Amazon), 346, 412n66
algorithm(s): as assemblages, 32, 323, 344, 350; of care and refuge, 36; clustering (see K-Means clustering algorithm); as collective singular, 18–19; critical studies of, 19, 23–33, 358n21, 399n38; dangers of, 24–25, 34–35, 199–200, 212–27, 254–57, 344, 358n21, 359n34; datafication, 223–27; dehumanization by, 12–16, 24, 35–36, 344; distant listening, 203–212, 224–27; ethical (see ethical algorithms); versus ethical agency, 26–33; ethics of (see ethics of the algorithm); force driven clustering, 167–69; as heuristics, 15, 32–33, 257, 294, 299; information extraction, 17, 260–61, 264–69, 279, 282, 297–99, 402n35; Kowalski's definition of, 20–22; machine-learning (see machine learning); natural language (see natural language processing; BERT); neural network, 17–18, 236–38, 268; overview, 17–20; racial bias in, 255–56, 357n15, 399n42; recommendation, 344, 357n14, 359n34, 411n57, 412n63; rule-based (see semantic triplets); thinking with, 32, 34–35, 233, 252, 334, 346, 361n79; as "transcendental ideal," 22; usefulness of, 25–26, 77–78; verb characterization, 266–67. See also specific tool
algorithmic criticism, 261–62
algorithmic fabulation, 76, 300, 303, 311, 316, 320, 342, 370n103, 406n12, 411n58
algorithmic judgment, versus human judgment, 19, 28–30, 298–99, 360nn48 and 61
Algorithmic Justice League, 358n22
algorithmic parataxis, 344–45
algorithmic thought, history of, 35–36
algorithmic violence, 23–24
al-Khwārizmī, Muḥammad ibn Mūsā, 20
Allport, Gordon, 105–7, 116
Amazon Alexa, 346, 412n66

For general queries, contact info@press.princeton.edu
American Soldier, The (multivolume study), 120
Amoore, Louise, 23–24, 199, 256, 358nn23 and 31, 362n82, 406n12
Amsterdam Bureau of Statistics, 51–53
“Analysis of Five Topical Autobiographies of Christian Faith” (Brown), 118–19
annotations: Boder’s, 87, 104–5, 201, 373n31, 374n46, 375n58, 382n37, 392n38; expressivity, 201–12; N-grams, 133–34; ProQuest transcripts, 201; semantic triplets, 266–68
Antigone’s Claim (Butler), 316–17, 319
antisemitism, 54, 79–80, 101–2, 153, 241, 283–97, 327, 339, 403n51; antisemitic laws, 54, 102, 285; antisemitic speech, 292, 414n77; responses to, 290–96
Apelian, Zabel (“Rose”) (testimony), 176, 178, 179–80, 387n48
Arendt, Hannah, 28–30, 55, 142, 160, 259, 360n48, 361n64
Armenian Film Foundation, 175–82, 386n35, 387n42
Armenian genocide testimonies, 147, 157, 172–82, 184–88, 383n2, 385n31, 386n35, 387n42 and 48
Arolsen Archives, 355n41, 396n4
art, testimony as, 181–82
audio testimony: linguistic analysis (see language analysis); media migration, 7–8, 372n24; metadata (see indexing systems); methods of, 79–82, 84, 177; segmentation of, 87; sound analysis (see voice analysis); transcription of, 104–5, 160, 201, 262, 304; translation of (see translations)
Auerbach, Erich, 390n16
Austerlitz (Sebald), 77
authenticity, 341–42, 349–50, 414n79
automatic speech recognition (ASR), 3–4, 236, 330, 334
Aviary Platform, 85, 372n24
Bakker, Rob, 54–55, 363n19
Balibar, Étienne, 404n55
Bamman, David, 267, 400n8, 402nn29 and 30
“banal deception” (Natale), 409n12
bare data: concept of, 34, 42, 50–51; in data collection, 199, 207, 224, 363n3; as dehumanization, 35, 42–56, 74–76, 224–27; examples of, 42, 50–51, 70, 74; humanization of, 61, 66, 74–76; in relation to numeracy, 36, 42, 68, 71, 74–77, 367n71. See also bare life; numeracy
bare life, 37, 50–51, 71, 77–78
Barthes, Roland, 220, 393n48, 394n75
Bartov, Omer, 8
Barzilai, Maya, 390n19
Bassfreund, Jürgen ( Jack Bass) (testimony), 104, 110–12, 115, 118, 265, 268–74, 297, 401n25
 Bateson, Gregory, 225
Bauman, Zygmunt, 14–15, 359n44
bearing witness, 9, 198, 317, 354n34
“Bearing Witness or the Vicissitudes of Listening” (Laub), 353n21
Beloved (Morrison), 75–77
Bender, Emily, 399n39 and 40, 413nn73 and 74, 414n79
Benita H. (testimony), 305, 311
Benjamin, Ruha, 357n15, 369n97, 399n44
Bergen-Belsen memorial museum, 352n4
Berlin Holocaust memorial, 67–68, 71
Bernice S. (testimony), 398n31
Bernstein, Charles, 391n24

