I would like to think about privacy by focusing on the different ways in which people can be represented within a computer system. My sense is that there is a potentially significant line between two possible kinds of systems, one that has important technical, social, and humanistic consequences, and should therefore be asked to bear legal consequences as well. This essay will give a tentative sketch of the distinction and the ways it ramifies.

Crudely put, it is the difference between “James Grimmelmann” and “@grimmelm” in a tweet on Twitter. This former is a string of characters drawn from the Latin alphabet. They may be represented in all sorts of ways inside of a computer, but in the common UTF-8 encoding used by Twitter they will take up seventeen bytes (i.e. 136 individual ones and zeroes), one per character. Semantically, the preferred interpretation of this string is as my name; you are unlikely to type in these characters for any other reason.

The latter is something subtly different. It’s also a string; it contains nine characters, and would require nine bytes in UTF-8. Semantically, its preferred interpretation also refers to me; “grimmelm” is my Twitter username, and several years ago, Twitter users started prepending the @ symbol to usernames as a shorthand way of referring to each other. But then, noticing the popularity of the syntax, Twitter did something profound. It turned each such string—an @ followed by a username—into a hyperlink to that user’s profile page on twitter.com.

This move on Twitter’s part had interesting consequences. Before the change, “James Grimmelmann” and “@grimmelm” were essentially equivalent. A Twitter user who knew me would understand that they referred to me; a Twitter user who didn’t know me would still surmise that they referred to someone with that name or username. These usages are both conventional. True, the tradition of assigning and capitalizing names is older, more widely known, and more universally followed. But at root, they are both conventions within an interpretive community of humans. By contrast, Twitter’s software was ignorant of the semantic content of these strings. They were, to it, just as meaningful (or rather, meaningless) as “d#fh@@3.pQMNa0” would have been. Each tweet was a blob of unstructured data: 140 characters that could be anything.

After the change, though, Twitter now knows about me in tweets that use the @grimmelm syntax. Twitter’s users also benefit from the hyperlinks, but they’re more in the nature of a convenience than an actual bearer of human-intelligible meaning. (At most, the linking provides a clue that the username is a username.) Twitter, however, has associated the tweet with a specific entry in its database of users: the entry corresponding to my account. Strings with @grimmelm or other @usernames in them are categorically different now: they have structure, and that
structure has semantic content. Twitter is no longer dependent on the interpretive conventions of its users (conventions that the complexities of human language and thought render mostly opaque to even the best-programmed computers). It knows that “@grimmelm” refers to a specific Twitter user.

One may object that Twitter, being a computer system, hardly knows anything in an epistemologically meaningful sense. I have been using “know” loosely; I don’t mean to claim that Twitter has mental states. Instead, my point is that, from a functional perspective, Twitter is capable of taking actions on the basis of the distinction between “@grimmelm” and “@amturing”: it treats them differently. We might say that Twitter now has the capacity for automated reasoning about users mentioned in tweets; its programmers can take advantage of that capacity to do interesting things, such a producing a list of tweets that mention a given user.

This reasoning is possible because Twitter represents users as entities in a database. It has a list which tells it that “grimmelm” and “amturing” are usernames but that “d#fh@@3.pQMNa0” is not. Its internal representation of users almost certainly does not use these character strings. Instead, following standard database practice, Twitter probably assigns each user a unique numerical identifier; that identifier is the primary key in a database table that describes the association between username and identifier.

Whenever any new information that should be connected up with a particular user comes in—a password change, a new tweet, a new follower, etc.—that information is added to another database table in an entry that also includes that user’s unique numerical identifier. Everywhere inside Twitter’s systems that numerical identifier goes, it is intended to refer to a specific user, and does. The semantic reference is arguably still dependent on at least some human-assigned meaning, but even granting that point, it refers to a user in a more direct and reliable way than “James Grimmelmann” does.

The computer science term for this sort of direct representation is “first-class object.” The idea is that any system has a certain set of things that it can describe directly, which are “first-class”: a simple system might treat numbers, boolean true/false values, and simple pairs (such as (3,5)) as its first-class objects. Everything else cannot be represented directly, but must instead be described in terms of the basic first-class objects. In this simple system, for example, a list of numbers must be built up out of successive pairs: the list 1,2,3 consists of the pair whose first element is number 1 and whose second element is the pair of the numbers 2 and 3: $(1,(2,3))$. This list is a second-class object: it is harder to work with directly and to reason about.

