Business Problem: Political Network and Influence Among Graduates of Top US Universities

1) What are the connections between graduates of Top US Schools and US Politicians ?
    - How is this network affecting US Federal Government in recent elections?
2) Current election season: what is current real time social media sentiment?
3) How much money do graduates of top schools donate and to which politicians/parties?
    - What are the total dollars donated to politicians and how are dollars split by party?

Obtaining and Loading Data

Challenge: How to obtain a complete data set of LittleSis.org

- LittleSis makes its entire database freely available through API accessbile with a user key
- Calls are HTTP calls; limited to 10,000/day

Plan : Obtain data via loop calls to API or webcrawler

- Unsure of total DB size/time required

Resolution: Reach LittleSis support for direct transfer of complete DB dump

Challenge: SQL format of MySQL Littesis datadump incompatible with PostgresSQL.

- How to migrate, transform and load local 4 GB MySQL DB to EC2/Postgres DB

➔ Why Postgres as Datasource?

Postgres is the database of choice for the following reasons:

- Recent coursework featured Postgres (familiarity)
- Open source , non-proprietary
- Simple table structure and types
- Pre-installed and configured on EC2 AMI for w205

Plan:

1) generate schema from MySQL
2) export MySQL tables to CSVs
3) migrate CSVs to EC2

Challenge: MySQL CSV export format **incompatible** with Postgres

- Entire wikis dedicated to converters; not straightforward process

Resolution: Discovery of Pentaho converter

- Pentaho takes a MySQL .sql and automaically generates :
    1) Postgres schema and Postgres-compatible csvs
    2) Entire Postgres .sql dump file including schema and data

Resolution: Build LittleSis database stepwise/modularly:

1) load schema
2) load data/CSVs generated by Pentaho

Why build step-wise rather than running Postgres .SQL?

- Devloper can view/modify schema code
- Understand grants in schema
- Modify schema/grants piece-wise while developing

Working with LittleSis Tables:

Challenge: tables are highly indexed and require multiple, iterative joins to achieve digestible content.

Resolution: had to create a number of intermediate tables to study data in a "digestible" format and understand how to satisfy the project proposal. All of these tables are not used by the serving layer but were necessary part of understanding the data locations/flow.

Challenge: dealing with big data, there's an inherent tendency to "Boil the Ocean":

- LittleSis is a vast trove of a political data / connections; desire was to use as much as possible
- Dilemma - too much interesting data/too little time
- Advanced SQL required: target information required advanced SQL
- Example: (this can be considered for next/future steps):
    - Lobby groups/PACs are not tagged to a political party in LittleSis
    - However, recursive joins of Lobbists/PACs connects may reveal a political association
    - Challenge: number of recursive calls varies; political association not guaranteed

Endpoint decision to answer project question:

Identify all persons (not organizations) classified as 'elected representative' or 'politician' and query donations made to these people by graduates of Top Schools.

Choosing a Serving Layer

Why use a REST API as the Serving Layer?

- REST API lends itself to "walking a graph"of relationships
    - Queries linked to results of previous query
- Similar in concept to following links through web pages
- Similar to LittleSis.org website

Final Results using REST API request:

curl http://<hostname>.compute-1.amazonaws.com:8080/topschools
curl http://<hostname>.compute-1.amazonaws.com:8080/donationsummaries/<school or 'all'>/<year or 'all'>
curl http://<hostname>.compute-1.amazonaws.com:8080/donations/<school or all>
curl http://<hostname>.compute-1.amazonaws.com:8080/donations/<gradid>
curl http://<hostname>.compute-1.amazonaws.com:8080/connections/<gradid>

Top 10 Schools (can be swapped out when reproduced) :
Harvard
Yale
Princeton
UPenn
UChicago
MIT
Duke
Columbia
Cal Tech
Stanford

Lessons Learned:

- SQL and CSV formats between databases can be utterly incompatible

- Without 3rd party tool, nearly impossible to migrate
- Manually changing csv/schema formats for a large DB (even using a shell script) too tedious

- Working with highly indexed data requires an intermediate/personal 'read' dictionary

