Should Computer Scientists Experiment More?

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14th Dec, 2014

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Introduction

- What is Computer Science?
- How much of Science are we doing?
- How much of Engineering are we doing?
- Objective and Data-driven methods!

Why should we experiment?

- Theory falsification
  an experiment can only show the presence of bugs in a theory, not their absence.
- Theory from observation (help with induction)
  For example, Artificial Neural Networks!

Fallacies

Traditional Scientific method isn't applicable

- Information, but not energy or matter
  functional programming, object-oriented programming, and formal methods
- What is traditional method?
  https://www.youtube.com/watch?v=bUa-ilQqEv0

Current level of experimentation is good enough

Really?!

Experiments cost too much

- Medicine
- Theory of relativity

Demonstrations will suffice

- Demos can provide proof of concepts
- Talk {Beliefs} is cheap, show me the code {data}!

There's too much noise in the way

- Have you heard of Benchmarks?
- Randomized double blind tests are the gold standard!

Progress will slow

"Questionable ideas" weeded out more quickly

Technology changes too fast

If a question becomes irrelevant quickly, it is too narrowly defined and not worth spending a lot of effort on

You'll never get it published

- Low number of good experimental papers is a supply problem
- Things are changing

Substitutes won't work

Can we get by with forms of validation that are weaker than experimentation?

May be, if its a radically new idea or significant breakthrough!

Trust your intuition

- Meetings were considered essential
- Multi-version programs
- Traditional software development model

Trust the experts

Like, seriously?

Some problems

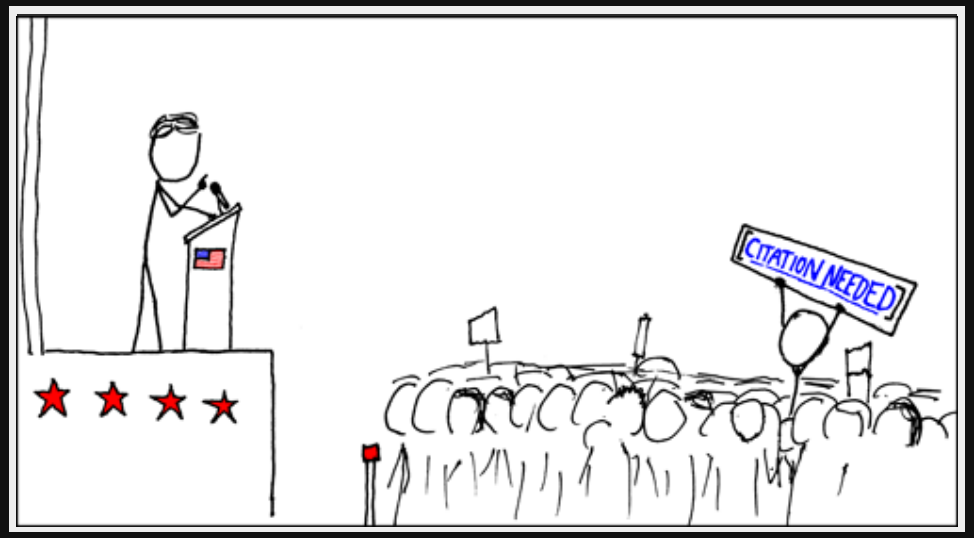
Competing theories

If scientists neglect experiment and observation, they'll have difficulties discovering new and interesting phenomena worthy of better theories.

Unbiased results

Keeping decision-makers in the dark has an overwhelmingly higher damage potential than informing them to the best of one's abilities

Summary



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