Analyzing chronological changes in philosophical and religious inclination from text

Seung Heon (Sheon) Han
Advised by Christiane Fellbaum

Motivation

- Classifying textual data (political speeches, newspaper articles, tweets, etc.) by political inclination
  - Highly successful with supervised machine learning
- Limitations:
  - Mostly binary classification into liberal/conservative
  - Short time span. e.g. Election period
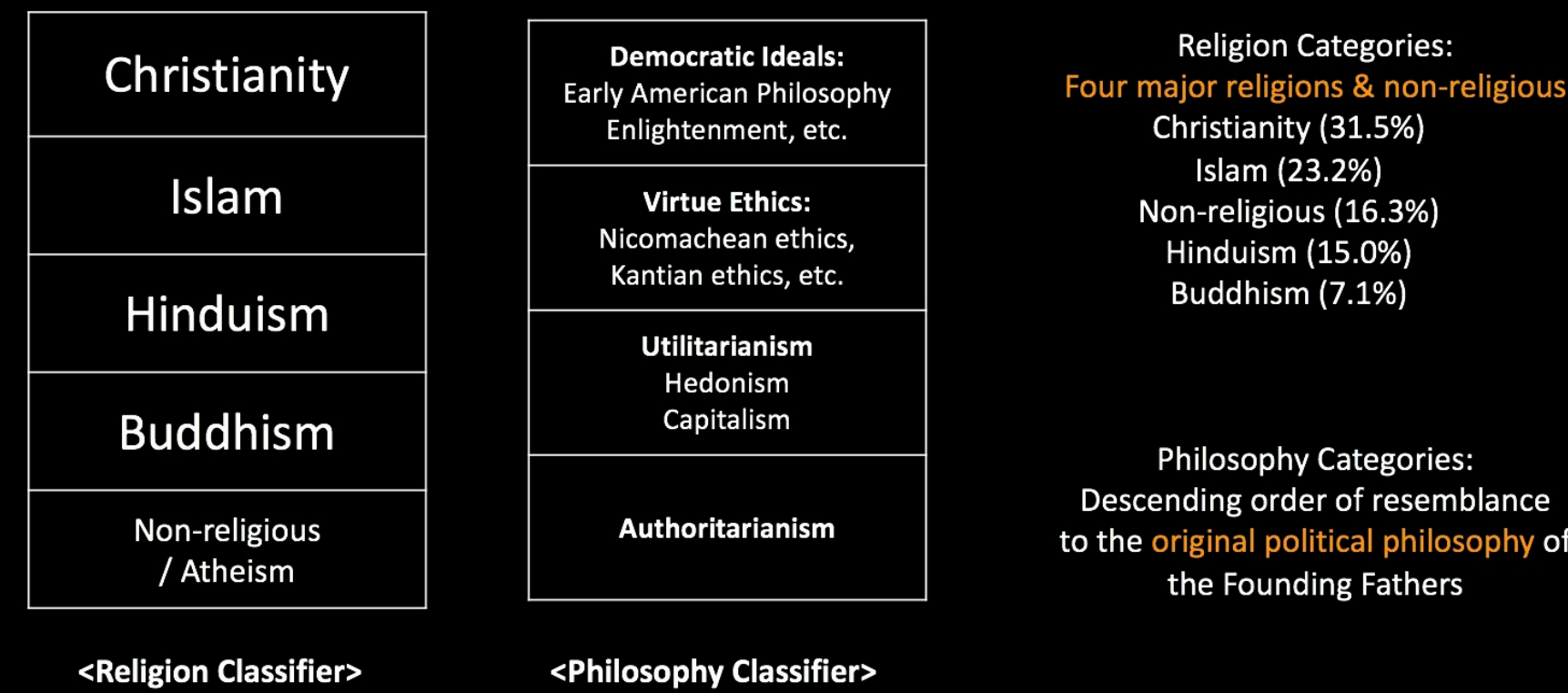- Detect how religious and philosophical inclinations have changed over time