For general queries, contact info@press.princeton.edu
BERT (Bidirectional Encoder Representations from Transformers), 18, 96–97, 102–3, 236–38, 252–57, 267, 398n36, 399n39
BERTopic model, 384n17
Beschloss, Morris (testimony), 293
Betacam SP videotapes, 7
Bettelheim, Bruno, 274
bias, 24–25, 255–56, 348, 399n39 and 43
See also specific project
Binder, Janine. See Oberrotman, Janine
Birdwhistell, Ray, 224
Birenbaum, Salomon (testimony), 289
Bisenhaus, Polia (testimony), 87, 92, 373n33
bit-level preservation, 336, 338
Black Studies, 71–77, 367n71, 368n86, 369n88 and 97
blockchain, 349
Bloemendal, Hans Joseef ben Michael, 366n57
Blut und Boden (blood and soil) ideology, 51, 56, 67
Bobrow, Louise, 192
Boder, David: background of, 83–84, 106; graduate students, 107, 116–19, 375n69, 377n92; portrait of, 80
Boder, Dora Neveloff, 116–17, 126
Boder’s corpus of interviews, 85–86; Boder’s macroanalysis of, 121; close-up analysis of, 96–104; collection building, 37, 82–83, 89–90, 104–10; motivation for, 79–81, 84–85, 370n7; non-survivor interviewees, 372n23, 374n41; quantification of trauma (see trauma index); recording technology, 7, 79–82, 84, 104; role in Holocaust testimony genre, 37, 79, 83, 85–86, 121–22, 175, 182; visualizations of, 87–96. See also specific interview
Boder’s indexing system, 89–90, 92, 125–31; annotations, 87, 104–5, 201, 373n31, 374n46, 375n58, 382n37, 392n38; versus N-grams, 134–39; versus semantic triplets, 140–42, 271–74, 277; versus USC Shoah system, 182–86
Boder’s interview style: versus Armenian Film Foundation, 179; characteristics of, 86–107, 333, 373n30, 374n45; corpus dashboard, 98, 250–52; development of, 6; gray zone and, 123–25, 128–29, 145; interview question analysis: corpora comparison, 238–46; methodology, 96–104, 236–38
Boekhouders van de Holocaust (Bakker), 363n19
Boersma, Paul, 390n18
Boger, Wilhelm, 315–16
Bogost, Ian, 22, 398n35
Bomba, Abraham (testimony), 191–98, 202, 227–31, 389n7–9, 390n14 and 17, 390n20, 391n22
Bonazzi, Anna, 92, 123, 375n58, 392n38
BookCorpus, 236–38, 256
Boswell, Matthew, 352n4, 408n7, 410n28
Bothe, Alina, 389n8, 390n14
BRAT annotation tool, 266–67
Braun, Anna (testimony), 112, 378n102
breath units, 197, 200–202, 210, 212, 216–17, 220, 390n19, 393n48
Brennan, Daniel, 360n53
brick memorials, 64, 66–67
Brown, Alice, 107, 116, 118–19, 377n93, 378n102
Brown, Vincent, 75
Browning, Christopher, 8, 353n26, 407n23
bubble charts, 238–40, 246–47, 269
Buber, Martin, 9
Bucher, Taina, 21, 33, 356n2
“Burden of History, The” (White), 31, 361n72
Butler, Judith, 316–17, 319
cadence, 38, 199, 212–22. See also voice analysis
Calmeyer, Hans, 364n30
Cambodian genocide, 385n31, 386n41
camera work, 176–77, 181–82, 327–28, 387nn44 and 45
care, ethic of, 317–19, 354n35
Caswell, Michelle, 386n41
cataloguing. See indexing systems
Cavarero, Adriana, 199, 200, 394n56
Celan, Paul, 200–201, 390n19
Census Bureau for Statistics in the Ministry of Interior (Netherlands), 43
censuses, 36, 43–44, 49, 56, 363n13, 364n31
Center for Advanced Study in the Behavioral Sciences (Stanford), 224–25
Central Database of Shoah Victims’ Names (Yad Vashem), 11, 367n67
Central Names Index (CNI), 396n4
CGI, 335
Chaja G. (testimony), 304, 318
ChatGPT, 346–47, 412n70, 413n71
Chun, Wendy Hui Kyong, 358n21, 359n44
chunk parsing, 264–69, 279, 285
Claims Conference, 11, 355n43
Clement, Tanya, 392n36, 393n49
close listening, 38, 194, 200, 391n24; versus distant listening, 193–94, 203–12; phonetic-semantic combination, 199–200
close reading, algorithmic, 119–20, 260–68, 298–99
“cloud ethics” (Amoore), 23–24, 358n31
code-switching, 92–94, 199, 201–2, 390n14, 393n46
coric speech, 263–64, 265, 271–72, 284–87, 403n53
cognitive assemblages (Hayles), 32, 361n78
Coleridge, Samuel, 109
collective voice, 260, 285
collective witnessing. See testimonial ensembles
common community (sensus communis), 28
Common Language Resources and Technology Infrastructure (CLARIN), 13
computational analysis: dehumanization by (see dehumanization); ethical methods, 68–78, 345; role of, 11–16, 18–19, 37–38. See also algorithm(s); quantification; specific method
computational architecture, 189–90
computationalism, 359n44
computational linguistics: 13, 37, 83, 132. See also natural language processing
computational tractability, 38
Computer Power and Human Reason (Weizenbaum), 27–28, 353n63, 359nn43–47
computers: humans as, 56; power of, 359n44 conscience, 29–30
context, importance of, 22, 255–56
context terms, 265, 268–69, 279, 285
control components (of algorithm), 20–22
controlled vocabularies. See indexing systems
Conversa platform, 337
counter-indexing, 123–36; N-grams, 125, 131–39; semantic triplets, 139–46
Crawford, Kate, 357n16, 398n35, 399n43
creaky voice, 210, 394n60
criteria for life history, 118
“critical fabulation” (Hartman, S.), 76, 341–42, 406n12, 411n58
cult of rationality, 14
cultural history of values, 121, 122
cultural memory machines, 40, 323, 326–33, 336, 341, 345, 408n1
Częstochowa ghetto, 192–98, 390n17
dangers of algorithms, 24–25, 212–27, 254–57, 344, 358n21
data: bare (see bare data); big (see big data); collected by state (see also censuses), 23–24, 42–58, 223–24; indeterminate, 165; missing, 23, 68, 70–77, 368n80, 369nn92 and 100; training (see machine learning); transformation of narrative into, 148, 157–165, 188–90, 386n38
database(s): algorithm compared to, 21; ethics of, 160, 169–72, 188–90; function of,
160–70, 188, 208, 386n38; graph, 280; indexing (see indexing systems; metadata; spreadsheets); interface (see interfaces); modular, 157, 161, 182, 385n31; versus narrative, 160, 165, 169–70, 189–90, 386n38; relational, 21, 158, 166, 170; searching (see search systems); structured query language (SQL), 158–60; triplets (see semantic triplets); “unsaying,” 38, 188–90, 388n64. See also specific database
data capture, 160–61, 372n29
*Data Feminism* (D’Ignazio and Klein), 351n4, 358n22, 387n51
datafication, dialectic of, 223–27, 344
Data for Black Lives, 358n22
data integrity, 7–8, 335–36, 349
data justice, 23–24, 358n22
data preservation, 8
data review, 252–54, 269, 382n36, 399n37; pronoun disambiguation, 116–18, 140, 304, 308, 403n44
data storage, 158, 160–61
data visualizations. See visualizations
Davidson, Khoren (testimony), 178, 179
Dawidowicz, Lucy, 8
de Beauvoir, Simone, 33–34
*De Bevolkingsboekhouding* (*Population book-keeping*) (Lentz), 44
Deblinger, Rachel, 323–26, 374n45, 379n12, 392n37, 411n46
decibels. See loudness
deculturation, 107, 108, 375n67
defeaces, 337, 346, 414n80
deep memory, 208, 394n8, 396n14
DeepQA (software), 409n16
defiance, acts of, 290–97; Mala Zimetbaum, 40, 261, 300–322, 370n103
Defonseca, Misha, 350
deforomance, 261
de Hond family, 57
dehumanization: bare data as, 42–56, 74–76, 224–27; example of (see Dutch Jewish registry); technologies used for, 12–16, 24, 344
Demnig, Gunter, 63–64
democratization of witnessing, 154, 171
Density of the Distress Relief Quotient (Boder), 116
de Pauw, Samuel, 61, 64
dependency parsing, 262–66, 401n22
deporation: 30, 35–36, 54–55, 192, 194, 197, 253. See also Holocaust deportation database
Derrida, Jacques, 188, 353n27, 388n62, 392n30
*Destruction of the Dutch Jews, The* (Presser), 55–56
Deutsche Hollerith Maschinen Gesellschaft (Dehomag), 364n32
“devocalization of logos” (Cavarero), 200
Diament, Henrietta (testimony), 292
diathesis, 394n75
differential listening, 208
difflib (software), 380n23
digital archives: development of, 4–5, 10–14, 188–89, 323; formats used in, 7–8; gaps in, 73–77, 324–26, 369n101, 406n12, 412n58; role of AI in, 348–50. See also specific archive
Digital Audio Tape (DAT) files, 7
digital humanities: analytical tools, 12–15 (see also specific tool); big data models and methods, vii–ix, 19, 31, 36, 40, 104, 148, 150–57, 166–175, 183–190, 233–52, 284–90, 299; integrated methodologies, 12, 75, 83, 112–16, 118, 355n52; mass digitization of artifacts, 11–12; paradigm shift, 15–16, 18, 38, 75, 120, 175, 186, 323; practices, vii–ix, 11–12, 71–77, 119–122, 226, 233, 256–257, 279–83, 298–99, 351n1 and 5, 356n1, 369nn88 and 97, 392n36, 399n38. See also algorithm(s); computational analysis; visualizations
Digital Library System (USC Shoah Foundation), 160–61
digital mapping, 13, 351n5, 355n52, 369nn90 and 91, 388n57

