Big Data is Not About the Data!

Gary King¹

Institute for Quantitative Social Science Harvard University

University of Florida, 3/17/2016

¹GaryKing.org

The *Data* In Big Data (about people) The Last 50 Years:

The Last 50 Years:

• Survey research

The Last 50 Years:

- Survey research
- Aggregate government statistics

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

The Next 50 Years: Fast increases in new data sources, due to...

• Much more of the above — improved, expanded, and applied

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact:

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact: changed most Fortune 500 firms

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact: changed most Fortune 500 firms; established new industries

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact: changed most Fortune 500 firms; established new industries; altered friendship networks

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact: changed most Fortune 500 firms; established new industries; altered friendship networks, political campaigns

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact: changed most Fortune 500 firms; established new industries; altered friendship networks, political campaigns, public health

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact: changed most Fortune 500 firms; established new industries; altered friendship networks, political campaigns, public health, legal analysis

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact: changed most Fortune 500 firms; established new industries; altered friendship networks, political campaigns, public health, legal analysis, policing

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact: changed most Fortune 500 firms; established new industries; altered friendship networks, political campaigns, public health, legal analysis, policing, economics

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact: changed most Fortune 500 firms; established new industries; altered friendship networks, political campaigns, public health, legal analysis, policing, economics, sports

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact: changed most Fortune 500 firms; established new industries; altered friendship networks, political campaigns, public health, legal analysis, policing, economics, sports, public policy

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact: changed most Fortune 500 firms; established new industries; altered friendship networks, political campaigns, public health, legal analysis, policing, economics, sports, public policy, literature,

The Last 50 Years:

- Survey research
- Aggregate government statistics
- One off studies of individual places, people, or events

- Much more of the above improved, expanded, and applied
- Shrinking computers & the growing Internet: data everywhere
- The replication movement: data sharing (e.g., Dataverse)
- Governments encouraging data collection & experimentation
- Advances in statistical methods, informatics, & software
- The march of quantification: through academia, professions, government, & commerce (SuperCrunchers, The Numerati, MoneyBall, and innumerable "big data" articles)
- Impact: changed most Fortune 500 firms; established new industries; altered friendship networks, political campaigns, public health, legal analysis, policing, economics, sports, public policy, literature, etc., etc.

- Data:
 - easy to come by; often a free byproduct of IT improvements

- Data:
 - easy to come by; often a free byproduct of IT improvements
 - becoming commoditized

- Data:
 - easy to come by; often a free byproduct of IT improvements
 - becoming commoditized
 - Ignore it & every institution will have more every year

- easy to come by; often a free byproduct of IT improvements
- becoming commoditized
- Ignore it & every institution will have more every year
- With a bit of effort: huge data production increases

- easy to come by; often a free byproduct of IT improvements
- becoming commoditized
- Ignore it & every institution will have more every year
- With a bit of effort: huge data production increases
- Where the Value is: the Analytics

- easy to come by; often a free byproduct of IT improvements
- becoming commoditized
- Ignore it & every institution will have more every year
- With a bit of effort: huge data production increases
- Where the Value is: the Analytics
 - Output can be highly customized

- easy to come by; often a free byproduct of IT improvements
- becoming commoditized
- Ignore it & every institution will have more every year
- With a bit of effort: huge data production increases
- Where the Value is: the Analytics
 - Output can be highly customized
 - Moore's Law (doubling speed/power every 18 months)

- easy to come by; often a free byproduct of IT improvements
- becoming commoditized
- Ignore it & every institution will have more every year
- With a bit of effort: huge data production increases
- Where the Value is: the Analytics
 - Output can be highly customized
 - Moore's Law (doubling speed/power every 18 months)
 - v. One good data scientist (1000x speed increase in 1 day)

The Value in Big Data: the Analytics

• Data:

- easy to come by; often a free byproduct of IT improvements
- becoming commoditized
- Ignore it & every institution will have more every year
- With a bit of effort: huge data production increases
- Where the Value is: the Analytics
 - Output can be highly customized
 - Moore's Law (doubling speed/power every 18 months)
 v. One good data scientist (1000x speed increase in 1 day)
 - \$2M computer v. 2 hours of algorithm design

The Value in Big Data: the Analytics

• Data:

- easy to come by; often a free byproduct of IT improvements
- becoming commoditized
- Ignore it & every institution will have more every year
- With a bit of effort: huge data production increases
- Where the Value is: the Analytics
 - Output can be highly customized
 - Moore's Law (doubling speed/power every 18 months)
 v. One good data scientist (1000x speed increase in 1 day)
 - \$2M computer v. 2 hours of algorithm design
 - Low cost; little infrastructure; mostly human capital needed