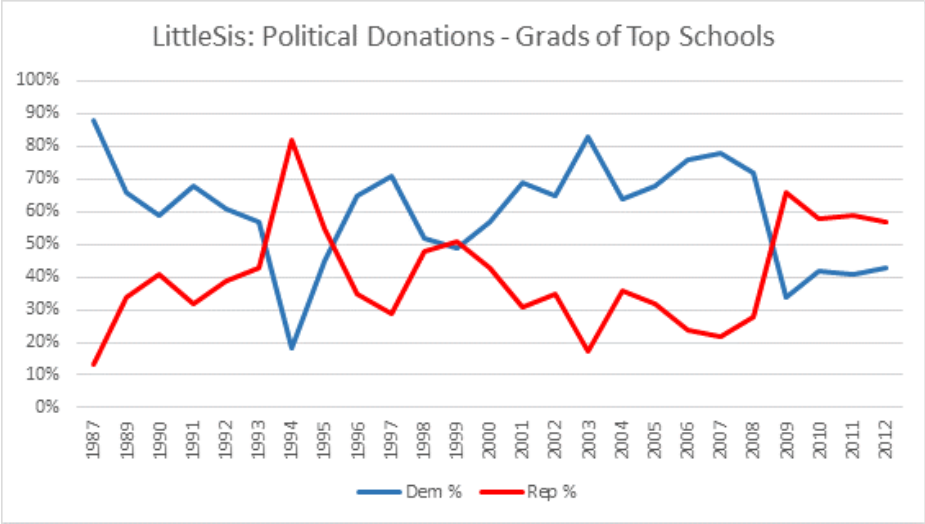
- LittleSis publishes API documentation, but is far from complete; unanswered questions :
    - Why do years for donation records cease at 2012?
    - What is CRUP field in FEC_filing table
    - If start date/end date spans several years but # of filings == 1, how should donation amount be understood? (To resolve this I only used start date, not end date)
    - Why are some elected_representatives (60 of them) not in the political_candidate table?

- REST API is an elegant tool for walking a connections graph; difficult to debug via HTTP calls

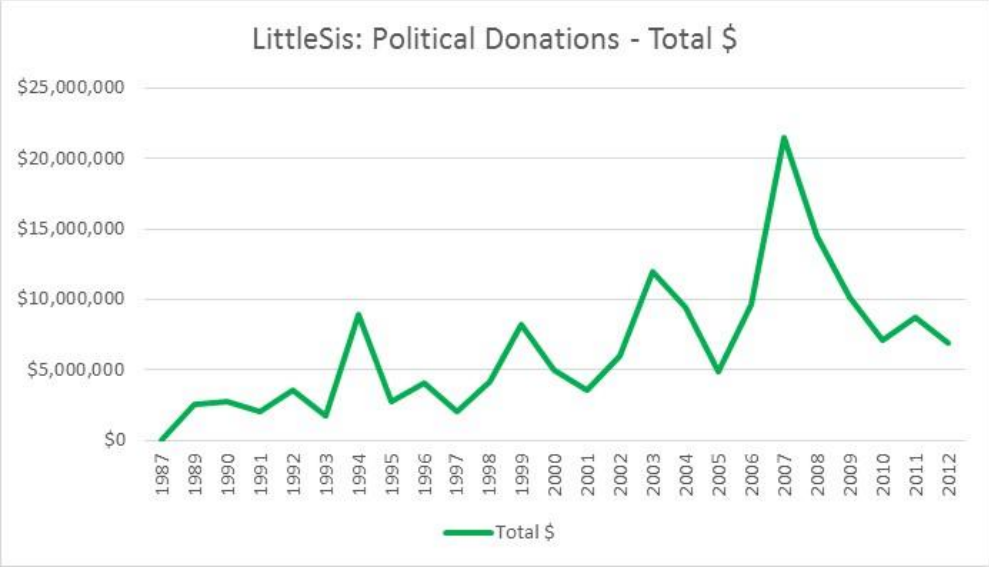
- Overall LittleSis is fascinating database and a great organization to work with. I look forward to working more with Littlesis.org in the future !!!!!

