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PREDICTION AND ITS LIMITS

By Barbara R. Jasny and Richard Stone

We have tried to predict the future since ancient times when shamans looked for patterns in smoking entrails. As this special section explores, prediction is now a developing science. Essays probe such questions as how to allocate limited resources, whether a country will descend into conflict, and who will likely win an election or publish a high-impact paper, as well as looking at how standards should develop in this emerging field.

Social scientists and the machine learning community are acquiring new analytical tools to distinguish meaningful patterns from noise. New tools are exciting. But using software packages off the shelf, without understanding them fully, can lead to disaster. Several authors in this special section describe the importance of realistic goals that seek to balance machine learning approaches with the human element.

In the 1950s, author Isaac Asimov imagined the science of psychohistory, in which computers crunching gargantuan data sets could forecast the rise and fall of empires. The science is not fully there yet—as the latest U.S. presidential election showed. A News story and associated Report describe the state of the art, with scientists believing that as methods improve and validated data sources grow, elections and other social events will become increasingly predictable.

Success seems to be achieved most consistently when questions are tackled in multidisciplinary efforts that join human understanding of context with algorithmic capacity to handle terabytes of data. Researchers may still fall far short of predicting outcomes with the precision that policy-makers long for, but the scenarios that they now can envision should help shape a better future.

Brad Wable also edited this special section.

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A major challenge for using data to make predictions is distinguishing what is meaningful from noise. The image represents one approach that visually indicates the complexity of the problem by highlighting some links in a network and deleting other possible links, with the hole indicating the more meaningful information.



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Barbara R. Jasny and Richard Stone (February 2, 2017)

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