The Value in Big Data: the Analytics

• Data:

- easy to come by; often a free byproduct of IT improvements
- becoming commoditized
- Ignore it & every institution will have more every year
- With a bit of effort: huge data production increases
- Where the Value is: the Analytics
 - Output can be highly customized
 - Moore's Law (doubling speed/power every 18 months)
 v. One good data scientist (1000x speed increase in 1 day)
 - \$2M computer v. 2 hours of algorithm design
 - Low cost; little infrastructure; mostly human capital needed
 - Innovative analytics: enormously better than off-the-shelf

• Opinions of activists:

• Opinions of activists: A few thousand interviews

 Opinions of activists: A few thousand interviews → billions of political opinions in social media posts (650M/day)

- Opinions of activists: A few thousand interviews → billions of political opinions in social media posts (650M/day)
- Exercise:

- Opinions of activists: A few thousand interviews → billions of political opinions in social media posts (650M/day)
- Exercise: A survey: "How many times did you exercise last week?

- Opinions of activists: A few thousand interviews → billions of political opinions in social media posts (650M/day)
- Exercise: A survey: "How many times did you exercise last week? → 500K people carrying cell phones with accelerometers

- Opinions of activists: A few thousand interviews → billions of political opinions in social media posts (650M/day)
- Exercise: A survey: "How many times did you exercise last week? → 500K people carrying cell phones with accelerometers
- Social contacts:

- Opinions of activists: A few thousand interviews → billions of political opinions in social media posts (650M/day)
- Exercise: A survey: "How many times did you exercise last week? → 500K people carrying cell phones with accelerometers
- Social contacts: A survey: "Please tell me your 5 best friends"

- Opinions of activists: A few thousand interviews → billions of political opinions in social media posts (650M/day)
- Exercise: A survey: "How many times did you exercise last week? → 500K people carrying cell phones with accelerometers
- Social contacts: A survey: "Please tell me your 5 best friends" → continuous record of phone calls, emails, text messages, bluetooth, social media connections, address books

- Opinions of activists: A few thousand interviews → billions of political opinions in social media posts (650M/day)
- Exercise: A survey: "How many times did you exercise last week? → 500K people carrying cell phones with accelerometers
- Social contacts: A survey: "Please tell me your 5 best friends" → continuous record of phone calls, emails, text messages, bluetooth, social media connections, address books
- Economic development in developing countries:

- Opinions of activists: A few thousand interviews → billions of political opinions in social media posts (650M/day)
- Exercise: A survey: "How many times did you exercise last week? → 500K people carrying cell phones with accelerometers
- Social contacts: A survey: "Please tell me your 5 best friends" → continuous record of phone calls, emails, text messages, bluetooth, social media connections, address books
- Economic development in developing countries: Dubious or nonexistent governmental statistics

- Opinions of activists: A few thousand interviews → billions of political opinions in social media posts (650M/day)
- Exercise: A survey: "How many times did you exercise last week? → 500K people carrying cell phones with accelerometers
- Social contacts: A survey: "Please tell me your 5 best friends" → continuous record of phone calls, emails, text messages, bluetooth, social media connections, address books
- Economic development in developing countries: Dubious or nonexistent governmental statistics ~> satellite images of human-generated light at night, road networks, other infrastructure

- Opinions of activists: A few thousand interviews → billions of political opinions in social media posts (650M/day)
- Exercise: A survey: "How many times did you exercise last week? → 500K people carrying cell phones with accelerometers
- Social contacts: A survey: "Please tell me your 5 best friends" → continuous record of phone calls, emails, text messages, bluetooth, social media connections, address books
- Economic development in developing countries: Dubious or nonexistent governmental statistics → satellite images of human-generated light at night, road networks, other infrastructure
- Many, many, more...

- Opinions of activists: A few thousand interviews → billions of political opinions in social media posts (650M/day)
- Exercise: A survey: "How many times did you exercise last week? → 500K people carrying cell phones with accelerometers
- Social contacts: A survey: "Please tell me your 5 best friends" → continuous record of phone calls, emails, text messages, bluetooth, social media connections, address books
- Economic development in developing countries: Dubious or nonexistent governmental statistics → satellite images of human-generated light at night, road networks, other infrastructure
- Many, many, more...
- In each: without new analytics, the data are useless

• Examples of Bad Analytics:

- Examples of Bad Analytics:
 - Physicians' "Verbal Autopsy" analysis

- Examples of Bad Analytics:
 - Physicians' "Verbal Autopsy" analysis
 - Sentiment analysis via word counts

- Examples of Bad Analytics:
 - Physicians' "Verbal Autopsy" analysis
 - Sentiment analysis via word counts
- Unrelated substantive problems, same analytics solution:

- Examples of Bad Analytics:
 - Physicians' "Verbal Autopsy" analysis
 - Sentiment analysis via word counts
- Unrelated substantive problems, same analytics solution:
 - Key to both methods: *classifying* (deaths, social media posts)

- Examples of Bad Analytics:
 - Physicians' "Verbal Autopsy" analysis
 - Sentiment analysis via word counts
- Unrelated substantive problems, same analytics solution:
 - Key to both methods: classifying (deaths, social media posts)
 - Key to both goals: estimating %'s

- Examples of Bad Analytics:
 - Physicians' "Verbal Autopsy" analysis
 - Sentiment analysis via word counts
- Unrelated substantive problems, same analytics solution:
 - Key to both methods: classifying (deaths, social media posts)
 - Key to both goals: estimating %'s
- Modern Data Analytics: New method led to:

- Examples of Bad Analytics:
 - Physicians' "Verbal Autopsy" analysis
 - Sentiment analysis via word counts
- Unrelated substantive problems, same analytics solution:
 - Key to both methods: classifying (deaths, social media posts)
 - Key to both goals: estimating %'s
- Modern Data Analytics: New method led to:



1.



Fast Company Names Crimson Hexagon Number Seven on "The 10 Most Innovative Companies in Web" List Leading Social Intelligence Firm Recognized For Revolutionary Measurement of Consumer Opinions in Social Media

Published: Wednesday, 16 Mar 2011 9:20 AM ET	T Text Size - +

CAMBRIDGE, Mass., Mar 16, 2011 (BUSINESS WIRE) -- Fast Company named

• Examples of Bad Analytics:

1.

- Physicians' "Verbal Autopsy" analysis
- Sentiment analysis via word counts
- Unrelated substantive problems, same analytics solution:
 - Key to both methods: classifying (deaths, social media posts)
 - Key to both goals: estimating %'s
- Modern Data Analytics: New method led to:



Fast Company Names Crimson Hexagon Number Seven on "The 10 Most Innovative Companies in Web" List Leading Social Intelligence Firm Recognized For Revolutionary Measurement of Consumer Opinions in Social Media



CAMBRIDGE, Mass., Mar 16, 2011 (BUSINESS WIRE) -- Fast Company named

2. Worldwide cause-of-death estimates for



• Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures;

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods:

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed;

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative;

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history
 - Results:

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history
 - Results: unbiased until 2000;

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history
 - Results: unbiased until 2000; systematically biased after

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history
 - Results: unbiased until 2000; systematically biased after
 - Actuaries hunkered down, insulated themselves, refused to budge when Democrats & Republicans pushed hard for changes

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history
 - Results: unbiased until 2000; systematically biased after
 - Actuaries hunkered down, insulated themselves, refused to budge when Democrats & Republicans pushed hard for changes
 - In the process, they also insulated themselves from the facts:

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history
 - Results: unbiased until 2000; systematically biased after
 - Actuaries hunkered down, insulated themselves, refused to budge when Democrats & Republicans pushed hard for changes
 - In the process, they also insulated themselves from the facts: Especially since 2000, Americans started living unexpectedly longer lives

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history
 - Results: unbiased until 2000; systematically biased after
 - Actuaries hunkered down, insulated themselves, refused to budge when Democrats & Republicans pushed hard for changes
 - In the process, they also insulated themselves from the facts: Especially since 2000, Americans started living unexpectedly longer lives (due to statins, early cancer detection, etc.)

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history
 - Results: unbiased until 2000; systematically biased after
 - Actuaries hunkered down, insulated themselves, refused to budge when Democrats & Republicans pushed hard for changes
 - In the process, they also insulated themselves from the facts: Especially since 2000, Americans started living unexpectedly longer lives (due to statins, early cancer detection, etc.)
- New customized analytics we developed:

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history
 - Results: unbiased until 2000; systematically biased after
 - Actuaries hunkered down, insulated themselves, refused to budge when Democrats & Republicans pushed hard for changes
 - In the process, they also insulated themselves from the facts: Especially since 2000, Americans started living unexpectedly longer lives (due to statins, early cancer detection, etc.)
- New customized analytics we developed:
 - Logical consistency (e.g., older people have higher mortality)

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history
 - Results: unbiased until 2000; systematically biased after
 - Actuaries hunkered down, insulated themselves, refused to budge when Democrats & Republicans pushed hard for changes
 - In the process, they also insulated themselves from the facts: Especially since 2000, Americans started living unexpectedly longer lives (due to statins, early cancer detection, etc.)
- New customized analytics we developed:
 - Logical consistency (e.g., older people have higher mortality)
 - Far more accurate forecasts