Related Works

- Computational Identification of Ideology in Text (Riabinin, 2009)
  - Conservative/liberals in Canadian Parliamentary Debates
- Political Ideology Detection Using Recursive Neural Networks (Iyyer, et al., 2006)
  - Conservative/neutral/liberal in US Congressional floor debates
- Sentiment Analysis of Political Tweets (Bakliwal et al., 2012)
  - Pos/Neu/Neg Tweets about Irish General Elections
- Determining support or opposition from Congressional floor-debate transcripts(Thomas et al., 2008)
  - Supporting/Opposing speeches to proposed legislation

Inputs and Outputs
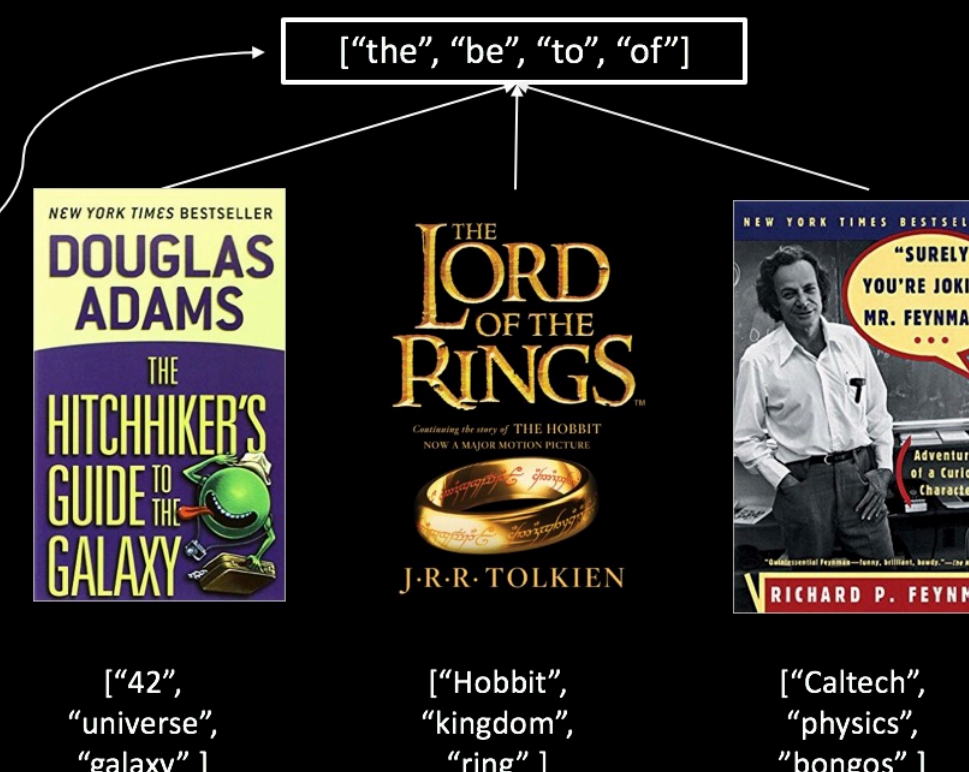
- Political datasets (1789 - 2016):
  - State of the Union Addresses