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“Digital Monument to the Jewish Community in the Netherlands” website, 57–63, 66, 70, 287
digital provenance, 324, 349–50, 414n79
digital remains, 335–38, 346–47. See also Dimensions in Testimony
digital streaming formats, 7
digitization, 7–8, 372n24
D’Ignazio, Catherine, 358n22, 387n51
Dimensions in Testimony (DiT): AI component, 327–28, 330, 333–36; versus Boder’s interviews, 90–91, 103–4; as cultural memory machine, 40, 323, 326–33, 336, 341; ethical standards, 335–36; example from, 1–5, 325–26; interview methodology, 236, 328–29, 408n7; interview question analysis, 327–33; interview question corpora comparison, 238–46; machine-learning platform, 3–4, 18, 236, 330–31, 334, 409n16; methodology, 236–38, 373n35; motivation of interviewees, 336; user questions, 327–28, 330–33, 408n8. See also specific testimony
disbelief of interviewer, 80, 240, 244–47
Discomfort-Relief Density Quotient (Boder), 116
Discomfort-Relief Quotient (Boder), 107, 109, 118–19, 377n92 and 93
discourse network 2000, 161
discrimination: algorithm as tool of, 24–25, 255–56; antisemitism, 54, 283–97, 339, 403n51
disembodied information, 335
disinformation, 359n34
“Displaced People of Europe, The” (Boder), 82
distant listening, 166, 354n38; versus close listening, 193–94, 203–12; ethics of, 225–27; methods of, 207; phonetic-semantic combination, 199–200
distant reading, 383n6. See also macroanalysis
distant witnessing: of agency, 259; defined, 10; democratization of, 154; ethics of, 10, 15–16, 19, 32, 35, 188, 199, 203, 208, 225–27, 345; future of testimony, 4, 40, 326, 338, 345; memorials providing, 67, 74; social media for, 341–42, 344; in technologically mediated space, 4, 10, 333, 350
Distress-Relief Quotient (Boder), 116, 377n93
“Distribution of Jews across the Municipality” (map), 51–53
divided self, 211, 226
Dobson, James E., 397n22, 399n38
Dollard, John, 107, 109, 118–19, 375n67
Donia W. (testimony), 247, 250, 398nn33 and 34
“D.P. Story, The” (Boder), 81, 370n7, 372n25
Drexler, Margot, 315–16
Drucker, Johanna, 63, 160, 367n59, 372n29
Du Bois, W.E.B., 368n86
Dutch Holocaust Memorial of Names (Holocaust Namenmonument), 64, 66–67
Dutch Jewish Monument (Joods Monument), 57–63, 66, 70, 287, 366n55, 366n57
Dutch Jewish registry, 35–36, 42–78; as bare data, 42, 50–51; distribution maps, 51–53; legal basis of, 43; punch card system, 49–50, 364nn28 and 31, 365n32; rationale for, 43–46; registration form, 47–48
Eclipse of Reason (Horkheimer), 27
Eichmann, Adolf, 7, 30, 55, 303, 361n64, 405n3
Eidsheim, Nina Sun, 391n27
Einsatzgruppen Trial (Nuremberg), 398n28
Eisenberg, Kalman (testimony), 371n13
Eisenman, Peter, 67–68, 71
ELIZA (software), 27
Eltis, David, 73–74
embodiment, importance of, 349–50
emotions, indexing of, 349–50
Encyclopedia of Camps and Ghettos, 355nn42 and 52
“enemy of humankind” (hostis generis humani), 361n64
entity-recognition software, 125

For general queries, contact info@press.princeton.edu
Esther S. (testimony), 318
Eternime (company), 335, 338, 410n29
ethical agency, 26–33
ethical algorithms, 23–25; as heuristics, 15, 32–33, 257, 294, 299; Kearns and Ross on, 24–25; proposed methods, 33–41; for representing totality and infinity, 68–78, 92
ethical editing practices, 411n56
ethic of care, 317–19, 354n35
ethic of the for-the-other, 200
Ethics of Ambiguity, The (de Beauvoir), 33–34
eugenics, 45, 147, 395n78
European Holocaust Research Infrastructure (EHRI), 13, 356n54
evaluation triplets, 263–64, 265–66, 271, 284, 308–9
"Evaluative Traumatological Lexicon" (Boder), 120
@eva.stories (Instagram), 40, 324, 338–45, 411n47 and 55
“expanded way of thinking” (eine erweiterte Denkungsart) (Arendt), 28–29
expressivity, 38; Dimensions in Testimony, 329; markup for, 201–12; microanalysis of, 224–25; N-gram indexing, 136–37; systems unable to reflect, 38, 124–26, 163–64, 169, 177–82, 223–27; vocal (see voice analysis)
fabulation, algorithmic, 76, 261, 303, 311–20, 342, 348, 370n103, 406n12, 411n58
Facebook, 25, 357n14
faceted searching, 169–71, 188
factuality: debates over, 8–9, 181–82, 355n46; focus on (see limitations of indexing); versus thinking with algorithms, 34–35, 233, 252, 334, 346
factual metadata, 233
fairness, accuracy, transparency, and ethics (FATE) principles, 24–25, 358n31
Fan, Lizhou, 123, 258, 401n21
federated search, 304
Feld, Eugene (testimony), 293
Fele F. (testimony), 319
Felman, Shoshana, 192
feminist objectivity, 358n17
Ferber, Joseph (testimony), 371n13
Feuer, Otto (testimony), 94, 373n40
figura, 390n16
finding aids. See indexing systems; search systems
Finn, Ed, 323, 408n1, 409n25
Firestone, Renee (née Weinfeld) (testimony), 204–8, 236, 326–33, 336, 398n28
Fisher, Carrie, 335
fluid data ontologies, 188–89
force-driven clustering, 167–69
forces of constraint, 261
Forever Project (UK National Holocaust Museum), 5
Fortunoff Archive: access to, 342; versus Boder’s interviews, 37, 86–87, 90–91; corpus dashboard, 246–50; ethical dimensions, 9; “In Search of the Drowned: Testimonies and Testimonial Fragments of the Holocaust” project, 405n4; interview corpus, 7; interview methodology, 234–35, 373n31, 396n2 and 9; interview question analysis and corpora comparison, 238–46; Let Them Speak project, 13, 379n5, 400n10, 403n49, 404n54; methodology, 236–38; testimonial ensemble, 303; voice in, 201–2. See also specific testimony
Foucault, Michel, 45, 363n14, 396n5
Frank, Anne, 171, 341, 352n4, 413n71
Freilich, Dora (testimony), 319
Freilich, Fania (testimony), 112, 118
frequency counts, 116–17, 132–34, 138
frequency range. See spectrograms
Freudian psychoanalysis, 106, 108
Frieda K. (testimony), 305, 318
Friedländer, Saul, 12, 71, 170–71, 226–27, 355n46, 394n58
Friendly Eastern Refugees (FER) group (Boder), 115, 118
Fritzshall, Fritzie (testimony), 1–5, 323–26
Frumin, Simon, 204
Frydman, Henja (testimony), 301–3, 305, 406nn9 and 15
Gabbai, Dario (testimony), 384n16, 393n53, 397n15
Galinski, Edek, 301, 311, 318–19, 405nn3 and 5
Gebru, Timnit, 256, 358nn27 and 28, 399n39, 413nn73 and 74, 414n79
gender, 175, 246, 250–52, 373n34, 407n22
generative adversarial network (GAN), 346, 412n68
generative AI, 324, 346–50, 412n70
generative pretrained transformer (GPT), 347, 412n70
generous interfaces, 70, 287–91, 368n74, 404n56
genocide: as administrative work, 56; global documentation, 354n39, 383nn1 and 2, 385n31, 386n41; Holocaust as paradigm for testimony, 38, 171–90, 386n41. See also specific event
geographic information systems, 13, 51–53, 355n52, 388n57
Geographies of the Holocaust project, 13, 351n5, 355n52
Gephi (software), 167–69
“ghost in the machine” logic, 334–36, 409n25
Gillespie, Tarleton, 20
GitHub repository, 268, 401n21
globally oriented inquiry, 170–71
Glowacka, Dorota, 389n2
Godfrey, Mark, 67
Goldstein, Paul (testimony), 293
Columbia, David, 359n44
GPT-3 technologies, 347, 412n70
grain (voice), 393n48
grammatical structure (parsing), 133–34, 233, 262–69, 279–80
gray zone, the: concept of, 37, 40, 124–25, 131, 145–46; counter-indexing, 123–36; N-grams, 125, 131–39; Levi on, 124, 131, 140, 145–46; semantic triplets, 139–46
Gregson v. Gilbert ruling (1783), 76
Grese, Irma, 332
Grodno ghetto, 108, 277
Gross, Alex (testimony), 292
Gross, Jan, 8
Gruenewald, Helmut (testimony), 292
Gruner, Wolf, 274, 403n41 and 42
Guatemalan genocide, 354n39, 383n1, 385n31
Guillory, John, 364n26
Gustman, Samuel, 160–62, 385n20, 410n41
Gutter, Pinchas (testimony), 326–33
Haas, Arie Leopold (testimony), 166–67, 171
Hagopian, Michael, 175, 179
“half bells” model (Boder), 120
Hamidian massacres, 387n49
Hammond, Polly, 107, 116, 118, 375n66, 377n93
Handelman, Matthew, 414n77
Haraway, Donna, 22, 358n17
Harout, Hrahad (testimony), 176, 178, 180
Hartman, Geoffrey, 9, 10, 235, 341–42, 354n36, 407n18
Hartman, Saidiya, 76, 369n101, 406n12, 408n25, 411n58
hate speech, 414n77
hauntology, 200, 392n30
Hausner, Gideon, 361n64
Hayles, N. Katherine, 32, 335, 356n1, 361n78 and 79, 383n5, 386n38, 410n26
heat maps, 246–48
Hebrew University: Lab for the Computational Analysis of Holocaust Testimonies, 384n15
hedonic experiences, 105
Hello History AI Chat, 346–47, 413n71
Hertzberg, Sara (testimony), 289
heuristics, algorithms as, 15, 32–33, 257, 294, 299
Heyman, Eva (@eva.stories), 40, 324, 338–45
Hilberg, Raul, 8, 274, 381n33
Historical Geographic Information Systems (HGIS), 13
history, as science, 31–32, 77, 361n72, 378n1
Hoffman, Efraim “Fred” (testimony), 218–22
Hollerith punch card system, 35, 49–50, 56, 364nn28–31, 365n32
Holocaust (TV miniseries), 7
“holocaustal” events (White), 71, 76
“Holocaust by bullets,” 354n39
Holocaust deportation database (Yad Vashem), 14, 355n43, 356n57, 365n38, 366n45
Holocaust Ghettos Project, 355n52
Holocaust Memorial Day (Yom HaShoah), 338, 343–44
Holocaust Memorial Foundation of Illinois, 324
Holocaust memory: culture machines, 323, 333, 336–37, 345, 408n1; fallibility, 3, 8, 85, 311, 372n25; institutions of, 6–8, 11, 85 (see also specific institution); memorials, 57–68, 70–71, 287, 345, 367n65 and 66; multidirectional, 378n111, 386n41, 411n56; practical past, 32; in relation to memory of transatlantic slave trade, 71–77; role of AI in, 348–50; on social media, 338–45, 411n55; virtual, 3–5, 352n4, 409n11, 410n28; voice, 2, 193–98, 206–8, 210–13, 226–27. See also Boder’s corpus of interviews; digital archives; Dimensions in Testimony; Fortunoff Archive; Visual History Archive
Holocaust Survivors Film Project, 6–7, 234
Holocaust testimony: debates over, 8–9; ethics of, 9; generational shift in, 4–5, 10, 341; as interview (see interview methodologies); origins of, 6, 37, 79–86, 352n9, 370n3, 371n13 (see also Boder, David); as paradigm for other genocides, 38, 171–90, 386n41; in relation to slavery archives, 76–77. See also specific person; specific institution
Holocaust testimony recordings: as big data, 19; digital forms of, 4–8, 10, 14; first, 6, 37, 79–82, 352n9 (see also Boder, David); last, 4–5, 10; metadata (see indexing systems; metadata); overview of, 5–11; watchers of (see distant witnessing) holograms, 335, 351n2, 408n11, 410n28. See also Dimensions in Testimony
homo sacer, 51
Horkheimer, Max, 27
Horton, Zachary, 21
Howard, Stephen (testimony), 292
Human Condition, The (Arendt), 29, 259
humanization of data, 61, 66, 74–76
human judgment, 26–33, 298–99, 348, 360nn48 and 61
Hurston, Zora Neale, 371n9