Findings and Discussion (p1. of 3):

Results for all graduates across all top schools:



- 1994 saw a record breaking Republican sweep of federal government positions
- Post 9/11 and entry into the Iraq war, donations trended higher to Democratic candidates /politicians (2001-2008)
- This changed after Obama became president, after which Republican donations surpassed Democratic donations.
- The record-breaking Repbulican sweep of 2010 elections were a direct result of this support.
- Dollar spike in 2007-2008 (seen above) driven by the Obama Presidency campaign.



Findings and Discussion (p2. of 3):

Using the REST API, one can generate all the summary views in the discussion below using the call: *<hostname>/donationsummaries/<string:topschool>/<string:year>, where year == "all".*
The REST API can also be used to show top 10 donations for a top school or for a single grad, top 10 connections for a grad, and additional summary data for donation patterns of graduates of top schools along party lines.

Results show that donation patterns at the top schools ***have direct impact on national elections***. While UPenn, UChicago, Princeton, Columbia show consistent democratic support, other schools see flips between democrat and republican, that mirror the winning parties for those years. In the charts below, there are visible spikes in donations to Republicans during 1994 and 2010 election seasons when republicans had record breaking sweeps in the federal government.

From Wikipedia, record breaking republican election sweeps in 1994 and 2010:

United States elections, 1994

From Wikipedia, the free encyclopedia

The **1994 elections in the United States** were held on November 8, 1994. The election occurred in the middle of Democratic President Bill Clinton's first term in office, and elected the members of 104th United States Congress. This was the year known as the Republican Revolution, in which members of the Republican Party captured majorities in the House of Representatives, Senate and governors mansions. Republicans were able to gain eight Senate seats, fifty-four House seats, and ten governorships. The 1994 elections turned out to be an "epic slaughter" of the Democratic Party, with Republicans winning 54 House and 9 U.S. Senate seats, increasing the number of Republican governors from 20 to 30 (out of 50), and flipping many state legislatures from Democratic to Republican control.[1] The election ended "60 years of Democratic dominance in American politics" and ushered in a period when "the two parties were on a par."[1]

Partisan control of Congress and the presidency

	Previous party	Incoming party
President	Democratic	Democratic
House	Democratic	Republican
Senate	Democratic	Republican

United States elections, 2010

From Wikipedia, the free encyclopedia

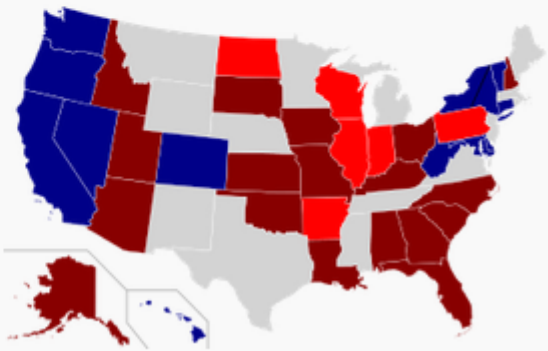
The **2010 United States elections** were held on Tuesday, November 2, 2010. During this midterm election year, all 435 seats in the United States House of Representatives and 37 of the 100 seats in the United States Senate were contested in this election along with 38 state and territorial governorships, 46 state legislatures (except Louisiana, Mississippi, New Jersey and Virginia),[1] four territorial legislatures and numerous state and local races. The election occurred in the middle of Democratic President Barack Obama's first term in office.

Approximately 82.5 million people voted.[2] The Democratic Party suffered massive defeats in many national and state level elections, with many seats switching to Republican Party control. Although the President's party usually loses congressional, statewide and local seats in a midterm elections, the 2010 midterm election season featured some of the biggest losses since the Great Depression. The Republican Party gained 63 seats in the U.S. House of Representatives, recapturing the majority, and making it the largest seat change since 1948 and the largest for any midterm election since the 1938 midterm elections. The Republicans gained six seats in the U.S. Senate, expanding its minority, and also gained 680 seats in state legislative

2010 United States elections

Midterm elections

Election day	November 2
Senate elections	
Seats contested	34 seats of Class III and 3 special elections
Net change	Republican +6



2010 Senate election results map

House elections

Findings and Discussion (p3. of 3):