

# Interacting with Predictions: Visual Inspection of Black-box Machine Learning Models

Josua Krause  
New York University  
New York, NY, USA  
josua.krause@nyu.edu

Adam Perer  
IBM T.J. Watson  
Research Center  
Yorktown Heights, NY, USA  
adam.perer@us.ibm.com

Kenney Ng  
IBM T.J. Watson  
Research Center  
Yorktown Heights, NY, USA  
kenney.ng@us.ibm.com

## ABSTRACT

Understanding predictive models, in terms of interpreting and identifying actionable insights, is a challenging task. Often the importance of a feature in a model is only a rough estimate condensed into one number. However, our research goes beyond these naïve estimates through the design and implementation of an interactive visual analytics system, *Prospector*. By providing interactive partial dependence diagnostics, data scientists can understand how features affect the prediction overall. In addition, our support for localized inspection allows data scientists to understand how and why specific datapoints are predicted as they are, as well as support for tweaking feature values and seeing how the prediction responds. Our system is then evaluated using a case study involving a team of data scientists improving predictive models for detecting the onset of diabetes from electronic medical records.

## Keywords

interactive machine learning; predictive modeling; partial dependence; visual analytics; model visualization

This paper was published before. The original manuscript can be found at:

<http://perer.org/papers/adamPerer-Prospector-CHI2016.pdf>.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from [permissions@acm.org](mailto:permissions@acm.org).

*IDEA '16 San Francisco, California, USA*

© 2016 ACM. ISBN 123-4567-24-567/08/06...\$15.00

DOI: [10.475/123\\_4](https://doi.org/10.475/123_4)