Computational Journalism:
A Call to Arms to Database Researchers

Sarah Cohen Public Policy, Duke U.

Chengkai Li CSE, U. Texas Arlington

Jun Yang CS, Duke U.

Cong Yu Google Inc.

CIDR, January 2011

Crisis

- Traditional news media:
  fewer readers → lower ad revenue → fewer resources
  → less original investigative reporting
- Journalism’s watchdog function is in trouble

Quis custodiet ipsos custodes?
(Who will guard the guardians?)

- Who will hold governments, corporations, and powerful individual accountable to society?

http://www.dbgallery.co.uk/historys-whos-who/195869_socrates.html

Opportunity

- Democratizing data: more data are becoming publicly available

- Computation has a proven track record with big data

☞Computational journalism

  - Lower cost
  - Increase effectiveness
  - Broaden participation: democratizing data analysis

http://www.filetransit.com/images/screen/2f4df0324760b79935b80ea340398d82_Matrix_Code_Emulator.jpg

Fact checking

… (Lincoln) Davis voted with Nancy Pelosi 94 percent of the time…

… For 36 months in a row, our district has maintained the lowest unemployment rate among our neighboring five districts…

- Fact-checking is absurdly difficult, even if you know SQL and the databases are cleansed and documented

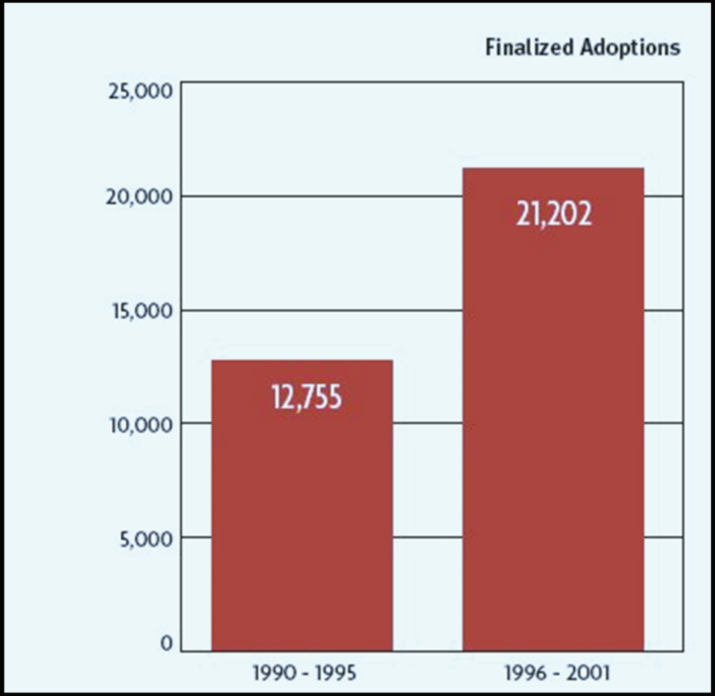
☞ *U-check: a relational investigative tool for you*

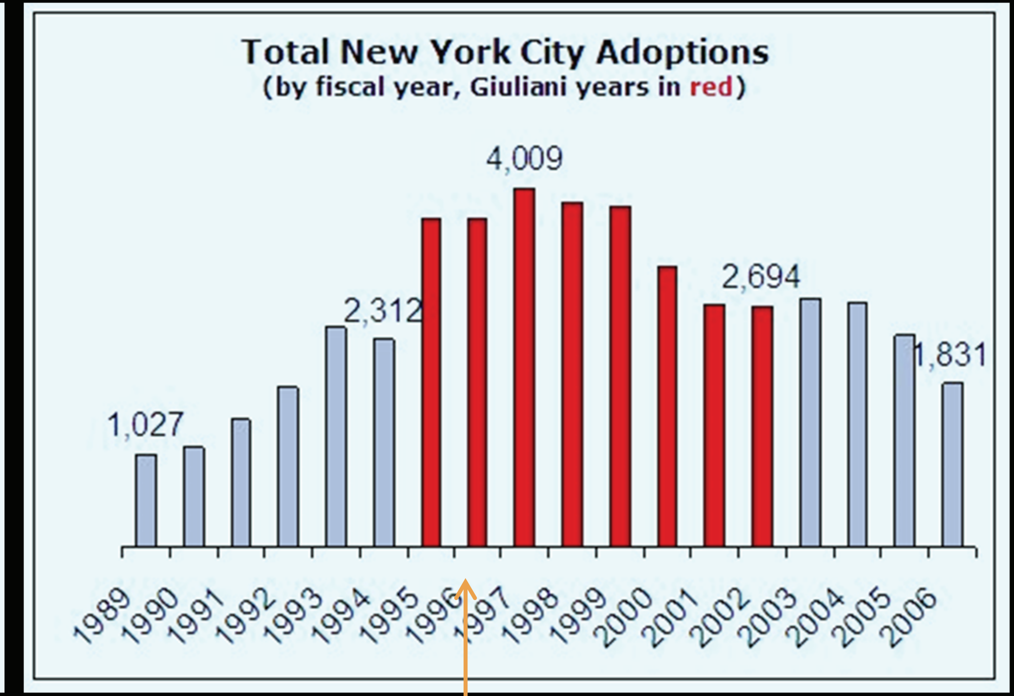
- No knowledge of schema or SQL required

- But is this simply natural language querying (NLQ)?