  - Presidential Nomination Acceptance Speeches from both parties
- Expected Outputs:
  - Map each instance to different categories
  - Observe the difference in the proportions
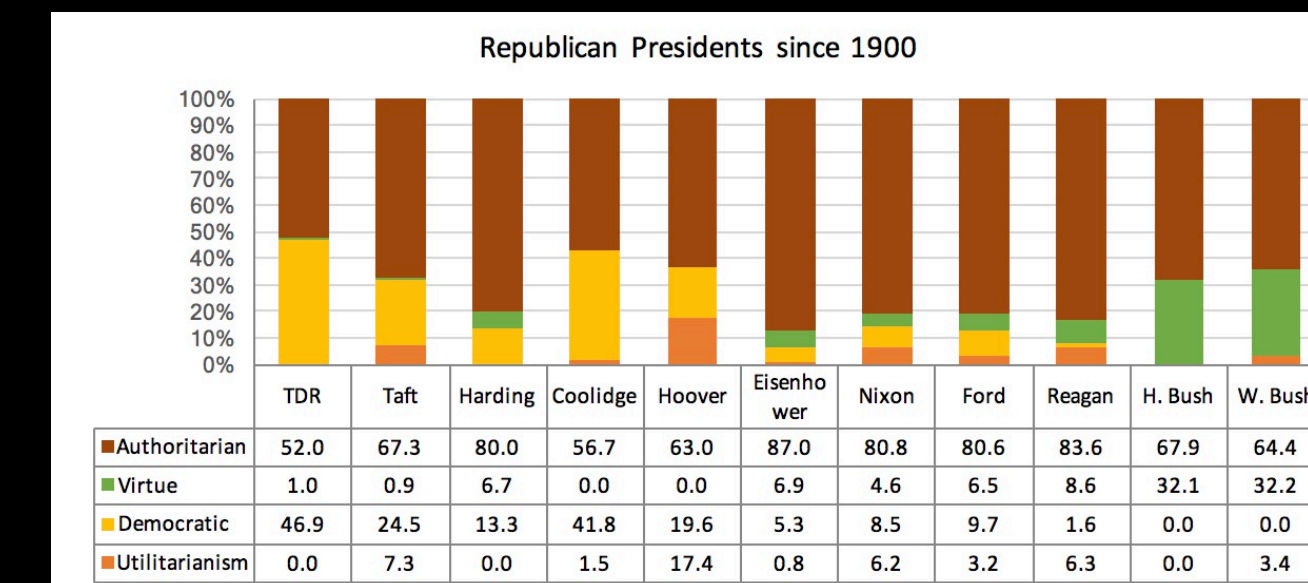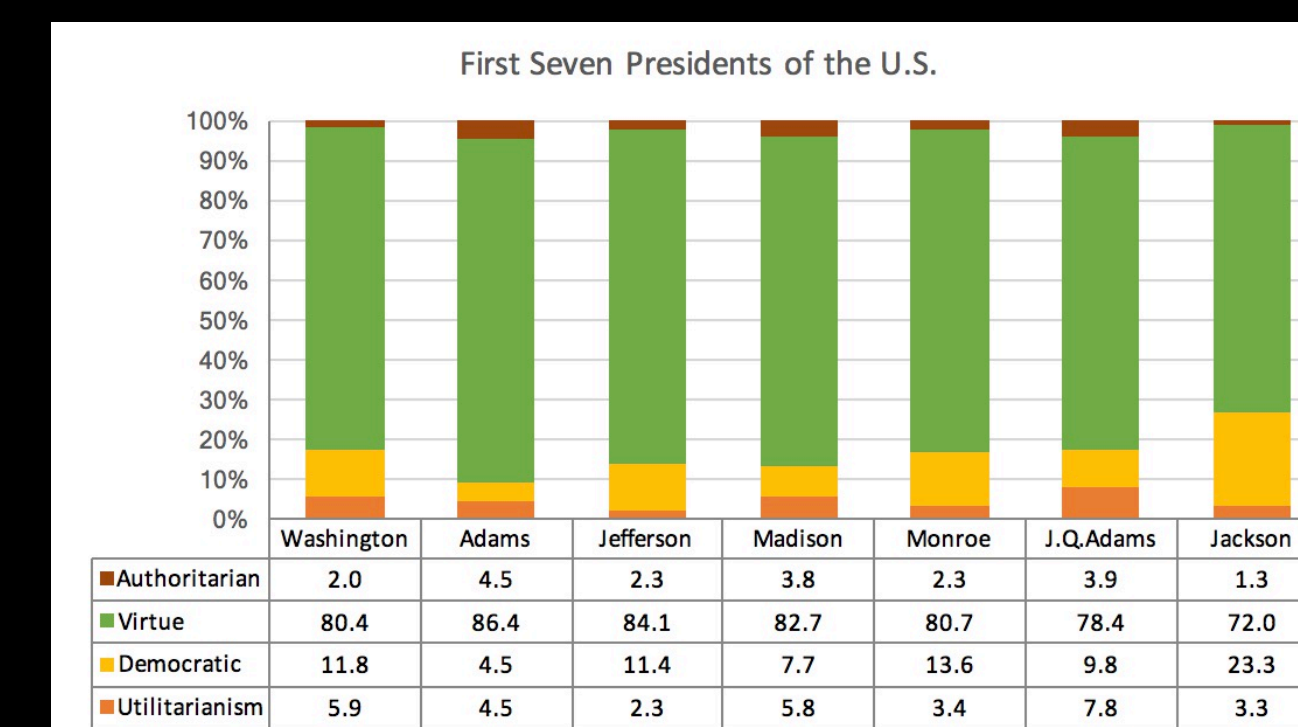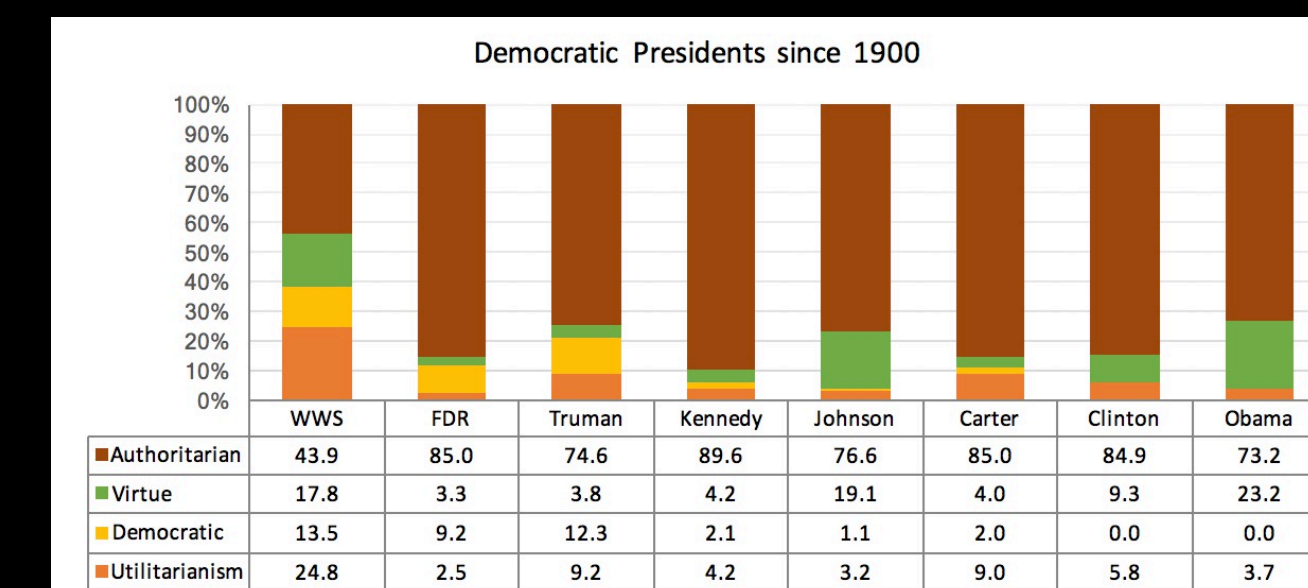
Approach – Two Multiclass Classifiers