IBM (International Business Machines): Hollerith system, 364n32; Watson system, 18, 330, 409n16
“Ich-du” (1-you) relationship (Buber), 9, 197
identity cards, 43–44

I Did Not Interview the Dead (Boder), 81–82, 104, 126, 370n7, 374n52, 388n60
“I don’t know/I didn’t know” cluster, 138–39, 381nn27 and 28
Illinois Holocaust Museum and Education Center (IHMEC), 324
Illinois Institute of Technology (IIT), 7, 83, 84, 96, 110, 372n24; Voices of the Holocaust, 85, 92, 371n13, 372nn24 and 28 (see also Boder, David)

“Impact of Catastrophe, The” (Boder), 107, 110, 114–16, 118, 376nn82 and 85
indeterminate data, 165
indexable content, 164–65, 181, 275–77
indexing systems: antisemitism histories, 284, 403n51; Armenian genocide testimony, 180–82, 385n31, 386n35; Boder’s work (see Boder’s indexing system); compared to other corpora, 171–90; information architecture, 157–71; innovative use of, 188–89, 385n31; keyword counting, 128–29; limitations of (see limitations of indexing); manual (see manual indexing); methods of, 125–31; N-grams, 125, 131–39; purpose of, 125, 385n29; semantic triplets (see semantic triplets); Visual History Archive, 201, 378n105, 383n3, 392n36; whole corpus views, 147–57. See also metadata
infinity, 68–78, 92
information: aim of neutrality of, 161, 165, 358n17; disembodied, 335; disinformation, 359n34; new writing genres, 364n26
information architecture: components of, 160–61; innovation of, 188–90; Visual History Archive, 157–71. See also indexing systems; metadata
information system, goal of, 188–89, 385n23
inheritance relationships, 162
In memoriam [L’zecher] (Bloemendal), 366n57
“In Search of the Drowned: Testimonies and Testimonial Fragments of the Holocaust” (Tóth), 356n55, 405n4
Instagram: @eva.stories, 40, 324, 338–45, 411nn47 and 55; AIDS Memorial project on, 412n65
InstructGPT, 413n76
instrumental reason, 27
integrated methodology, 12–13, 75, 82–83, 86, 112–16, 118, 121–22, 355n52, 368n86
interactivity: digital memorials, 63, 70, 74, 287; interview topic visualizations, 242–45, 250; IWitness portal (see Dimensions in Testimony)
interfaces: digital memorials, 61–62, 66–70, 74, 287; generous, 70, 287–91, 368n74, 404n56; innovation of, 188–90; search and navigation, 148–49, 160–61; subject-oriented, 74; toggling within, 92, 190; user versus subject, 367n59. See also specific platform
International Tracing Service archive, 11

interview methodologies: Allport, 105–7; Armenian Film Foundation, 179; Boder (see Boder’s interview style); comparison across corpora, 234–36, 373n31; Dimensions in Testimony, 236, 328–29, 373n35, 408n7; ethics of, 9–10; Fortunoff Archive, 234–35, 373n31, 396n12 and 9; Lanzmann, 191–92, 198, 329, 389nn2, 7, and 8; multilingual (see multilingual interviews); USC Shoah Foundation, 177–78, 192–93, 235, 373n31, 396n2

interview question analysis: Boder’s work, 96–104; clustering process errors, 252–54; comparison across corpora, 238–46; corpus dashboards, 246–52; distinct topics, 242–46; extraction methods, 234–36; lim-
INDEX