Users are first-class objects in Twitter; its computers have a direct representation of its users. They are entries in Twitter’s databases. By contrast, for example, musical notes are not first-class objects in Twitter. Neither are cities, emotions, galaxies, cars, or judicial opinions. One can talk about these things on Twitter, and much much more, but not in a way that Twitter’s servers will understand in the slightest. In contrast, one can talk about Twitter users in a way that Twitter will get; it will know who you’re talking about, and be able to react accordingly. People are truly first-class on Twitter: it goes out of its way to treat them specially. But they’re also objects: the system reasons about them and acts on them, perhaps without their knowledge or consent.

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1 Another suggestive term is that these are the system’s “primitives.”
OTHER EXAMPLES

Let us pull back for a longer view. This phenomenon is hardly unique to Twitter. Instead, it is an important, characteristic distinction across a wide range of systems. Consider a few more examples.

The Internet Archive’s Wayback Machine is a near-comprehensive archive of the Web. It crawls the Web repeatedly, taking snapshots of every webpage it finds. Users can then retrieve a historical archive of any given webpage, seeing what it looked like on various dates stretching out across years. Many of these pages refer to people. When they do, however, the Internet Archive has no idea that they do. Names are, like “James Grimmelmann” in a tweet, just blobs of text, indistinguishable from any of the other blobs of text in the archived webpages. People are not first-class objects in the Internet Archive. (If I retrieved pages from the Wayback Machine and then scanned them for text that looked likely to be a name, I might create a system that treated people as first-class objects and that incorporated information gleaned from the Wayback Machine, but the process would be imperfect, approximate, error-prone.)

By way of contrast, Facebook was designed from the ground up to treat people as first-class objects. It asks users to supply their real names (indeed, its terms of service explicitly require real names, and Facebook has been known to enforce this rule strictly). These names, along with a great deal of other personal information, are incorporated into profiles linked (in the ubiquitous database) to the unique user identifier. Facebook displays these profiles both in a format designed for humans (webpages) and in formats designed for other computers (through its API). Activities associated with a person—Wall posts, photos, friend relationships, events, etc.—are then richly hyperlinked and sorted. There are dozens of ways I can walk through my list of friends, from sending them Event invitations to tagging them in photos to adding them to lists. Facebook is profoundly oriented towards automated reasoning about people: it collates, categorizes, analyzes, exposes, and projects them.

Another prominent—but less pure—example of treating people as first-class objects is the credit reporting agency. In order to report a credit history or credit score for a person, the agency must maintain a file for that person. Once again, this file takes the form of a unique identifier that is then cross-linked in a database with every transactional datum available on the person to whom that identifier corresponds. This last example demonstrates some of the unease associated with the “object” half of “first-class object.” Credit reporting is a classic case of social concern about secret surveillance.

It is also a classic case of social concern about mistakes. The Fair Credit Reporting Act is concerned, in part, with ensuring that consumers can fix incorrect information in their files. It is perhaps not always appreciated that many of these mistakes stem from the ways in which credit files fail to treat people consistently as first-class objects. Identity theft, wrong addresses, conflation with other people with the same name—all of these crossed wires can be triggered when a credit file is populated with outside information which is mistakenly assigned to your identifier in the database. In database terminology, these mistakes are the results of a faulty “join” operation; it is the looseness of the fit between identifier and person that causes the fault. The problem comes when one tries to cram imperfectly structured information into a more rigorous structure.
Sometimes, *users* may be first-class objects, but not *people*. This can happen with websites that don’t ask for real names or don’t check them. The site has lots of data on a user’s activity, but that data can’t be connected up with any specific person. (We might also say that the user is “unidentified” or “pseudonymous.”) The same can happen with tracking cookies. They are unique per-computer, but the profile of web pages and advertisements associated with each cookie is rarely, if ever, linked to a person. (This missing link, in fact, is, one argument used by the online advertising industry to fend off regulation: yes, it has profiles on millions of web users, but no, it can’t tell who they are.)