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history
 - Results: unbiased until 2000; systematically biased after
 - Actuaries hunkered down, insulated themselves, refused to budge when Democrats & Republicans pushed hard for changes
 - In the process, they also insulated themselves from the facts: Especially since 2000, Americans started living unexpectedly longer lives (due to statins, early cancer detection, etc.)
- New customized analytics we developed:
 - Logical consistency (e.g., older people have higher mortality)
 - Far more accurate forecasts
 - \rightsquigarrow Trust fund needs > \$800 billion more than SSA thought

- Social Security: single largest government program; lifted a whole generation out of poverty; extremely popular
- Forecasts: used for programs comprising > 50% of the US expenditures; e.g., if retirees draw benefits longer than expected, the Trust Fund runs out
- First evaluation of SSA forecasts in 85 years:
 - Methods: little changed; mostly qualitative; a time when we've learned more about forecasting than at any time in history
 - Results: unbiased until 2000; systematically biased after
 - Actuaries hunkered down, insulated themselves, refused to budge when Democrats & Republicans pushed hard for changes
 - In the process, they also insulated themselves from the facts: Especially since 2000, Americans started living unexpectedly longer lives (due to statins, early cancer detection, etc.)
- New customized analytics we developed:
 - Logical consistency (e.g., older people have higher mortality)
 - Far more accurate forecasts
 - \rightsquigarrow Trust fund needs > \$800 billion more than SSA thought
 - Many other applications to different types of forecasts

• An experiment:

• An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples:

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional,

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional, coverage,

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional, coverage, obama,

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional, coverage, obama, ACA...

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional, coverage, obama, ACA...
- Median keywords recalled:

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional, coverage, obama, ACA...
- Median keywords recalled: 8

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional, coverage, obama, ACA...
- Median keywords recalled: 8
- Unique keywords recalled by 43 undergrads:

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional, coverage, obama, ACA...
- Median keywords recalled: 8
- Unique keywords recalled by 43 undergrads: 149

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional, coverage, obama, ACA...
- Median keywords recalled: 8
- Unique keywords recalled by 43 undergrads: 149
- Keywords 42 of 43 <u>failed</u> to recall:

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional, coverage, obama, ACA...
- Median keywords recalled: 8
- Unique keywords recalled by 43 undergrads: 149
- Keywords 42 of 43 failed to recall: 98 (66%)

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional, coverage, obama, ACA...
- Median keywords recalled: 8
- Unique keywords recalled by 43 undergrads: 149
- Keywords 42 of 43 failed to recall: 98 (66%)
- ~> Humans recognize keywords well, recall them poorly

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional, coverage, obama, ACA...
- Median keywords recalled: 8
- Unique keywords recalled by 43 undergrads: 149
- Keywords 42 of 43 failed to recall: 98 (66%)
- ~> Humans recognize keywords well, recall them poorly
- Thresher: New technology to discover the right keywords

- An experiment: "We have 10,000 twitter posts, each containing the word 'healthcare', from the time period surrounding the Supreme Court decision on Obamacare. Please list any keywords which come to mind that will select posts in this set related to Obamacare and will not select posts unrelated to Obama care."
- Examples: unconstitutional, coverage, obama, ACA...
- Median keywords recalled: 8
- Unique keywords recalled by 43 undergrads: 149
- Keywords 42 of 43 failed to recall: 98 (66%)
- ~ Humans recognize keywords well, recall them poorly
- Thresher: New technology to discover the right keywords















Example Substitution 1:





"Eye field"

Example Substitution 1:





"Eye field" (nonsensical)

Example Substitution 1: Homograph





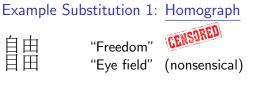
"Eye field" (nonsensical)

Example Substitution 1: Homograph

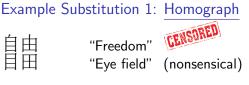




"Eye field" (nonsensical)

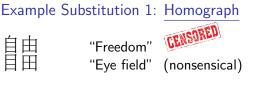


Example Substitution 2:



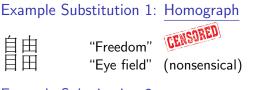
Example Substitution 2:

和谐



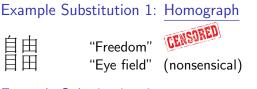
Example Substitution 2:

和谐 "Harmonious [Society]" (official slogan)



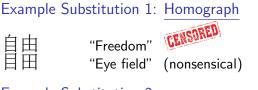
Example Substitution 2:

和谐 "Harmonious [Society]" (official slogan) Gensered



Example Substitution 2:

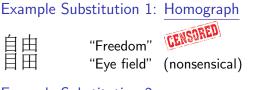
"Harmonious [Society]" (official slogan)