- 425

tations of, 254–56; manually reassigned topics, 252–54; parent topics, 238–42; topic identification methods, 236–38 intrusive questioning, 192
Iraqui Yazidi genocide, 354n39
Israel M. (testimony), 319
Itta W. (testimony), 304, 318–19
Jackob-Marks, Christine, 67
Jacoby, Erika (testimony), 158–59, 171, 203–4, 208–12, 269, 275–78, 293
Jakubovic, Alice (testimony), 311, 319, 405n2
Jakubowska, Wanda, 300
Jaskot, Paul, 12, 351n5, 355nn50 and 52
Jehovah’s Witness survivors, 147
Jewish Community Councils, 131, 137–38, 142–46, 380n26, 381n33
Jewish Historical Commissions, 6, 352n9
Jewish militias (police), 137–38, 142–46, 380n26, 383n42
Jewish Publication Society of America, 81
Jewish registry system. See Dutch Jewish registry
Jewish resistance, acts of, 274–79; Mala Zimetbaum, 40, 261, 300–322, 370n103
Jewish survivors. See Holocaust testimony; specific person
Jinks, Rebecca, 386n41
Jockers, Matthew L., 153–54, 383n6
Jockusch, Laura, 6
Johnson, Jessica Marie, 73–75, 367n71, 368n86, 368n87, 369n88, 369n97
Jokos files (Netherlands), 57
Joods Monument. See Dutch Jewish Monument
Journey App, 352n4
judgment, 15, 19, 26–33, 36, 40, 77, 97, 131, 146, 212, 294, 298–99, 348, 360nn48 and 61
Judith P. (testimony), 318, 407n17
Kagan, Raya (testimony), 303, 405n3
“Kaletska” (Kovitzka), Anna (testimony), 87, 108–9, 112, 115, 118–19, 262–63, 269, 277–82, 298, 371n13, 372n25, 376n70, 401nn19 and 20
Kansas City Flood (1951), 110, 376n82
Kansteiner, Wulf, 411n56
Kant, Immanuel, 52, 77, 360nn48, 362n82, and 54
Kaplovitz, Rose (testimony), 291
Karl, Anita (testimony), 293
Kearns, Michael, 24
Keydar, Renana, 260, 384n15, 400n9, 414n78
keywords, 125; counting of, 128–29. See also indexing systems
Khartizian, Avedis (testimony), 176, 178, 180–82
Kharchenko, Ioan (testimony), 112, 378n102
khurbn (destruction), 81, 371n13, 391n23
Kielar, Wieslaw (testimony), 303, 318, 405n3 and 5
Kimmelmann, Abraham (testimony): Boder’s indexing, 128, 131; Boder’s interview style, 82, 91–92, 103, 123–24; incomplete interview, 388n60; N-gram indexing, 133–39, 381n29; semantic triplet indexing, 139–46; word counts, 117–18, 124
kinship, 317–19
Kittler, Friedrich, 161
Klein, Lauren F., 358n22, 387n51
Kline, Dana, 396n9
Klüver, Julius (testimony), 112, 115, 118, 378n102
Knowles, Anne, 351n5, 355nn51 and 52
Kochavi, Mati, 339, 340–41
Kochavi, Maya, 339
Kowalski, Robert, 20–22
Krakowski, Stanley (testimony), 291–92
Kramer, Johann, 315
Kurt I. (testimony), 398n29
Kuyda, Eugenia, 410n44
Kuzmack, Linda G., 389n9

Lab for the Computational Analysis of Holocaust Testimonies (Hebrew University), 384n15
Labov, William, 266
LaCapra, Dominick, 10, 12, 192, 226
Lager trustees, 140, 142
Lang, Berel, 165
langdetect (software), 380n19
Langer, Lawrence, 211, 226, 333, 395n89, 396n14
language analysis: by Boder (see trauma index);
large language models, 324, 347–50; multilingualism (see multilingual interviews);
phonetic methods (see voice analysis); phonetic-semantic combination, 198–203;
semantic methods (see natural language processing; specific method)
“Language of Catastrophe, The” (Boder), 120
Language of New Media, The, (Manovich), 170
language switching, 92–94, 199, 201–2, 390n14, 393n46
Lanzmann, Claude, 7, 191–92, 198, 329, 389nn2, 7, and 8, 391nn21 and 22
large language models, 324, 347–50
Lasker-Wallfisch, Anita (testimony), 236, 326–33, 336, 398n26 and 28, 409n24
Last Chance Testimony Collection (USC Shoah Foundation), 4–5
Latour, Bruno, 258–59, 282
Laub, Dori, 7–10, 234–35, 333, 353n21, 354n34, 396n9
Lea, David (testimony), 92–93
Le Bui, Matthew, 358n31
Lee, Benjamin Charles, 396n4
Lee, Michelle, 96, 232, 395n1
lemmas, 140, 266, 269
lens, algorithm as, 299
Lentz, Jacobus, 36, 43–56, 362n2, 364n22
Leopard, Dan, 409n24
“Let Them Speak” project, 13, 379n5, 400n10, 403n49, 404n54
Levi, Primo, 9, 124, 146, 171, 398n30, 405n3, 405n7
Levinas, Emmanuel, 9–10, 189, 354n35, 368n72
Lewis, Cudjo (testimony), 371n9
Lewis Institute, 84
lexical tokens, 120
Li, Xiaochang, 223–24
Libeskind, Daniel, 64, 66–67
Library of Congress, 7, 371n9
Lichtheim (Nichthauser), Fela (testimony), 112, 118
life-affirming data, 35–37
Life of the Mind, The (Arendt), 360n48
Light Out of Darkness (film), 351n2
limits of representation, 12, 355n46
Lin, Maya, 67
linguistic analysis. See language analysis
Lippmann, Rosenthal and Company, 59
Lipschits, Isaac, 366n55
Liro cards (Netherlands), 59
listener: as bearing witness, 9–10 (see also distant witnessing); interviewer as, 87
listening: active, 234, 391n29; close (see close listening); differential, 208; distant (see distant listening; distant witnessing)
literary analysis, 106–9, 121, 282
literature: slaughterhouse of, 384n10; testimony as, 181–82
Liu, Alan, 161
LIWC (Linguistic Inquiry and Word Count), 377n95