Christianity
Islam
Hinduism
Buddhism
Non-religious / Atheism

<Religion Classifier>

Democratic Ideals:
Early American Philosophy
Enlightenment, etc.

Virtue Ethics:
Nicomachean ethics,
Kantian ethics, etc.

Utilitarianism
Hedonism
Capitalism

Authoritarianism

<Philosophy Classifier>

Religion Categories:
Four major religions & non-religious
Christianity (31.5%)
Islam (23.2%)
Non-religious (16.3%)
Hinduism (15.0%)
Buddhism (7.1%)

Philosophy Categories:
Descending order of resemblance
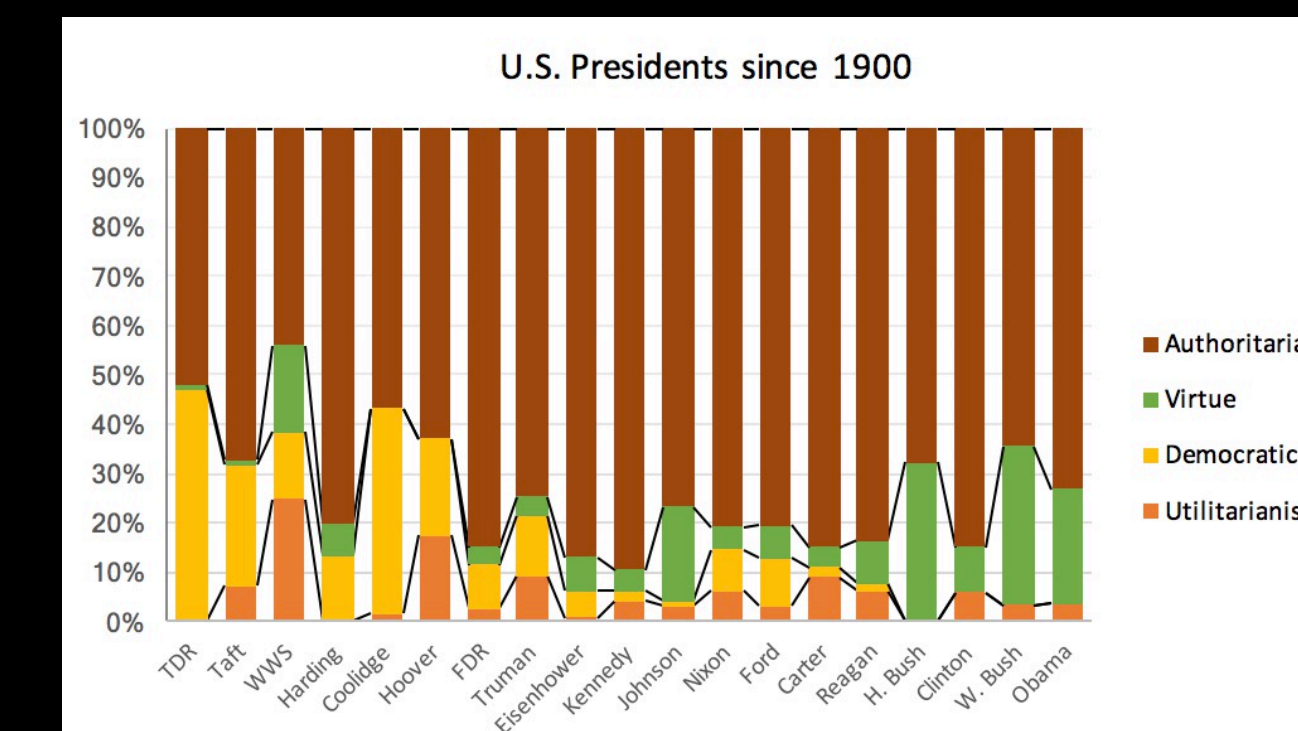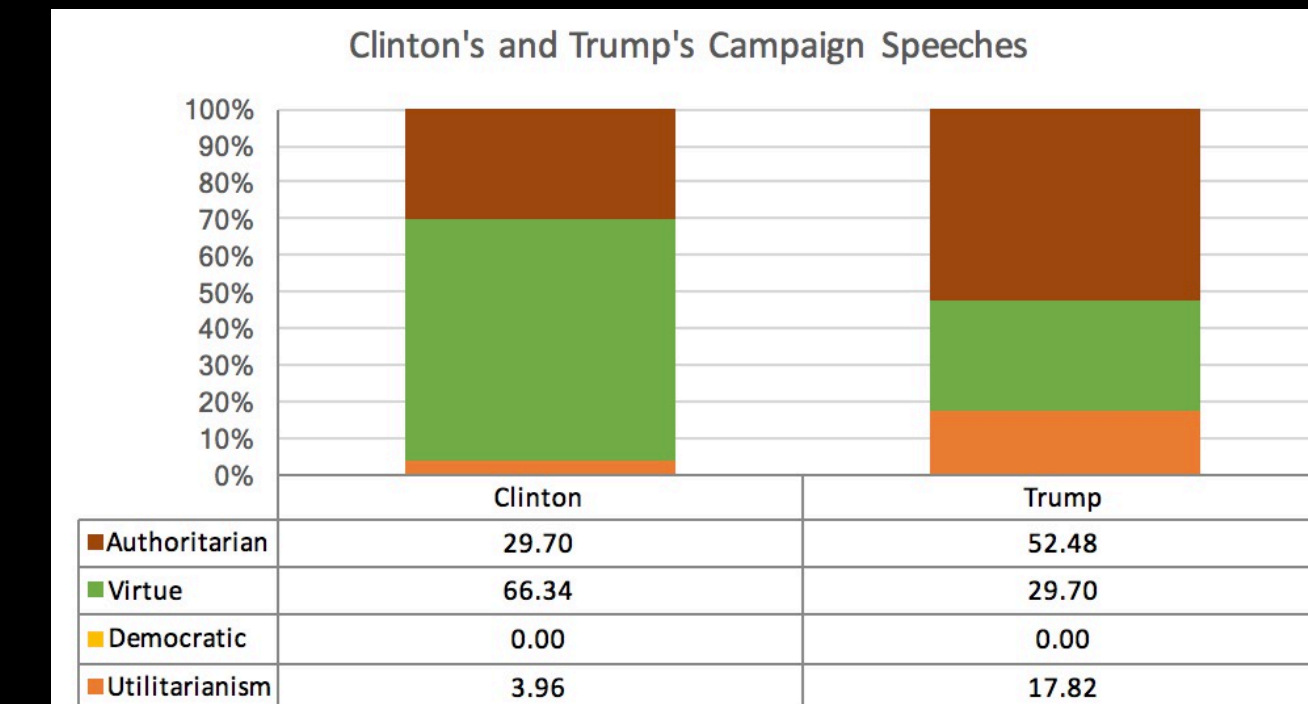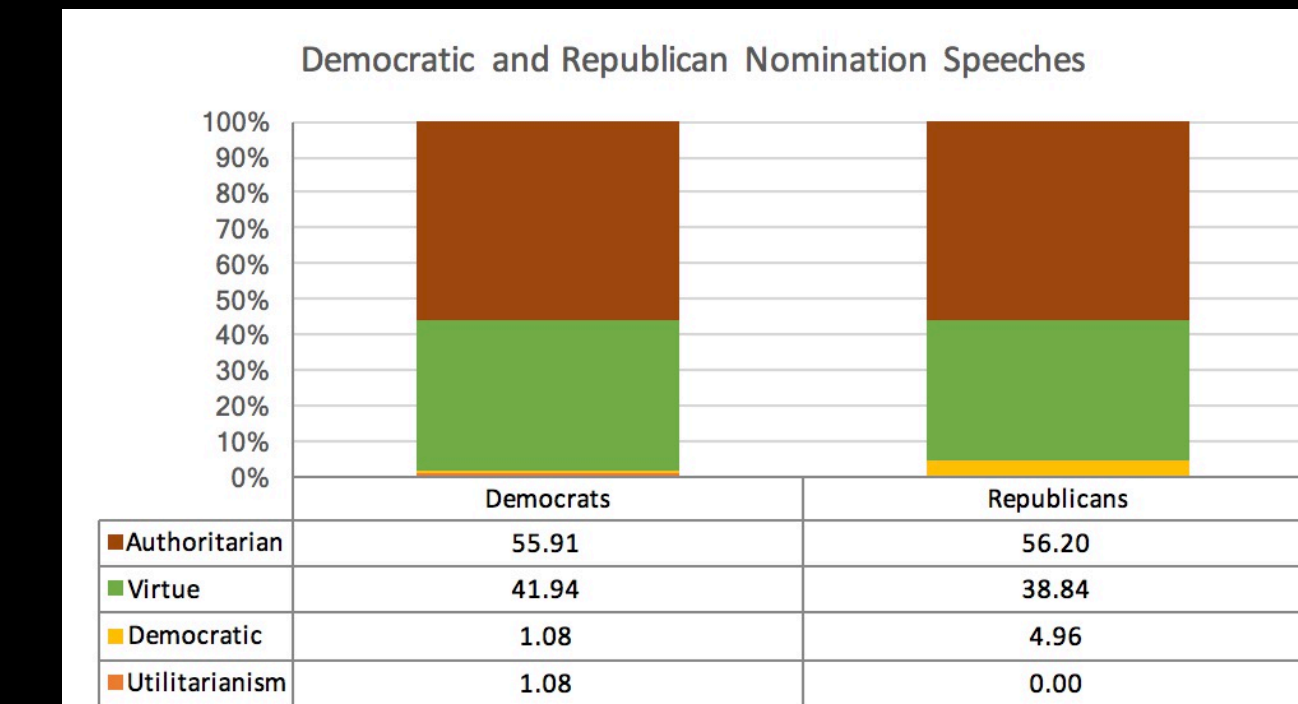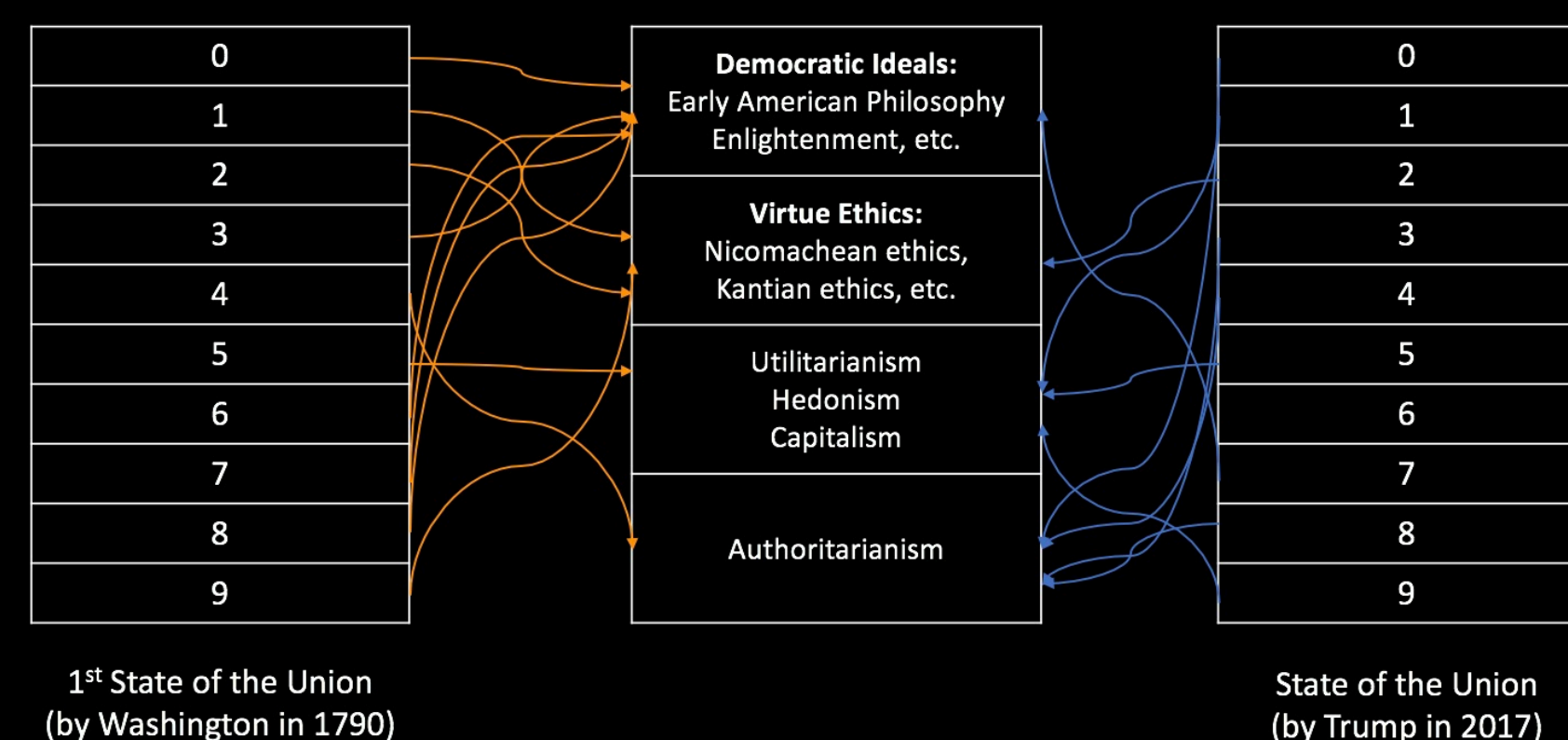to the original political philosophy of
the Founding Fathers

