

# Predicting the Present with Search Engine Data

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## ABSTRACT

Many businesses now have almost real time data available about their operations. This data can be helpful in contemporaneous prediction (“nowcasting”) of various economic indicators. We illustrate how one can use Google search data to nowcast economic metrics of interest, and discuss some of the ramifications for research and policy.

Our approach combines three Bayesian techniques: Kalman filtering, spike-and-slab regression, and model averaging. We use Kalman filtering to whiten the time series in question by removing the trend and seasonal behavior. Spike-and-slab regression is a Bayesian method for variable selection that works even in cases where the number of predictors is far larger than the number of observations. Finally, we use Markov Chain Monte Carlo methods to sample from the posterior distribution for our model; the final forecast is an average over thousands of draws from the posterior.

An advantage of the Bayesian approach is that it allows us to specify informative priors that affect the number and type of predictors in a flexible way.

## Categories and Subject Descriptors

J.4 [Economics]: Social and Behavioral Sciences

## General Terms

Economics

## Keywords

Nowcasting; Macroeconomic indicators; Google Data

## Short Bio

Hal R. Varian is the Chief Economist at Google. He started in May 2002 as a consultant and has been involved in many aspects of the company, including auction design, econometric analysis, finance, corporate strategy and public policy.



He is also an emeritus professor at the University of California, Berkeley in three departments: business, economics, and information management.

He received his SB degree from MIT in 1969 and his MA in mathematics and Ph.D. in economics from UC Berkeley in 1973. He has also taught at MIT, Stanford, Oxford, Michigan and

other universities around the world.

Dr. Varian is a fellow of the Guggenheim Foundation, the Econometric Society, and the American Academy of Arts and Sciences. He was Co-Editor of the American Economic Review from 1987-1990 and holds honorary doctorates from the University of Oulu, Finland and the University of Karlsruhe, Germany.

Professor Varian has published numerous papers in economic theory, industrial organization, financial economics, econometrics and information economics. He is the author of two major economics textbooks which have been translated into 22 languages. He is the co-author of a bestselling book on business strategy, *Information Rules: A Strategic Guide to the Network Economy* and wrote a monthly column for the *New York Times* from 2000 to 2007.

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KDD '13, August 11–14, 2013, Chicago, Illinois, USA.  
ACM 978-1-4503-2174-7/13/08.