For general queries, contact info@press.princeton.edu
logic components, of algorithm, 20–22
logic programming, 21
Long, Hoyt, 256, 399n45
loudness, 38; sonic consistency, 214–22; vocal intensity, 193–98, 203–13, 219–22, 390n11, 393n51. See also voice analysis
Lowe, Lisa, 408n30
Luban, David, 361n64
“machine in the ghost” logic, 334–36
machine learning: ethics of, 23–26, 256–57, 333; interviews (see interview question analysis); manual indexing supplemented with, 294; pronoun disambiguation, 267–68; training of, 24–25, 330, 346–49, 399n39, 409n16, 413n70 and 74, 414n79; use of, 5, 13, 39–40, 236–38, 252–57, 357n13, 399n38–40. See also BERT; Dimensions in Testimony
macroanalysis, 119–20, 153–54, 283–90; Boder’s work, 121; across corpora, 171–90; ethics of, 171–72, 298; example of (see Visual History Archive)
macrohistories, 170; agency, 261; antisemitism, 283–90, 403n51; versus microhistories (see toggling)
“Mala Zimetbaum: Between Kinship and Death” (story), 316–320
Mandel, Maria, 301–2, 306, 308, 314, 316
Mania W. (testimony), 304, 407n17
Manovich, Lev, 170
manual data review, 252–54, 269, 382n36, 399n37; pronoun disambiguation, 116–18, 140, 304, 308, 403n44
manual indexing, 157–71, 182; versus automated, 132, 138; obsolescence of, 348; supplementation of, 271–74, 294
maps, 51–53, 70–74
markup language, 104–5
Marx, Magda (testimony), 292
mass testimony, 260–61, 283, 316, 320, 349, 400n9, 407n23, 414n78
Matzner, Jack (Jaques) (testimony), 112–13, 115, 118, 183
Mbembe, Achille, 3, 351n1
McGann, Jerome, 261
McKittrick, Katherine, 74–75
McQuown, Norman, 225, 395n84
media migration, 7–8, 372n24
media storage, 158, 160–61
memorials: Dutch, 57–68, 287; social media, 345; totality and infinity represented in, 68–78. See also specific memorial
Memorial to the Murdered Jews of Europe (Eisenman), 67–68, 71
Memory. See Holocaust memory
Mengele, Josef, 209, 332
Merin, Moshe (Moniek), 142, 144
metadata: Boder’s work, 89–90, 92, 125; creation of, 39–40, 160, 392n36; factual, 233; scaffolding (metatext), 162; subjunctive, 39–40, 233, 257; Visual History Archive, 154–60, 164, 169, 172. See also indexing systems
method: defined, 34; ethical (see ethical algorithms)
“Method and Apparatus for Cataloguing Multimedia Data” (patent), 161–63
Methorst, H. W., 44, 363n12
meticulous chunk parsing, 265, 268–69, 279–80
Meyerowitz, Ruth Krautwirth (testimony), 319
Michelson, Aron Mendel. See Boder, David
microhistories: acts of defiance, 290–97; agency, 40, 170–71, 260–61, 274–79; antisemitism, 283–97, 403n51; concept of, 400n7; versus macrohistories (see toggling)
Microsoft Tay chatbot, 347, 352
middle-voicedness, 220–23, 226–27, 330
milieu traumas, 112
Mills, Mara, 223–24
Minsky, Rose (testimony), 292, 294–96
“miscellaneous footage” indexing category, 180–81, 386n35
missing content: in archives, 324–26; unindexed (see limitations of indexing). See also data: missing
modal speech, 263–64, 265, 284
modernist events (White), 70–71, 108, 368n75 (see also holocaustal events)
Moll, Otto, 302, 406n10
Moore, Bob, 54
Moreno, Armando (testimony), 166–67, 171
Moretti, Franco, 153–54, 383n6, 384n10
Morgan, Jennifer, 367n71, 368n80, 369n92
Mori, Masahiro, 408n11
Morrison, Toni, 75–77, 369n98
Motion JPEG 2000 digital files, 7
"movement" N-grams, 137
Mowrer, O. Hobart, 107, 109, 118–19, 376n86
Mozilla Foundation, 357n14
multidirectional memory (Rothberg), 378n111, 386n41
multidisciplinary approaches, 107–9
Multilingual BERT (mBERT), 398n36
multilingual interviews: analysis of, 201–2, 216, 227–31, 373n38, 389n36; by Boder, 86–87, 90, 92–96, 104–5, 380n19; code-switching, 92–94, 199, 201–2, 390n14, 393n46; Dimensions in Testimony, 329; interview question analysis, 253; omission of languages, 201–2; semantic triplets, 269; testimonial ensembles, 303; translation of (see translations); Yiddish language, 193–98, 202, 227–31, 371n13, 391n23, 393n46
Myanmar Rohingya survivors, 354n39, 383n1
Named Entity Recognition (NER), 264
Nanjing Massacre testimonies, 147, 157, 175, 186–88, 383n2, 385n31, 398n28
"narration" N-grams, 380n25
narrative, sociolinguistic model of, 266
narrative testimony, 156, 170, 181, 373n31; collective, 303, 305, 316–17; limitations of, 388n61; performative aspects of, 9, 71, 153, 177, 181–82, 191–92, 202, 213–16, 223–27 (see also expressivity); semantic triplets and, 297–98
Natale, Simone, 334, 409n12, 410n24
natality (Arendt), 160, 259, 360n53
National AIDS Memorial, 69–70, 287, 368n73
National Holocaust Centre and Museum (UK), 352n4
National Information Standards Organization (NISO) Z39.19 standard, 158, 162
National Population Accounting Decree of 1936 (Netherlands), 43
"Natural Conversation Storytelling System" (patent), 337
Natural History of an Interview, The (McQuown), 225, 395n84
"Natural History of an Interview" project, 224–25
natural language processing: agency expressions, 139–45, 262–99; to analyze Boder’s interviews, 96–104, 116; dependency parsing, 262–66, 401n22; development of, 13, 17–18, 27, 399n39, 400n8; interview question analysis, 236–38; IWitness portal (see Dimensions in Testimony); N-grams, 125, 131–39; semantic triplets (see semantic triplets); use of spaCy, 39, 125, 139, 262, 264–68, 401n22
Nazi perpetrators: collaboration with, 54–55, 131, 137–38, 142–46, 363n19, 364n21; semantic triplets about, 314–16
necromancy, 335
"necropolitics" (Mbembe), 3
Neiss, Russel, 343–44
"Nekome" ("Revenge") (poem), 195–98, 227–28, 390n14
Neo4j (software), 280, 298, 403n44
Ness, Robert (testimony), 214–18
Netherlands: antisemitic laws in, 54; Jews killed in, 54; memorials in, 57–68, 70, 287; Nazi collaboration in, 54–55, 363n19, 364n21; population registry in (see Dutch Jewish registry)
network visualizations: agency networks, 272–74, 280–81, 287–89; gray zone, 142–45; keyword connections, 166–69; testimonial ensembles, 308–10
NeuralCoref (software), 266–68
INDEX – 429

neural network algorithms, 17–18, 236–38, 268

neutrality: algorithms, 14–15, 19–24, 227, 333; historical representation, 31–32, 77; indexing systems, 124–25, 165; information, 161, 165, 358n17

N-grams, 125, 131–39

Nichanian, Marc, 181–82, 387n50

Nichthauser (Lichtheim), Fela (testimony), 112, 118

Niewyk, Donald, 375n58

NISO Z39.19 standard, 158, 162

NLTK (software), 380n21

Noble, Safiya, 255, 357n12, 358nn28 and 31, 399nn42 and 43

noncanonical stories, 169

non-negative matrix factorization, 384n17

non-tractable data, 181

noun-based ontologies, 125; examples of, 136, 150–53, 162–64, 177; federated search, 303–4; limitations of (see limitations of indexing). See also indexing systems

counting, 36, 42, 68, 71, 367n71; resistance to, 74–77, 368n86, 369nn88–97, 100, and 101

Nuremberg Race Laws (1935), 43

Nuremberg Trials, 398n28

Oberrotn, Janine (née Binder) (testimony), 103, 236, 326–33, 336, 398n28

objectivity. See neutrality

Object Noun Chunks, 266

object phrases, 265

objects, 262. See also semantic triplets

Odinets, Dimitri (testimony), 89, 112, 378n102

Oertelt, Henry (testimony), 293

O’Neil, Cathy, 31, 357n12

OpenAI, 412n70–413n76

OpenIE extractor, 265

OpenNLP (software), 125

Oppenheimer, Ruth (testimony), 293

oppression: algorithm as tool of, 24–25, 255–56, 357n15, 399n42; antisemitism, 54, 283–97, 339, 403n51

Order No. 6/41 (Netherlands), 43, 45–47, 53

orientation triplets, 263–64, 265–66, 271, 275, 284, 308–9

Ostatni etap (The Last Stage) (film), 300

outliers, 169, 212, 215

Oyneg Shabes archive (Ringelblum), 5, 274

Palomba F. (testimony), 318–19, 407n17

Panagia, Davide, 21, 357n9, 412n68

paper people (papieren mensen) (Lentz), 44–45, 56

paradigmatic relationships, 170, 386n38

paralanguage, 226. See also expressivity

paralinguistic cues, 25, 38, 207, 226, 391n26, 392n36, 399n42

parataxis, 320, 344–45, 407n18

paratext: metadata as, 170; semantic triplets as (see semantic triplets)

