

# Creating Greener Web Search Engines



Kilian Weinberger

Associate Professor of Computer Science, Computer Science and Engineering

## CURRENT RESEARCH

### Developing learning algorithms to increase web search energy efficiency

Google processes an average of nearly six billion web searches a day. Many Googlers may already know this fact, but few know about the massive amounts of energy that major web-search platforms, such as Google, consume on a daily basis. Dr. Kilian Weinberger who teaches at Washington University in St. Louis, has identified a new opportunity that will reduce the carbon footprint of major web search engines. Dr Weinberger has developed "learning algorithms" that have promising results for increasing energy efficiency for web searches.

- Dr. Kilian Weinberger and his team of researchers have developed a machine learning algorithm that can reduce web search energy usage by 90%, while maintaining the same search results as traditional web searches.
- The saving percentage of 90% was confirmed by Dr. Weinberger and his team using actual trading/testing data from *Yahoo*.
- Dr. Weinberger's learning algorithms have the potential to save enough energy to power a small town.
- The algorithm works like a knob controlling a shower head. For easy searches like Wikipedia, the algorithm "turns left" and uses little energy to complete simple searches. For more difficult and complex searches, it "turns right" and utilizes quite a bit more energy and computing power.
- This "knob" can be adjusted based on an individual's search preference, allowing for variable speed and energy usage.

Dr. Weinberger's algorithms can dramatically improve energy efficiency for large scale web search platforms or server farms. Beyond this immediate application, the learning algorithms Dr. Weinberger develops...

## AFFILIATION



Washington University

## EDUCATION

- Ph.D. in Machine Learning 2007 , University of Pennsylvania
- M.Sc. in Computer Science, 2004 , University of Pennsylvania
- B.S. in Mathematics and Computer Science, 2002 , University of Oxford

## AWARDS

- NSF CAREER Award, 2012
- Yahoo! Faculty Research and Engagement Award, 2012
- AAAI Outstanding Senior Program Chair Award, 2011
- Yahoo! Faculty Research and Engagement Award, 2010
- Yahoo! Inc. You Rock Employee Award
- and 8 more...

## RESEARCH AREAS

Technology, Informational Sciences / Internet, IOT, Devices, Data

## FUNDING REQUEST

Your contributions will support Dr. Weinberger and his research team by helping him recruit the necessary talent and technology infrastructure to "bring to scale" his cost savings initiative. Help him turn web search platforms "green"!

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