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# From Small Sensors to Big Data

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## ABSTRACT

In our increasingly digitized world almost everything we do creates a record that is stored somewhere, whether we are purchasing a book, calling a friend, ordering a meal, or renting a movie. And in today's world of sensors and internet-enabled devices, smartphones and wearables, this is no longer just limited to our online activities. Exercising in the park, shopping for groceries, falling asleep, or even taking a shower, are just some of the everyday real-world activities that are likely to generate data. This is the big data world of the so-called Sensor Web. It is enabled by the widescale availability of high-performance computing, always-on communications, and mobile computing devices that come equipped with a variety of powerful sensors. This provides for a powerful computing and sensing ecosystem with important applications across all aspects of how we live, work, and play.

The primary challenge for us now is to understand how we can (and whether we should) use this information. On the one hand, the promise of big data analytics is better decisions: better decisions about where we might live or where to send our kids to school; better decisions about the food we eat and the exercise we should take; and better decisions about some of the biggest choices facing modern societies when it comes to health, education, energy, and climate. On the other hand, this potential has a darker side, in the form of a gradual erosion of personal privacy as businesses and even governments seek to exploit our personal data for their own purposes, often without our informed consent.

What is certain is that the combination of mobile computation, cheap but powerful sensors, and big data analytics points to new ways of thinking about some of society's toughest challenges. But to take advantage of these benefits we must reconcile the promise of big data with the pitfalls of privacy. Only then can these technologies have a meaningful impact on how we can all benefit from the big data revolution as part of a healthier, safer, fairer world.

## Categories and Subject Descriptors

H.4 [Information Systems Applications]: Miscellaneous

## General Terms

Human Factors

## Keywords

Big Data Sensor Web; Data Analytics; Mobile Computing

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