paraphrasing, 133–34, 233, 262–69, 279–80

partial parsing, 264–65

part-of-speech (POS) tagging tool, 133–34, 262–66

passive speech, 263–64, 265, 271–72, 275, 284–87, 402n37

past conditional temporality, 408n30

Paul V. Galvin Library (IIT), 7, 371n13

pauses. See silence


Perlberg, Jacob David, 48

Perschel, Richard, 315

personal trauma, 112

Philip, M. NourbeSe, 76, 369nn92 and 100, 406n12

Philosophy of Marx, The (Balibar), 404n55

phonograph, 223

phonetic analysis, 38

physical memorials, 63–68

Pinchevski, Amit, 353n16, 371n10, 384n15, 384n18, 392n37, 408n11

For general queries, contact info@press.princeton.edu
Piper, Andrew, 282, 299, 383n6, 400n8, 401n16
pitch, 38, 199, 210–11. See also voice analysis
police, 131, 137–38, 142–46, 380n26, 383n42
politics of the archive, 355n41
Pollin-Galay, Hannah, 202, 391n23, 392n39, 392n43
population registration system. See Dutch Jewish registry
Praat (software), 195–96, 390n18
Practical Past, The (White), 31–32, 77, 370n103
Prager, Brad, 192, 389n6, 391n22
PredPol algorithm, 357n15
Pre-Interview Questionnaire (USC Shoah Foundation), 156, 386n41
Preservation Technologies (company), 161
Presser, Jacob, 55–56, 365n35
Prest, Anna (testimony), 112, 378n102
Procter, Donald M., 126
Prolog (language), 21
ProQuest transcripts, 201
"Psychological Impact of Unprecedented Social Catastrophes, The: An Analysis of Four Topical Autobiographies of Mature Displaced Persons" (Uher), 118–19
"Psychological Impact of Unprecedented Social Catastrophes, The: An Analysis of Four Topical Autobiographies of Young Displaced Persons" (Hammond), 118
psychology, 106–9, 118, 375nn63 and 67
punch card system. See Hollerith punch card system
Purcell, Alyssa, 388n63
Q-technique, 112, 118, 376n86
quantification: dehumanization by (see dehumanization); example of (see Visual History Archive); macroanalysis, 119–20, 153–57, 171–75, 182–88, 284–90; qualitative analysis combined with, 12, 37, 75, 83, 112–16, 118 (see also integrated methodology); role of, 13–15; of trauma (see trauma index). See also algorithm(s); specific method
queryability, 169–71
quilt panel memorial. See National AIDS Memorial
racial bias, 255–56, 399n42 and 43
racial descent: registration based on (see Dutch Jewish registry); versus religious affiliation, 46–47
racialized bodies, 45
racial purity ideology, 51–53, 56, 67
Rack, Ruth (testimony), 292
Ramsay, Stephen, 261–62, 386n39, 400n14, 401n16
Rappler (news site), 358n22, 359n34
Ratcliff-Obershelp gestalt pattern-matching algorithm, 380n23
Rebecca L. (testimony), 318
recombinant antinarrative (Philip), 406n12
recommendation algorithms, 344, 357n14, 359n34, 411n57, 412n63
redundancies, 25
relational database. See database(s) relational listener, 10
religious affiliation, versus race, 46–47
reluctance, 138–39, 180–82, 201, 381nn27 and 28
rememberable (Erinnerbares), 67
remembrance. See memorials; specific memorial
Remnants of Auschwitz (Agamben), 354n27, 389n66
Renov, Michael, 101, 389n3
repetition, trauma of, 179, 191–92, 324
Replika (company), 335, 338, 346, 410n44
resistance, acts of, 274–79; Zimetbaum, Mala, 40, 261, 300–322, 370n103
Resnick, Abraham (testimony), 291
Ressa, Maria, 358n22, 359n34
“Revenge” ("Nekome") (poem), 195–98, 227–28, 390n14
revenge, desire for, 195–98, 216, 227–28, 276
reverse georeferencing, 388n57
“Rhyme of the Ancient Mariner, The” (Coleridge), 109
rhythm (cadence), 38, 199, 212–22. See also voice analysis
Ringelblum, Emanuel, 5, 274, 352n7
Ringelheim, Joan, 104
Rivka K. (testimony), 304, 318
Rohingya Muslim survivors (Myanmar), 354n39, 383n1
Roma B. (testimony), 319
Roma genocide, 354–55n39, 374n46
Roma survivors, 147
Rosen, Alan, 370n3, 372n23, 373n38, 375n58, 379n2, 383n42, 403n48
Rosen, Kyle, 390n19, 392n35, 400n13
Rosenbaum, Hella (testimony), 305
Rosenfeld, Pinkhus (testimony), 371n13
Roth, Aaron, 24
Rothberg, Michael, 378n111, 379n15, 387n41
Rowland, Antony, 352n4, 408n7, 410n28
Rudof, Joanne, 234–35, 396n9
Ruiter, Johann, 315–16, 319
rule-based algorithm. See semantic triplets
Rwandan Tutsi genocide, 147, 157, 172–75, 186–88, 354n39, 383n2, 385n31, 386n36
Salamonovits, Malvina, 276
Sarah G. (testimony), 317–19
“saying,” methods of, 38, 189, 200, 207, 220, 388n64
SBERT (Sentence-BERT), 96–97, 102–3, 236–38, 252–57
scatterplots, sonic consistency, 214–18
Schindler, Oskar, 394n65
Schindler’s List (film), 7
science, purported to be value-free, 14–15, 19–24, 31–32, 77
search systems: digital memorials, 63, 70; ethics of, 169–71; federated, 304; interview topic visualizations, 250; reimagination of, 188–89; searchability, 3, 7, 169, 208; semantic triplets, 271, 295–96, 298, 308–14; Visual History Archive, 148–49, 158, 161–62, 169–70
Sebald, W. G., 77
self-determination. See agency
semantic triplets: algorithm development, 18, 39–40, 125, 260–61; antisemitism histories, 283–97, 403n51; classification of, 263–66, 269–72; components of, 139–40, 262, 401n17; example of, 262–63; extraction of, 268–79; further steps, 298–99; gray zone analysis, 139–46; limitations of, 297–98; macroanalysis, 283–90; methodology, 264–68, 401n21, 402n35; as microhistory (see microhistories); network analysis, 260–61, 268–74; as paratext, 39, 260, 262, 282, 298, 305, 311; semantic networks, 279–89; testimonial ensembles, 305–20
Sentence-BERT. See SBERT
sentence tokenizer, 234
sentiment analysis, 116, 377n95, 396n4
SequenceMatcher (software), 380n23
Serras, Edith (testimony), 301–11, 318, 319, 406nn9 and 15, 407n20
sex, analytics of, 45, 363n14, 368n80, 373n34, 407n22
sexism, 255
sexual violence, 175, 387n48
Seyss-Inquart, Arthur, 42–43 (see also Order No. 6/41)
Shahinian, Shooshanig (testimony), 176, 178, 180
Shakur, Tupac, 335
shame, 181–82
Shandler, Jeffrey, 352n14, 353n16, 384n12, 387n45, 390n14, 392n39, 393n46
Shannon, Claude, 161, 385n23
Sharpe, Christina, 71, 75, 368n71 and 78, 369nn94–96 and 100
Shatner, William, 337
Shenker, Noah, 234, 352n16, 370n4, 384n12, 386nn31 and 41, 387n45, 392n39, 396nn2 and 9, 397n17, 410n24
Shiver, Toba (testimony), 92
Shoah (film), 7, 191–92, 198, 329, 391nn21 and 22
“shoe commando,” 317–18
Sichelschmidt, Lorenz, 405n3, 406n8
silence: analysis of, 38, 389n2, 390n11 (see also voice analysis); archival gaps, 73–77, 324–26, 369n101, 406n12, 412n58; interviewer’s breaking of, 191–92, 198; marking of, 181, 201–8, 220; N-gram indexing, 139
Sinti survivors, 147
slave testimony (United States), 81, 371n9
Slave Trade Database (Trans-Atlantic), 36–37, 42, 73
SlaveVoyages project, 70–77, 368n73, 369n100
Smith, Frank J., 116–17, 377n97
Smith, Stephen, 7, 328, 333, 335–36, 338, 353n18, 393n53, 397n15, 409n20, 4
4nn80
social impact of algorithms, 23–24, 348
social media, 25, 40, 324, 338–45, 357n14
sociotechnical ensemble, 20
Sonderkommando (Toten-commando), 131, 183, 274, 302, 384n16, 405n3, 406n10
song, 201–2, 213, 216, 317
sonic consistency visualizations, 214–22
spaCy (software), 39, 125, 139, 262–66, 401n22
Spaulding, Norman, 30, 360n61
spectral messianicity (Derrida), 188
spectrograms, 193–98, 203–12, 216–17, 220–23, 393n50
speculative speech, 263–64, 265, 271, 284
speech analysis: language (see language analysis); sound (see voice analysis)
speech recognition, 3–4, 236, 330, 334
Spek (software), 203–4
Spielberg, Steven, 7
“split voice” (Langer), 226
spreadsheets: Boder’s metadata, 89, 372n23; question topics, 96–102, 237–38 (see also visualizations); semantic triplets, 269–70, 285–87, 290–91, 295–96, 305–8, 311–15, 402n36, 403n44, 403n52, 407n21; St. Louis Manifest project, 343; voice analysis, 203
Srinivasan, Ramesh, 358n22, 361n70
Stanford School of Engineering, 349
Starling Lab for Data Integrity, 349, 414n80
state, biopower of, 45–46, 49, 56
Statistiek der bevolking van Joodschen bloede in Nederland (Statistics regarding the population of the Jewish race in the Netherlands) (Lentz), 53–54
Steir-Livny, Liat, 340, 411n55
Stephenson, William, 376n86
St. Louis Manifest project (Twitter), 40, 324, 342–45
Stolpersteine (Stumbling Stones) project, 63–65, 345
Stone, Dan, 355n41
stone memorials, 63–68
Stop LAPD Spying Coalition, 358n22
Stopnitsky, Udél (testimony), 371n13
StoryFile (company), 335–38
Stratign (Strategic Defense Technology), 395n81
Strnad, Halina (testimony), 292
structured query language (SQL) database, 158–60
Stulberg, Carol, 397n15
“subject and situations” index (Boder), 126, 128–31
subject-oriented interfaces, 74
subjects, 262. See also semantic triplets
subjunctive metadata, 39–40, 233, 257
Suhl, Yuri, 303
Suny, Ronald Grigor, 387n49
Survival in Auschwitz (Levi), 9
Survivors of the Shoah Visual History Foundation, 7, 161, 232. See also Visual History Archive
Sutherland, Tonia, 335, 388n63, 410n27
“Syllabus for Volunteer Interviewers” (Kline), 396n9
syntagmatic relationships, 386n38