Implementation – TF-IDF

- Bag of words representation
  - The number of distinct words in the datasets as features.
  - However, most frequent words are less useful.
- "Term Frequency - Inverse Document Frequency"
  1) Pick most frequent words
  2) Measure how infrequently the word occurs across all documents

["the", "be", "to", "of"]

["42", "universe", "galaxy"]

["Hobbit", "kingdom", "ring"]

["Caltech", "physics", "bongos"]

Implementation - Labeling/Mapping instances

Democratic Ideals:
Early American Philosophy
Enlightenment, etc.

Virtue Ethics:
Nicomachean ethics,
Kantian ethics, etc.

Utilitarianism
Hedonism
Capitalism

Authoritarianism

1st State of the Union
(by Washington in 1790)

State of the Union
(by Trump in 2017)

Democratic and Republican Nomination Speeches

	Democrats	Republicans
Authoritarian	55.91	56.20
Virtue	41.94	38.84
Democratic	1.08	4.96
Utilitarianism	1.08	0.00

Clinton's and Trump's Campaign Speeches

	Clinton	Trump
Authoritarian	29.70	52.48
Virtue	66.34	29.70
Democratic	0.00	0.00
Utilitarianism	3.96	17.82

U.S. Presidents since 1900

Democratic Presidents since 1900

	WWS	FDR	Truman	Kennedy	Johnson	Carter	Clinton	Obama
Authoritarian	43.9	85.0	74.6	89.6	76.6	85.0	84.9	73.2
Virtue	17.8	3.3	3.8	4.2	19.1	4.0	9.3	23.2
Democratic	13.5	9.2	12.3	2.1	1.1	2.0	0.0	0.0
Utilitarianism	24.8	2.5	9.2	4.2	3.2	9.0	5.8	3.7

First Seven Presidents of the U.S.

	Washington	Adams	Jefferson	Madison	Monroe	J.Q.Adams	Jackson
Authoritarian	2.0	4.5	2.3	3.8	2.3	3.9	1.3
Virtue	80.4	86.4	84.1	82.7	80.7	78.4	72.0
Democratic	11.8	4.5	11.4	7.7	13.6	9.8	23.3
Utilitarianism	5.9	4.5	2.3	5.8	3.4	7.8	3.3

Republican Presidents since 1900

	TDR	Taft	Harding	Coolidge	Hoover	Eisenhower	Nixon	Ford	Reagan	H. Bush	W. Bush
Authoritarian	52.0	67.3	80.0	56.7	63.0	87.0	80.8	80.6	83.6	67.9	64.4
Virtue	1.0	0.9	6.7	0.0	0.0	6.9	4.6	6.5	8.6	32.1	32.2
Democratic	46.9	24.5	13.3	41.8	19.6	5.3	8.5	9.7	1.6	0.0	0.0
Utilitarianism	0.0	7.3	0.0	1.5	17.4	0.8	6.2	3.2	6.3	0.0	3.4

Future Works and Limitations

- Separate philosophy classifier from politics classifier
- Boundaries between different schools of thought and religious sects not clear
- Acquire other datasets
  - The New York Times (1987 – 2007)
  - Newspapers in the liberal/conservative states
  - Princeton Commencement Speeches (1900-2016)