Tips for Working in Tech (and elsewhere)

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2019 NISS Webinar

Themes of this Talk

Variety

    Interesting career

    Bounce back from failure

Advice

In Growing Field of Big Data, Jobs Go Unfilled

September 3, 2013 5:20PM   Follow NewsFactor on **twitter**!   SHARE

Looking for work? Consider this: Employers are finding a shortage of workers trained in big data, business intelligence, statistics and data analytics. In fact, by 2018, the U.S. could face a shortfall of about 35 percent in the number of people with advanced training in statistics who can help companies realize the potential of digital information.

About Me

Statistician at Google
Previously:
    Undergrad math, US & Germany
    PhD Statistics, Stanford
    Pacific Gas & Electric Co.
    College Prof
    Statistical Software/Research
Sierra Club
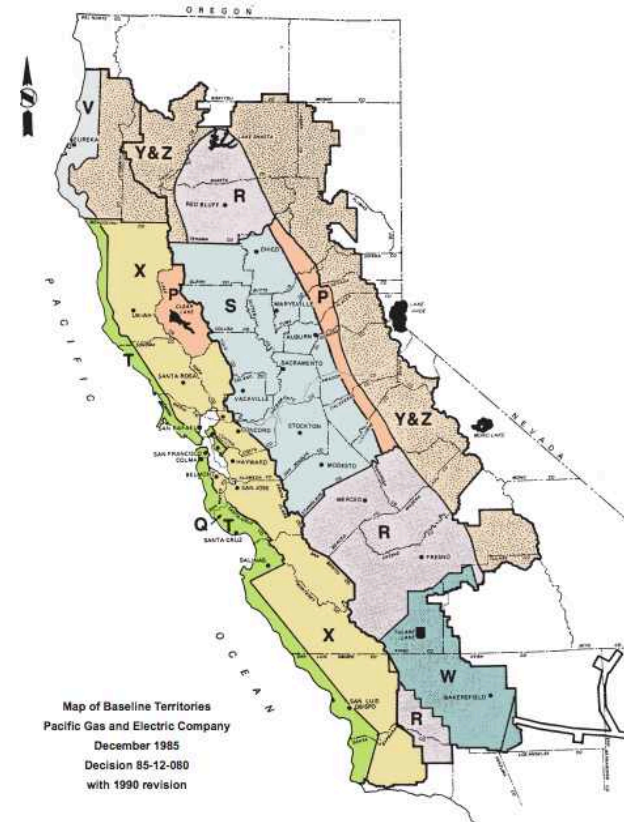Computers to Guatemala, CR, Ecuador
Water Bottle Rockets

Pacific Gas & Electric

Internal think tank/consulting

    20 people, ~10 countries

    EE, CS, OR, Math, Stat

Big project: fuel oil inventory

Map of Baseline Territories
Pacific Gas and Electric Company
December 1985
Decision 85-12-080
with 1990 revision

Fuel Oil Inventory

PG&E has diverse electrical supply

    Hydro, nuclear, geothermal, coal, gas, oil

    Oil is fuel of last resort (dirty & expensive)

    How much to carry in inventory for winter?

    Need depends on rain, snow, outages, …

Simulation

    Generate artificial years, see what happens

    Optimize (outage rate 1/200)

Importance Sampling

Interesting cases are rare; so oversample them

    Cold, dry, nuclear outages

Reweight to avoid bias $\qquad w_i = f(x_i) / g(x_i)$

    Artificial year twice as likely : weight ½

Weighted average

    Common sense vs literature $\qquad (1/n)\sum w_i y_i$

    Dissertation! $\qquad \sum w_i y_i \,/\, \sum w_i$

Academia

Small colleges, small classes, lot of student involvement

Summer research (self or with students)

Consulting

    20 faculty (& their students), 12 departments

    One project – estimating seismic deformation from stream networks (Science 1994)

Did not get tenure!

Insightful Corp.

- Statistical Software – S-PLUS (before R)
- Research
  - Work with academic consultants
  - Produce commercial-quality software
- Consulting
- Training (Short courses, U.S. & Europe)
- Development, Tech Support, Documentation, Sales Support, …

Google

- Which ads are less annoying?
- Estimating effectiveness of display ads
- Optimizing web sites (*sequential design*)
- What Chrome apps to show
- Traffic speeds
- Detecting changes in query rates
- How to tell if people like Google maps
- …

Slides removed

Two slides are removed – search results for

- Flights to Hawaii (many ads)
- Latent variables (no ads)

Experimentation

Data mining is all the rage.

    But too many candidates only know data mining

Experimentation matters.

    Not enough candidates with background

Experimentation is far easier online.

      When you search on Google you may be in the active arm of 100 experiments.

Experiments

- Classical Experiments

  - Plan size in advance

  - Analyze at end

- Clinical Trials

  - Infrequent analysis

- Web

  - Continuous!

  - Multi-armed bandit

Rothamstead Station, R. A. Fisher arrived 1919

Bootstrap, Permutation Tests

- Statistics Education
  - Chihara & Hesterberg 2018, Mathematical Statistics with Resampling and R
- Statistical Practice
  - More accurate
  - Easier to get answers
  - Can do better statistics
  - Sometimes faster than formulas
- What ~~Teachers~~ Everyone Should Know About the Bootstrap, The American Statistician, 2015

What do statisticians do at Google?

Teams: Economics, Hardware Operations, Quantitative Marketing, Video and TV Insights, Content Ads, Ads Quality, Conversions and Attribution, Quantitative User Experience, Travel Analytics, Sales Finance, Affiliate Ops, People Analytics, Engineering Statistics, Machine Learning, Search Quality

Projects: Forecasting and planning, project evaluation, testing new features, modeling behavior of advertisers, publishers and users, auction design, tool building, survey analysis, …

Where: CA^4, NY, WA^2, CO, PA, *UK, CH, FR, IS*, …

Google Hiring

Four main criteria

- Statistical Knowledge

- Data Intuition

- Computation

- Communication

Other:

Leadership, Initiative, Teamwork, Googliness, …

google.com/careers

Internships

google.com/students

Expected posting

    Data Science Intern 10/21-11/20 & 1/6-1/24

    Business/Produce Analyst Intern 10/21-11/2

    …

Tips

Bonus for experimental design, big data

Review core statistical ideas and methods.

Think out loud (advantages, disadvantages).

Ask questions.

Admit what you don't know.

Consulting resume?

My *Advice for Statisticians interested in working at Google* = goo.gl/mxvlbg

Skills

- Stats (and understand concepts)
- Consulting
- Programming
- Experimental Design, scientific issues
- Writing
- Presentations

Money and Job

- Choose interesting work!
- Money
  - Life frugally (house and car!)
  - Flexibility in job choice
  - Reduce stress
- Avoid driving
  - Time & money & health & impact world
  - Live close, bike, public transportation

Get Involved

- Professional Groups
  - Raise your profile!
  - Organize sessions!
  - Give talks!
- Community Groups
  - Desperate for volunteers in modern America
- Do good
  - Own happiness
  - Time or money