Example Substitution 2:

和谐河蟹

"Harmonious [Society]" (official slogan) GENSIAED



Example Substitution 2:

和谐河蟹

"Harmonious [Society]" (official slogan) GENSORED "River crab" (irrelevant)





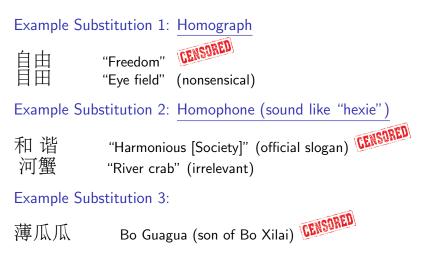
Example Substitution 3:

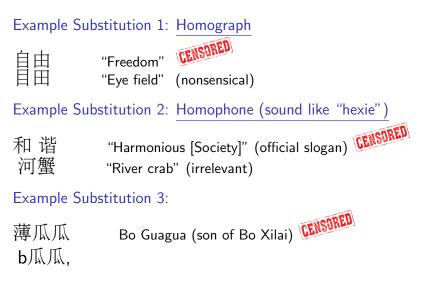


Example Substitution 3:

薄瓜瓜

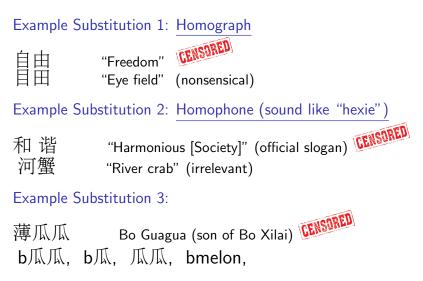
















- Substitutions:
 - An effective strategy for evading censors

- Substitutions:
 - An effective strategy for evading censors
 - Invisible to Chinese government filters

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot.

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search.

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours
- Thresher:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours
- Thresher:
 - The Method:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours
- Thresher:
 - The Method: Computer-assisted human led technology

• Substitutions:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours

• Thresher:

- The Method: Computer-assisted human led technology
- The Theory:

• Substitutions:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours

• Thresher:

- The Method: Computer-assisted human led technology
- The Theory: Computers excel at discovery;

• Substitutions:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours

• Thresher:

- The Method: Computer-assisted human led technology
- The Theory: Computers excel at discovery;

• Substitutions:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours

• Thresher:

- The Method: Computer-assisted human led technology
- The Theory: Computers excel at discovery;

Humans excel at recognition

• Many applications:

• Substitutions:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours

• Thresher:

- The Method: Computer-assisted human led technology
- The Theory: Computers excel at discovery;

- Many applications:
 - Language drift: #BostonBombings \rightsquigarrow #BostonStrong

• Substitutions:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours

• Thresher:

- The Method: Computer-assisted human led technology
- The Theory: Computers excel at discovery;

- Many applications:
 - Language drift: #BostonBombings → #BostonStrong
 - Political advantage: pro-life/choice ~→ reproductive rights

• Substitutions:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours

• Thresher:

- The Method: Computer-assisted human led technology
- The Theory: Computers excel at discovery;

- Many applications:
 - Language drift: #BostonBombings \rightsquigarrow #BostonStrong
 - Political advantage: pro-life/choice ~→ reproductive rights
 - Criminals hiding in plain sight

• Substitutions:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours

• Thresher:

- The Method: Computer-assisted human led technology
- The Theory: Computers excel at discovery;

- Many applications:
 - Language drift: #BostonBombings \rightsquigarrow #BostonStrong
 - Political advantage: pro-life/choice → reproductive rights
 - Criminals hiding in plain sight
 - Look-alike modeling

• Substitutions:

- An effective strategy for evading censors
- Invisible to Chinese government filters
- Not in any thesaurus
- No other structured data can help
- The Theory: Humans are more creative than computers
- The Government or Industry Analyst:
 - The Method: Read a lot. Search. Repeat.
 - The Theory: Our humans are more creative than yours

• Thresher:

- The Method: Computer-assisted human led technology
- The Theory: Computers excel at discovery;

- Many applications:
 - Language drift: #BostonBombings \rightsquigarrow #BostonStrong
 - Political advantage: pro-life/choice \rightsquigarrow reproductive rights
 - Criminals hiding in plain sight
 - Look-alike modeling
 - Starting point for most automated text analysis

• To understand many documents, humans create categories to represent conceptualization, insight, etc.

