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Content

Note from the editor

The Brave New World of Big Data

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This issue is organized around the theme of Big Data as our new social world, one that has been taking shape thanks to three important recent advances in information technology, all accelerated in the last few years.

First, there has been an enormous increase in our capacity to gather and transmit data. *Sensor and communication technology* allows the inexpensive collection of vast quantities of information, aided by the fact that society has been enticed to communicate and run its everyday life more and more digitally. We don't write letters, only emails, and we do it on our GPS equipped smart phones that sense our location and transmit our messages instantaneously. Our cars and appliances have sensors that communicate with their manufacturer, and automatic license plate readers can follow cars in many big cities and highways, while cameras in public spaces record every second they see. Many of these sensors work without us even noticing them, like high resolution satellite photos that can now deliver resolutions of 30 centimeters, while others, like our own digital cameras, require our active participation by taking the pictures and then uploading the digital images. Some sensors record physical properties, like heat sensors at airports picking out passengers arriving with a fever from abroad; others that scan barcodes and microchips are designed to recognize coded information we must first create and encode. Recently, many of these sensors have become tiny, cheap, as well as more sophisticated in their ability to detect whatever they need to sense. As commu-

nication technology improves, this vast quantity of data can move ever faster. The coming of 5G systems will increase broadband speed by a factor of 20 and decrease latency (wait time created by the way signals are processed) by a similar magnitude. This allows for the creation of the internet of things (IOT), where objects like self-driving cars can communicate with one another in real time without human intervention. Optical cables and broadband networks can now move the information from sensors to databases in milliseconds to make them available for use in real time and for storage in databases.

Our increasing *ability to store and process data* is the second technological advance. That capacity has grown exponentially following Gordon Moore's famous prediction in the April 1965 issue of *Electronics* magazine. The latest breakthrough in quantum computing by Google opens even more dizzying horizons.

And third, new *powerful algorithms* have been invented. There have been two important milestones in computer algorithms: machine learning and hierarchical artificial neural networks. The conceptual, mathematical breakthroughs happened in the 1980s and 1990s. However, in the last decade, a series of successful applications of machine learning and hierarchical neural networks (or deep learning) have generated unprecedented excitement. The first provided a new approach to computing that replaced expert systems trying to model existing knowledge with algorithmic discovery. The second offered an extremely powerful statistical tool to uncover existing patterns in data. A breakthrough in speech recognition came in 2010, two years later in computer vision, and in 2014–2015 in machine translation. These and other highly visible achievements have captured the social imagination and have created a new set of social expectations – some hopeful, others dystopic – that not long ago were confined to the realm of science fiction.

In this issue of *Economic Sociology*, the articles step away from the flurry of excitement and anxiety about the future and focus on the way new information technology runs up against the texture of economic, political and social life.

The five articles cover a wide geographic spectrum including India, China, the United States and the European Union. They show what happens when technology, which always changes the limits of what's possible, is deployed to produce a new form of digital and algorithmic governance.

Two articles discuss India and its effort to introduce Aardhaar, an information system that would allow every citizen to be incorporated into a unified database by assigning them a unique 12-digit number using their demographic information and three biometric identifiers, a photo of their face, finger print and iris scan. Reetika Khera, Professor of Economics at the Indian Institute of Management Ahmedabad and Ursula Rao, Professor of Anthropology at the University of Leipzig, describe how Aardhaar was originally introduced to improve the delivery of welfare services and then to promote financial inclusion, immediately encountering various problems and unintended consequences that they illustrate with powerful vignettes. Rao emphasizes the new form of governance Aardhaar aspires to deliver, while Khera connects it to a wider literature on the digital economy and politics.

The article on China's infamous social credit system by Chuncheng Liu, a doctoral student at the University of California, San Diego, provides a detailed map of the multipronged effort to create a nationwide system that assigns a score of trustworthiness to all Chinese citizens. While Aardhaar is intended to serve as a broad framework for the datafication of the population, the social credit system takes the next step: it attempts to combine available data to punish or reward and ultimately predict social behavior. Liu argues that presently the system is best viewed not as a dystopic, totalitarian imposition by the state but as a fragmented and incomplete project with deep historical roots and internal contradictions.

Unlike in China, where credit scoring was initiated by the state, in the United States the system of credit scoring emerged from market transactions. Barbara Kiviat, Assistant Professor of Sociology at Stanford University, describes how the current system of scoring creditworthiness has developed and how its reach has now extended well beyond consumer lending, offering a new measure of human worth and instrument of governance. Ultimately, these scores, like the social credit scores in China or Aardhaar in

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India, are intended to create order, stability and predictability.

Finally, Karoline Krenn, a research associate at the Fraunhofer Institute for Open Communication Systems in the Competence Center for Public IT in Berlin, recounts the European Union's efforts to regulate data use, including its latest attempt, the General Data Protection Regulation. Her contribution highlights the importance of putting limitations on the purposes for which data gathered about people can be used. She shows how this concern emerged from a debate in Germany in the 1970s. Her piece underscores one of the main problems of algorithmic governance: as lived experience is turned into data and further processed, the original context on which its meaning so much depends disappears, opening a wide chasm between reality and its data shadow.

A new feature of ES, launched in this issue, is the OpEd, originally a shorthand for "opposite to the editorial page," where invited authors can comment. Here the editor invites scholars to connect their recent research to topical concerns. We ask people to translate the findings of their research into the language of public sociology. In this inaugural OpEd, Jenny Andersson, CNRS Research Professor at the Center for European Studies (CEE), Paris, and author of the book, *The Future of the World*, shifts our attention from the present to the future and explains how to think about futurology, as a peculiar form of knowledge production about things yet to happen.

All six contributions stress that the new tools offered by recent technological advances are far from just describing existing patterns and making logical projections. They are not passive observers of social reality offering us an objective and superior vision of its underlying structures. These tools are formidable actors that are powerfully shaping our world present and future, yet as these articles remind us what they achieve in the end always depends on the social context in which they unfold.