One final example shows the interface between structured and unstructured data at work. If I perform a Google search for “James Grimmelmann,” I will see a list of web pages containing those two words. This much is unstructured, from the perspective of “James Grimmelmann” as a name. I am not a first-class object in Google’s text index. But the search results page will also contain a few references that suggest maybe something more is going on—that perhaps Google has some sense that this might be a name. Google has made an *inference* that this is a name, and done a little bit of analysis on that assumption. It treats me as first-class object for some purposes but not others. Even when it does, the analysis is shrouded in tentativity and uncertainty; Google knows that this guess may be wrong.

**PREVIOUS SHIFTS**

It will help to think about two prior shifts in how people are described and represented; in a loose sense, the transition to first-class digital representations of people is the combination of these two shifts. The historically first shift was the historical creation of (paper-based) structured information about people; the second is the general shift from analog media to digital.

The first can be loosely captured in the move from oral and literary descriptions of people to the creation of files and tables. (This is hardly a recent trend; it goes back before the Domesday Book, and is still ongoing.) The file is a catalog of all the information on a particular person: think of the personnel file or Richelieu. The table is a way to collate information about multiple people: think of actuarial tables or the census. The file permits intensive analysis; the table permits extensive analysis. Together, they are the key tools of bureaucracy, the essential instruments of rational administration.

Thus, the shift to records about people is associated with some well-known social phenomena. Accurate knowledge of who is who facilitates impersonal transactions; accurate knowledge of who owns what facilitates the property rights underpinning those transactions. Record-keeping supports the projection of governmental authority through both space and time; a bureaucracy can engage careful local auditing without forgetting what it learned the last time, thus enabling a state to function without the regular charismatic presence of a peripatetic monarch. For the people captured in the records, the experience can be both reductive and coercive. All of these themes should sound at least somewhat familiar from the debates over online identity.

The second shift has to do with the social move from analog media bounded in space and time to digital media whose ability to repair degraded signals removes those boundaries. A speech at Speaker’s Corner can reach a few dozen people; a post on speakerscornucopia.com can reach millions. Telephone calls are transient; instant messages can live forever.
danah boyd’s four-part taxonomy provides a good summary of the consequences of this shift. Digital media are persistent: messages in them don’t decay with time anywhere near as quickly. They’re searchable, which makes it much easier to find messages on a given subject than in a roomful of dead trees. They permit exact copying—the key to the worldwide transmission of messages on the Web. And they can readily reach invisible audiences: people who the creator of the message does not and cannot envision. Notice that digital representations of people inherit all four of these characteristics.

TECHNICAL CONSEQUENCES

Now we can ask what consequences the shift to representing people as first-class objects has. What, then, are the key, defining features of treating people as first-class digital objects? In addition to the characteristics derived from the shift to structured records and the shift to digital media, I would add a few that are specific to the representation of people in digital form.

First, these first-class digital objects are normalized. Sometimes, people in real life call me “Jim,” which isn’t quite right but isn’t quite wrong, either. Frequently, people write about me online as “James Grimmelman” which is an understandable enough mistake. In unstructured data intended for human consumption, both slippages tend to be unproblematic: even if I don’t always look up immediately when someone says “Jim,” I figure it out sooner or later, and everyone knows who “James Grimmelman” refers to. But they cause lots of ambiguity and difficulty for automated systems—”Jim” and “James” are different strings. It takes work to guess that they should be treated as having similar meanings, and it introduces errors, because sometimes they’re not the same. (Slim James? Jim Brown?) Conversely, if I write “John Smith” in a tweet, I could be talking about any of dozens of different people. There are serious mapping problems with unstructured data: each identifier is ambiguous, and there is no standard identifier for a given entity.

First-class objects, however, can avoid these problems. On Twitter, @grimmelm has a unique referent. There is only one user with that username: me. And, more subtly, @grimmelm is now the canonical identifier for my Twitter account. There’s no dithering about worrying whether I prefer “James” or “Jim”, no introduction of fresh ambiguity as you cast about for an appropriate identifier. Use @grimmelm; it does the right thing. Thus, making people first-class objects in a computer system has the effect of replicating the exact-copying feature of the shift to digital, at a higher level of meaning. Conversations with and about @grimmelm take place without “decay” in how I’m named, without slippages in who people are referring to.