- To understand many documents, humans create categories to represent conceptualization, insight, etc.
- Most firms: impose fixed categorizations to tally customer complaints, sort reports, retrieve information

- To understand many documents, humans create categories to represent conceptualization, insight, etc.
- Most firms: impose fixed categorizations to tally customer complaints, sort reports, retrieve information
- Bad Analytics:

- To understand many documents, humans create categories to represent conceptualization, insight, etc.
- Most firms: impose fixed categorizations to tally customer complaints, sort reports, retrieve information
- Bad Analytics:
 - Unassisted Human Categorization: time consuming; huge efforts trying *not* to innovate!

- To understand many documents, humans create categories to represent conceptualization, insight, etc.
- Most firms: impose fixed categorizations to tally customer complaints, sort reports, retrieve information
- Bad Analytics:
 - Unassisted Human Categorization: time consuming; huge efforts trying *not* to innovate!
 - Fully Automated "Cluster Analysis": Many widely available, but none work (computers don't know what you want!)

- To understand many documents, humans create categories to represent conceptualization, insight, etc.
- Most firms: impose fixed categorizations to tally customer complaints, sort reports, retrieve information
- Bad Analytics:
 - Unassisted Human Categorization: time consuming; huge efforts trying *not* to innovate!
 - Fully Automated "Cluster Analysis": Many widely available, but none work (computers don't know what you want!)
- Our alternative: Computer-assisted Categorization

- To understand many documents, humans create categories to represent conceptualization, insight, etc.
- Most firms: impose fixed categorizations to tally customer complaints, sort reports, retrieve information
- Bad Analytics:
 - Unassisted Human Categorization: time consuming; huge efforts trying *not* to innovate!
 - Fully Automated "Cluster Analysis": Many widely available, but none work (computers don't know what you want!)
- Our alternative: Computer-assisted Categorization
 - You decide what's important, but with help

- To understand many documents, humans create categories to represent conceptualization, insight, etc.
- Most firms: impose fixed categorizations to tally customer complaints, sort reports, retrieve information
- Bad Analytics:
 - Unassisted Human Categorization: time consuming; huge efforts trying *not* to innovate!
 - Fully Automated "Cluster Analysis": Many widely available, but none work (computers don't know what you want!)
- Our alternative: Computer-assisted Categorization
 - You decide what's important, but with help
 - Invert effort: you innovate; the computer categorizes

- To understand many documents, humans create categories to represent conceptualization, insight, etc.
- Most firms: impose fixed categorizations to tally customer complaints, sort reports, retrieve information
- Bad Analytics:
 - Unassisted Human Categorization: time consuming; huge efforts trying *not* to innovate!
 - Fully Automated "Cluster Analysis": Many widely available, but none work (computers don't know what you want!)
- Our alternative: Computer-assisted Categorization
 - You decide what's important, but with help
 - Invert effort: you innovate; the computer categorizes
 - Insights: easier, faster, better

- To understand many documents, humans create categories to represent conceptualization, insight, etc.
- Most firms: impose fixed categorizations to tally customer complaints, sort reports, retrieve information
- Bad Analytics:
 - Unassisted Human Categorization: time consuming; huge efforts trying *not* to innovate!
 - Fully Automated "Cluster Analysis": Many widely available, but none work (computers don't know what you want!)
- Our alternative: Computer-assisted Categorization
 - You decide what's important, but with help
 - Invert effort: you innovate; the computer categorizes
 - Insights: easier, faster, better
 - Technology: visualize the space of all possible clusterings

- To understand many documents, humans create categories to represent conceptualization, insight, etc.
- Most firms: impose fixed categorizations to tally customer complaints, sort reports, retrieve information
- Bad Analytics:
 - Unassisted Human Categorization: time consuming; huge efforts trying *not* to innovate!
 - Fully Automated "Cluster Analysis": Many widely available, but none work (computers don't know what you want!)
- Our alternative: Computer-assisted Categorization
 - You decide what's important, but with help
 - Invert effort: you innovate; the computer categorizes
 - Insights: easier, faster, better
 - Technology: visualize the space of all possible clusterings
 - (Lots of technology, but it's behind the scenes)

What Members of Congress Do

• Data: 64,000 Senators' press releases

- Data: 64,000 Senators' press releases
- Categorization: (1) advertising, (2) position taking, (3) credit claiming

- Data: 64,000 Senators' press releases
- Categorization: (1) advertising, (2) position taking, (3) credit claiming
- New Insight: partisan taunting

- Data: 64,000 Senators' press releases
- Categorization: (1) advertising, (2) position taking, (3) credit claiming
- New Insight: partisan taunting
 - Joe Wilson during Obama's State of the Union: "You lie!"