Example: Giuliani's adoption claim

- In the 2007 Republican presidential debate, Giuliani claimed that "adoptions went up 65 to 70 percent" in New York when he was in office





Administration for Children's Services was created in 1996

http://www.factcheck.org/elections-2008/levitating_numbers.html

Why U-check ≠ NLQ

- Claims often are vague and/or involve complex queries
- Users don't expect one-click fact-checking with instant gratification
- Clarifying a claim and tweaking the way it presents data are instructive in their own right

☞*An interactive interface that relies on user feedback*

- Suggest possible SQL queries for user to choose
- To help user choose, show English translations, preview answers, ask questions…

Fact-check+

… For 36 months in a row, our district has maintained the lowest unemployment rate among our neighboring five districts…

- Test how robust a claim is

  What's the margin? Did it change over time?
  What if we compare with six instead of five districts?

- See if similar claims hold for different settings

  How does my district do in a similar comparison?
  How about median income instead of employment rate?

- Monitor a claim over time

  What if we revisit the comparison a year later?
  Can we get an alert when the streak is broken?

☞ *Allow reuse of expertise/effort beyond a single story*

Finding answers → finding questions

- U-check allows us to build up a “library” of datasets, queries leading to claims, and stories using them

☞*A Reporters’ Black Box*

  - Learn “standard” query templates from the library and human experts
  - Run all templates on new/updated data to find claims that hold
  - Rank claims for further investigation by journalists

http://2.bp.blogspot.com/_5F-zDFdXlOY/SYe4qdS_GBI/AAAAAAAAAR4/BFQC7ioIPjE/s320/black-box.jpg

Vision: a cloud for the crowd

Cloud: aggregate/share computing resources

- Large-scale, real-time data analysis
  - E.g., map/reduce for machine translation, information extraction, reporters' black box, etc.

Crowd: aggregate/share data, tools, and insights

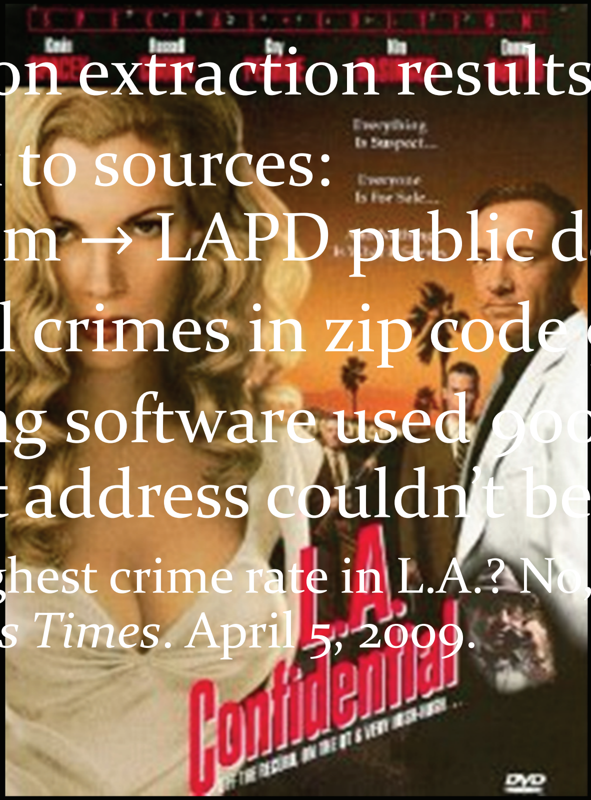
- Leverage the crowd in simpler and more effective ways
  - An "optimizer" for the investigative process with crowdsourcing support

Example: crime-ridden LA City Hall?

Suppose many blogs seem to be talking about high crime rates around LA City Hall; what do you do?

- Verify information extraction results from blogs?
- Trace blogs back to sources:
  → EveryBlock.com → LAPD public database
- Check individual crimes in zip code 90012
- LAPD's geocoding software used 90012 as the default zip when a street address couldn't be mapped!

☞ Welsh and Smith. "Highest crime rate in L.A.? No, just an LAPD map glitch." *The Los Angeles Times*. April 5, 2009.



An investigative “optimizer”

- The investigative process is difficult to plan
- Can our system help plan it intelligently (incl. directing the crowd), in a goal-driven fashion, like a query optimizer?
  - Specify tasks declaratively
  - Identify mini-tasks that can be crowdsourced
  - Quantify cost-benefit of mini-tasks
  - Matching mini-tasks to users
  - Coordinate/reprioritize execution of mini-tasks
  - …

Conclusion

- The need to save watchdog journalism is pressing
- You and I may hold the key
- Journalism is not only a consumer of technology, but it can also drive computer science
  - Our paper discusses more ideas and relevant research areas, but we have barely scratched the surface
- Don’t miss out working on something with a cause!

http://www.cancercouncilnt.com.au/Images/Call%20to%20Arms%20logoc.jpg