Normalization turns personal identifiers into convenient focal points for data aggregation. Indeed, this is precisely what a database join on a common key consists of; we combine two tables of information by assuming that the same key in both tables refers to the same person. That works with normalized identifiers; it doesn’t work without them. Reifying people as first-class objects thus is an essential step in bringing together information about people from many different sources. You are your Facebook profile; you are your credit file—and information about you sticks to these objects the same way that cat hair sticks to sweaters. It is no accident that thinkers have cast about for metaphors to express the uniquely personal characteristics of these new databases: Daniel Solove’s “digital dossiers,” John Battelle’s “database of intentions,” Paul Ohm’s “databases of ruin.”
The third interesting new feature of these first-class personal objects is that they necessarily implicate specific third parties. If you say “James Grimmelmann,” the knowledge of who you’re referring to comes out of the sociolinguistic community you and your hearer share. But if you say @grimmelm, you’re incorporating a mapping from usernames to people, a mapping that is maintained by Twitter. To run a credit report on someone requires consultation with a credit agency’s files. A social security number is meaningful because the Social Security Administration assigns and processes them. Note how closely linked these third-parties are with normalization and aggregation. Twitter enforces global uniqueness of usernames; the Social Security Administration requires that SSNs consist of precisely nine digits. If Twitter vanished, “@grimmelm” would become unanchored, would lose its special qualities. It could still refer to me, as anyone who’s corresponded with me on Twitter might remember my username (many people are known, in some communities at least, by variants of their email addresses), but this would be a matter of convention and tacit human knowledge, rather than a reliable, specific canonical reference.

These third parties are identity intermediaries; they’re injected into transactions and conversations where their presence may not always be obvious. On Facebook and Twitter, the use of the platform is apparent. But note how SSNs are used in all sorts of contexts beyond just the payment of Social Security benefits; each of them can implicate a different third party who will use the SSN as its own database key. This introduces a special kind of vulnerability if they decide to use their position of power to control how a person is represented. Facebook could metaphorically scribble a mustache on my profile; Twitter could redirect every mention of @grimmelm to my mortal enemy. This point is well understood for credit rating agencies and other commercial identity brokers; I think we have not yet grasped its full implications for online identity in general.

These third parties also enjoy a kind of lock-in effect. Because they are, in effect, custodians of people’s identities, they have the ability to hold those identities hostage. If I move a blob of unstructured data from one cloud storage service to another, it’s the same before and after. But when data with structure moves, care must be taken to preserve that structure, or meaning will be lost. (The process of making sure that structure is preserved on a context-changing move is known as marshaling or pickling in various computer-science contexts.) Exporting my Facebook network of friends as an address book is one thing; importing it into another context that can treat the friends as first-class objects and reconstruct the social network is another entirely. Not only does it require a network-wide move (something that may be quite difficult to arrange, as no one will want to be first), it requires a move to a platform that has a compatible semantic structure for representing people and does so in a compatible way to Facebook. Otherwise, we will leave the social structure behind. The richer the representation, the harder it is to recreate, and the harder to leave behind.

Next, treating people as first-class objects makes it possible to enumerate the references to them. That is, you can look through Twitter for all the tweets that mention you or through Facebook for all the photos in which you are tagged, and have high confidence that you have seen all such items that are possible for you to see. This is much, much harder in an unstructured data store where identity is fuzzy. This flows naturally from normalization and the use of third parties. The use of third parties means there is a single source maintaining a complete list of data about a person; normalization means there is a standard way of ensuring that all references to
that person are associated with their digital identifier. This property doesn’t hold in general; I am quite certain that I don’t know all of the places I’m referenced on the Web.

Information also decays differently when it refers to people through structured data. On the one hand, semantically rich data can be error-corrected. Enumeration makes it easier to round up stray, divergent data points and bring them back into line—a mistagged photo is relatively easy to spot. Normalization in general plays a centripetal role, fixing up misspellings and eliminating other minor mistakes before they multiply and feed each other. On the other hand, this centralization increases the risk of truly catastrophic failure. If Facebook collapses, all of information locked in its proprietary formats and adapted to its social network will be simply gone. The price we pay for resilience against daily small errors is a greater risk of a single big failure.

And finally, as I have noted in several places, treating people as first-class objects enables automatic reasoning about them. It becomes possible to make knowledge about people part of an ontology for an expert system, to write algorithms that process people, to enable inferences about people. This is the Semantic Web dream, of course: everything encoded in a way that supports the creation of complex relationships of out simpler pieces. Foursquare, for example, synthesizes knowledge about users who are in the same physical space from their checkins, and then publicizes that information. Facebook’s recommended friends and its personalized wall are also examples of such reasoning, as are the personalized ads served up by targeted ad networks that have inferred one’s demographic characteristics.