- Data: 64,000 Senators' press releases
- Categorization: (1) advertising, (2) position taking, (3) credit claiming
- New Insight: partisan taunting
 - Joe Wilson during Obama's State of the Union: "You lie!"
 - "Senator Lautenberg Blasts Republicans as 'Chicken Hawks' "

- Data: 64,000 Senators' press releases
- Categorization: (1) advertising, (2) position taking, (3) credit claiming
- New Insight: partisan taunting
 - Joe Wilson during Obama's State of the Union: "You lie!"
 - "Senator Lautenberg Blasts Republicans as 'Chicken Hawks' "
 - Basically anything said by a 2016 presidential candidate!

- Data: 64,000 Senators' press releases
- Categorization: (1) advertising, (2) position taking, (3) credit claiming
- New Insight: partisan taunting
 - Joe Wilson during Obama's State of the Union: "You lie!"
 - "Senator Lautenberg Blasts Republicans as 'Chicken Hawks' "
 - Basically anything said by a 2016 presidential candidate!
- How common is it?

- Data: 64,000 Senators' press releases
- Categorization: (1) advertising, (2) position taking, (3) credit claiming
- New Insight: partisan taunting
 - Joe Wilson during Obama's State of the Union: "You lie!"
 - "Senator Lautenberg Blasts Republicans as 'Chicken Hawks' "
 - Basically anything said by a 2016 presidential candidate!
- How common is it? 27% of all Senatorial press releases!

• Previous approach: watch a few posts; see what's removed

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

Stop criticism and protest about the state, its leaders, and their policies *Wrong*

• What Could be the Goal?

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state
 - 2. Stop collective action

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state Wrong
 - 2. Stop collective action

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state Wrong
 - 2. Stop collective action *Right*

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state Wrong
 - 2. Stop collective action *Right*
- Implications: Social Media is Actionable!

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state Wrong
 - 2. Stop collective action *Right*
- Implications: Social Media is Actionable!
 - Chinese leaders:

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state Wrong
 - 2. Stop collective action *Right*
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state Wrong
 - 2. Stop collective action *Right*
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state Wrong
 - 2. Stop collective action *Right*
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state Wrong
 - 2. Stop collective action *Right*
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:
 - Officials in trouble, likely to be replaced

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state Wrong
 - 2. Stop collective action *Right*
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:
 - Officials in trouble, likely to be replaced
 - Dissident arrests;

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state Wrong
 - 2. Stop collective action *Right*
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:
 - Officials in trouble, likely to be replaced
 - Dissident arrests; new peace treaties;

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state Wrong
 - 2. Stop collective action *Right*
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:
 - Officials in trouble, likely to be replaced
 - Dissident arrests; new peace treaties; emerging scandals

- Previous approach: watch a few posts; see what's removed
- Data: We get posts before the Chinese censor them
- pprox 13% censored overall
- Everyone knows the Goal:

- What Could be the Goal?
 - 1. Stop criticism of the state Wrong
 - 2. Stop collective action *Right*
- Implications: Social Media is Actionable!
 - Chinese leaders:
 - measure criticism: to judge local officials
 - censor: to stop events with collective action potential
 - Thus, we can use criticism & censorship to predict:
 - Officials in trouble, likely to be replaced
 - Dissident arrests; new peace treaties; emerging scandals
 - Disagreements between central and local leaders

• The Quant-Qual divide exists in *every* field.

- The Quant-Qual divide exists in *every* field.
- Qualitative researchers: overwhelmed by information; need help

- The Quant-Qual divide exists in *every* field.
- Qualitative researchers: overwhelmed by information; need help
- Quantitative researchers: recognize the huge amounts of information in qualitative analyses, starting to analyze unstructured text, video, audio as data

- The Quant-Qual divide exists in *every* field.
- Qualitative researchers: overwhelmed by information; need help
- Quantitative researchers: recognize the huge amounts of information in qualitative analyses, starting to analyze unstructured text, video, audio as data
- Expert-vs-analytics contests: Whenever enough information is quantified, a right answer exists, and good analytics are applied: analytics wins

- The Quant-Qual divide exists in *every* field.
- Qualitative researchers: overwhelmed by information; need help
- Quantitative researchers: recognize the huge amounts of information in qualitative analyses, starting to analyze unstructured text, video, audio as data
- Expert-vs-analytics contests: Whenever enough information is quantified, a right answer exists, and good analytics are applied: analytics wins
- Moral of the story:

- The Quant-Qual divide exists in *every* field.
- Qualitative researchers: overwhelmed by information; need help
- Quantitative researchers: recognize the huge amounts of information in qualitative analyses, starting to analyze unstructured text, video, audio as data
- Expert-vs-analytics contests: Whenever enough information is quantified, a right answer exists, and good analytics are applied: analytics wins
- Moral of the story:
 - Fully human is inadequate