taboo subjects, 129–31, 379n12
“talking” N-grams, 137
tape recorders, 84
tattoos, 179–80, 387n48
Taube, Moshe (testimony), 212–13, 218–19, 394n65
taxonomic structure, 125. See also indexing systems
Tay chatbot (Microsoft), 347, 414n77
tempo (words per minute), 214–20

tertiary witnesses. See distant witnessing
testimonial ensembles: collective narrative, 303–20; concept of, 37, 261, 300, 319–20, 353n27, 354n34, 370n3, 400n13, 404n55; creation of, 260–61, 268, 283, 305–20, 404n57; ethics of, 320; multilingual, 303

thesis. See indexing systems
thick mapping, 365n37

third space, 32–33
This Person Does Not Exist (website), 346
time-based markup system, 164
timestamps of recordings, 87, 89
time streams, 154–56, 172–75, 182–86, 246, 249–50
toggling: antisemitism histories, 283–90, 403n51; in Armenian Film Foundation archive, 177–78, 182–86; across corpora, 186–88; use of, 154–57, 170–71, 190; in Visual History Archive interface, 153; in Voices of the Holocaust interface, 92
tone, 210, 220. See also voice analysis
Topical Autobiographies (Boder), 83, 85, 96, 105–7, 126–31, 183–86, 201, 271, 372n24, 373n30, 376n85, 406n15
topic modelling. See interview question analysis
totality, 68–78
Toten-commando (Sonderkommando), 131, 183, 274, 302, 384n16, 405n3, 406n10
Tóth, Gábor, 13, 379n5, 400n10, 403n49, 404n54, 405n4
Trans-Atlantic Slave Trade Database, 36–37, 42, 73; SlaveVoyages project, 70–77, 368nn79–85, 369n10
transcription, 104–5, 160, 201, 262, 304
translations: Boder’s work, 96, 104–5, 133, 140, 374n52, 406n15; Bomba’s poems, 194, 227–31, 390n14, 390n20; markup of, 393n47; semantic triplets, 402n37; testimonial ensembles, 303–4.


trauma of repetition, 179, 191–92, 324.

traumatological content analysis, 121.

treemaps, 250–52.

TreeTagger, 133–34.

Trezise, Thomas, 353n21.

truth-telling, 9, 123–25, 181–82, 192, 198, 349.

Tulp, Sybren, 366n47.

Tupac, 410n27.

Turing test, 27, 334, 409n24.

Tutsi genocide (Rwanda), 147, 157, 172–75, 186–88, 354n39, 383n2, 385n31, 386n36.

Twitter: St. Louis Manifest project, 40, 324, 342–45; Tay chatbot, 347, 414n77.

type-token analyses, 116, 120.

Uher, Audrey, 107, 116, 118–19, 375n66, 377n93.

UK National Holocaust Museum, Forever Project, 5.

U-matic tape, 7.

unrelated testimony, 370n3.


unforgettable (Unvergessliches), 67, 76–77

United Nations Relief and Rehabilitation Administration (UNRRA), 352n9.

“unsaying,” methods of, 38, 188–90, 388n64.

USC Institute for Creative Technologies, 4.

USC Shoah Foundation: access to archives, 342; antisemitism as topic in testimonies, 283–97, 403n51; Digital Library System, 160–61; Dimensions in Testimony project (see Dimensions in Testimony); global genocide documentation, 354n39, 383n1 and 2, 385n31, 386n41; history of, 7–8, 147–48, 370n4, 383n1; indexing (see indexing systems); interview methodology, 177–78, 192–93, 235, 373n31, 396n2; Last Chance Testimony Collection, 4–5; Let Them Speak project, 13, 379n5, 400n10, 403n49, 404n54; methods used as paradigm, 38, 171–90, 384n12; Starling Lab for Data Integrity, 349, 414n80; thesaurus, 383n3, 385n31; Visual History Archive (see Visual History Archive).

US Holocaust Memorial Museum (USHMM), 11, 13, 198, 303, 343, 355n52, 389n7 and 9, 390n17.

utterances, 236, 330–33.

VADER (Valence Aware Dictionary and sEntiment Reasoner), 377n95.

value judgment, 26–33, 298–99, 348, 360n48 and 61.


verb phrases: focus on, 189, 291; N-grams, 132, 136–37; semantic triplets (see semantic triplets).

VHS tape, 7.

Video Archive for Holocaust Testimonies (Yale), 7, 234.

video indexing application, 158, 164.

video testimony: ethics of, 9, 341–42; metadata, 158–60, 164, 177 (see also indexing systems); recording methods, 176–78, 181–82; segmentation of, 160, 164, 172.

Vietnam Veterans Memorial (Washington, DC), 67, 367n66.

Vilna ghetto, 5, 274.

virtual remains, 335–38, 346–47. See also Dimensions in Testimony.

Vismann, Cornelia, 365n43.

Visual History Archive (VHA): versus Boder’s interviews, 37, 90–91, 182–86; compared to other corpora, 171–90; corpus dashboard,
246–50; ethical standards, 335–36; growth of, 383n2; information architecture, 157–71; interface, 148–49, 158, 160–61, 169–70, 290–91; interview question analysis and corpora comparison, 238–46; macroanalysis of, 38, 147–90; methodology, 236–38; network visualization, 288–90; origins of, 7; size of, 147; whole corpus views, 147–57. See also specific testimony


Wittelsohn, Henri (testimony), 293
Wolf, Bernard, 126
Wolfson, Leah, 202, 213, 392n42
Wonder of Their Voices, The (Rosen), 370n3, 372n23, 373n38, 375n58, 379n2, 383n42, 403n48
word counts, 116–17, 132–34, 138, 214–22, 373n31
WordNet-based characterization, 269
Wundt, Wilhelm, 84
Yaakov F. (testimony), 305, 319
Yad Vashem, 6, 11, 370n4, 412n64; Central Database for Shoah Victims’ Names, 11, 367n67; Holocaust deportation database, 14, 355n43, 356n57, 366n45
Yahad-In Unum, 11, 354n39
Yale Video Archive for Holocaust Testimonies. See Fortunoff Archive

Yazidi genocide (Iraq), 354n39
Years of Extermination, The (Friedländer), 71, 368n77, 386n40
Yom HaShoah (Holocaust Memorial Day), 338, 343–44
Young, James, 367n67
YouTube, 357n14, 412n63
Zelinger, Bernard (testimony), 292
Zerilli, Linda, 29, 360n58
Zgnilek, Bella (testimony), 93, 103, 128–29, 373n38
Ziegler, Roman (testimony), 292, 293
Zimetbaum, Mala, 40, 261, 300–322, 370n103
zooming in or out. See toggling
Zsolt, Ágnes, 339