SOCIAL CONSEQUENCES

What changes in a world where people are first-class objects? I would like to focus on the privacy issues.

For one, it’s harder to hide. Once you’re tagged, data sticks to your profile. That makes it far easier to assemble dossiers on other people. This can, of course, be a feature: Facebook profiles are intended to be shared dossiers. But it can also be a privacy bug. We all know about the gigantic databases that commercial profilers have on all of us. These, as already noted, depend critically on personal identifiers to perform this linking function. Less obvious is the way in which personal identifiers also help stalkers and other private individuals do the same. If I’m trying to look you up, I can get much further once I figure out what your Twitter handle is. You may not have put your real name on the account, but if I can infer that it’s you, the centralized, normalized role that it plays helps me build an extensive file on you quickly, precisely because so many other flows of information will also link through the convenience of its standardized form.

On the other hand, normalization and enumeration make it easier to protect one’s privacy through proactive monitoring. If I can enumerate every reference to myself in a given database, it may be much easier for me to check to make sure there aren’t unflattering or overly revealing ones out there. I may be able to monitor the addition of new ones in real time, perhaps even veto ones I don’t like before they go live. Facebook, for example, sends me a message every time someone tags a photo of me, and lets me refuse entirely to be tagged in Places. This kind of control works only imperfectly at best in a non-centralized, non-normalized space like the Web. Much of this, however, is dependent on the good will of the third party who maintains the relevant identities. If it hides the references from me (perhaps because it considers them to be
someone else’s private data, ha ha), I can do nothing. Indeed, advanced features like real-time monitoring require affirmative support from the third party, not just its passive acquiescence.

As the term suggests, being represented by a first-class object can be objectifying. It flattens out one’s identity to the standardized forms supported by the system. When protesters marched against computerization in the 1960s, with shouts that people were not to be folded, spindled, or mutilated, this was the idea at work. It is possible to argue that being represented in a database is intrinsically demeaning to one’s human dignity; it strips out the respect for your personhood that demands you be recognized as a full, worthy, complex person, not just a reductive set of binary digits. This idea has recurcd in various guises during the computer age, but it has never gone away entirely.

It is also possible to argue, however, that being treated as a first-class object has something genuinely first-class about it. A system that embeds aspects of my identity in it helps me project, control, and complexify that identity. It helps me to develop facets of self-presentation for different audiences, and to modulate the ways I present them. (Facebook groups and lists fit this category; other social networking services make the fragmentation of self-presentation even more explicit, with multiple personal profiles per user.) It embeds that identity in a rich graph structure, enabling me to see it as part of a larger social network; this sense of situatedness has a real value. Enumeration, in particular, helps me see myself as others see me, and centralization’s anti-decay properties can help serve as a memory aid: both of these features help me manage and act through my digital identity. There is evidence to suggest that social media are indeed helping people manage larger loose-ties networks in a personally satisfying way. The ability to maintain those relationships is itself a privacy gain of a sort. It counts as a refinement of the concentric circles of intimacy with which we surround ourselves, an articulation of our relationship with a now-more-differentiated world.

A SUGGESTION

I have argued that treating people as first-class objects—representing them with digital identifiers—has significant technical and social consequences. Perhaps it should have legal consequences, as well. The third party who maintains such an identifier stands in a closer, more significant relationship to me than the third party whose digital data contain only unstructured information:

- It has more power over me, my identity, and my life.
- It has more knowledge about me, and in a form that permits more careful reasoning.
- It has more ability to fix problems with personal data.
- It has exposed me to greater risks from the misuse of that data.
- It has specifically chosen to make its system speak about me.

I am not sure what duties (if any) these third parties ought to bear, what form their increased obligations should take. But I have the sense that if we are drawing lines, this is a sensible place to consider drawing them. (This is arguably, if only arguably, the line that the European Data Protection Directive draws with its definitions of “personal data” and data “controller.” Whether its specific duties are the right ones is a much larger question.) It might make sense to ask that the creators of these first-class objects take care to treat them with the respect and concern their name suggests they deserve.