- The Quant-Qual divide exists in *every* field.
- Qualitative researchers: overwhelmed by information; need help
- Quantitative researchers: recognize the huge amounts of information in qualitative analyses, starting to analyze unstructured text, video, audio as data
- Expert-vs-analytics contests: Whenever enough information is quantified, a right answer exists, and good analytics are applied: analytics wins
- Moral of the story:
 - Fully human is inadequate
 - Fully automated fails

- The Quant-Qual divide exists in *every* field.
- Qualitative researchers: overwhelmed by information; need help
- Quantitative researchers: recognize the huge amounts of information in qualitative analyses, starting to analyze unstructured text, video, audio as data
- Expert-vs-analytics contests: Whenever enough information is quantified, a right answer exists, and good analytics are applied: analytics wins
- Moral of the story:
 - Fully human is inadequate
 - Fully automated fails
 - We need computer assisted, human controlled technology

- The Quant-Qual divide exists in *every* field.
- Qualitative researchers: overwhelmed by information; need help
- Quantitative researchers: recognize the huge amounts of information in qualitative analyses, starting to analyze unstructured text, video, audio as data
- Expert-vs-analytics contests: Whenever enough information is quantified, a right answer exists, and good analytics are applied: analytics wins
- Moral of the story:
 - Fully human is inadequate
 - Fully automated fails
 - We need computer assisted, human controlled technology
 - (Technically correct, & politically much easier)

• Its cheap and powerful; don't skimp!

- Its cheap and powerful; don't skimp!
 - Off-the-shelf analytics \rightsquigarrow big advances

- Its cheap and powerful; don't skimp!
 - Off-the-shelf analytics \rightsquigarrow big advances
 - Innovative analytics \rightsquigarrow immensely better than off-the-shelf

- Its cheap and powerful; don't skimp!
 - Off-the-shelf analytics \rightsquigarrow big advances
 - Innovative analytics \rightsquigarrow immensely better than off-the-shelf
- Save it for last first!

- Its cheap and powerful; don't skimp!
 - Off-the-shelf analytics \rightsquigarrow big advances
 - Innovative analytics \rightsquigarrow immensely better than off-the-shelf
- Save it for last first!
 - The goal is "inference":

using facts you know to learn about facts you don't know

- Its cheap and powerful; don't skimp!
 - Off-the-shelf analytics \rightsquigarrow big advances
 - Innovative analytics \rightsquigarrow immensely better than off-the-shelf

- The goal is "inference": using facts you know to learn about facts you don't know
- The uncertainties in inference: not having the facts you need (most statistics are designed solely to overcome data problems)

- Its cheap and powerful; don't skimp!
 - Off-the-shelf analytics \rightsquigarrow big advances
 - Innovative analytics \rightsquigarrow immensely better than off-the-shelf

- The goal is "inference": using facts you know to learn about facts you don't know
- The uncertainties in inference: not having the facts you need (most statistics are designed solely to overcome data problems)
- Building analytics during design:

- Its cheap and powerful; don't skimp!
 - Off-the-shelf analytics \rightsquigarrow big advances
 - Innovative analytics \rightsquigarrow immensely better than off-the-shelf

- The goal is "inference": using facts you know to learn about facts you don't know
- The uncertainties in inference: not having the facts you need (most statistics are designed solely to overcome data problems)
- Building analytics during design:
 - avoids problems before they occur

- Its cheap and powerful; don't skimp!
 - Off-the-shelf analytics \rightsquigarrow big advances
 - Innovative analytics \rightsquigarrow immensely better than off-the-shelf

- The goal is "inference": using facts you know to learn about facts you don't know
- The uncertainties in inference: not having the facts you need (most statistics are designed solely to overcome data problems)
- Building analytics during design:
 - avoids problems before they occur
 - saves a fortune,

- Its cheap and powerful; don't skimp!
 - Off-the-shelf analytics \rightsquigarrow big advances
 - Innovative analytics \rightsquigarrow immensely better than off-the-shelf

- The goal is "inference": using facts you know to learn about facts you don't know
- The uncertainties in inference: not having the facts you need (most statistics are designed solely to overcome data problems)
- Building analytics during design:
 - avoids problems before they occur
 - saves a fortune,
 - opens many more possibilities

- Its cheap and powerful; don't skimp!
 - Off-the-shelf analytics \rightsquigarrow big advances
 - Innovative analytics \rightsquigarrow immensely better than off-the-shelf

- The goal is "inference": using facts you know to learn about facts you don't know
- The uncertainties in inference: not having the facts you need (most statistics are designed solely to overcome data problems)
- Building analytics during design:
 - avoids problems before they occur
 - saves a fortune,
 - opens many more possibilities
- Build a new discipline of data science

For more information

GaryKing.org

Institute for Quantitative Social Science Harvard University