CS231: Project 8

Word Trends

Parth Parth | CS231L-A | Dr. Alan Harper

Abstract

In this project, a Heap has been created to store words and their count in given files. A Heap is a tree-based data structure which is a complete (in this project, binary) tree that satisfies the "heap property" which is that any node in the heap is either greater than (if it is a max heap) or less than (if it is a min heap) than its parent node. The node at the top with no parents is called the root.

In the project, the heap has been used to analyze a. the ten most common words on Reddit between 2008-2015 and b. look at trends in data of words over the same time period.

Analysis

By running *CommonWordsFinder.java*, the following results were obtained:

	2008	2009	2010	2011	2012	2013	2014	2015
1	the	the	the	the	the	the	the	the
2	to	to	to	to	to	to	to	to
3	a	a	a	a	a	a	a	a
4	of	and	i	i	i	i	i	i
5	and	i	and	and	and	and	and	and
6	i	of	of	of	of	of	of	of
7	that	that	you	you	you	you	you	you
8	is	is	that	that	it	it	it	it
9	in	you	it	it	that	that	is	is
10	you	it	is	is	is	is	that	that

From analyzing the table, it was found that the most common words for all eight years were

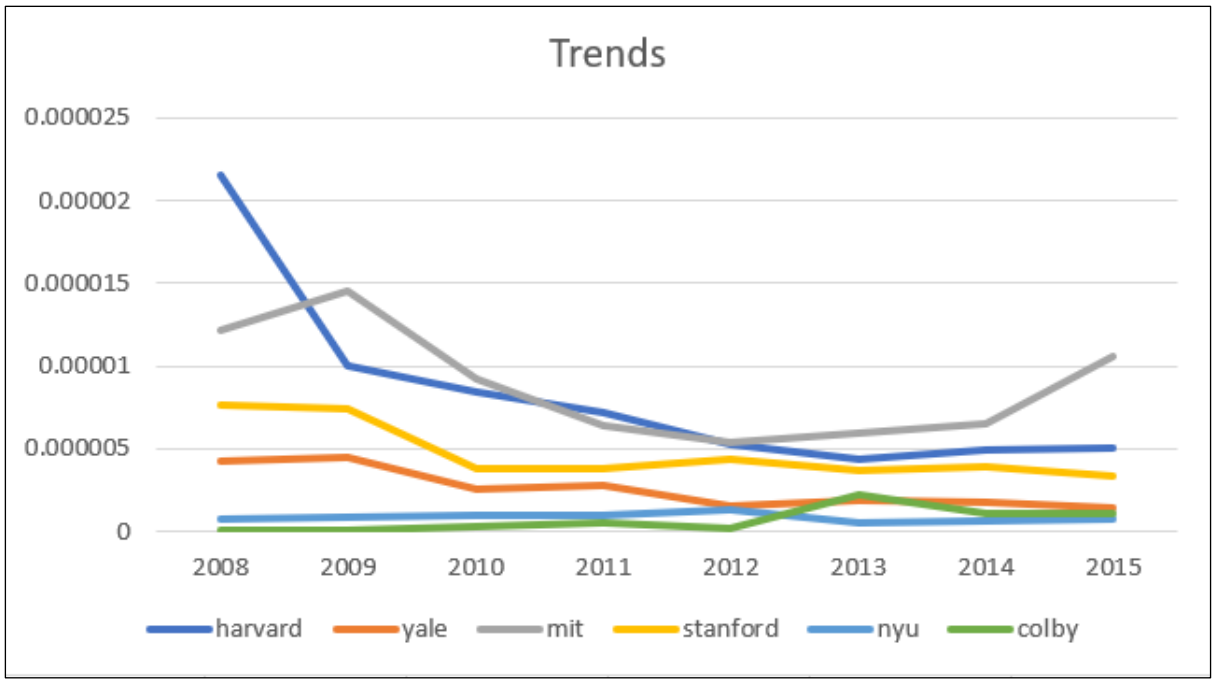
1. the
2. to
3. a
4. i
5. and
6. of
7. you
8. it
9. is
10. that

a. except for 2008 when “it” was replaced by “in.”
b. “the” and “to” remained the top two most popular words with “i,” “and,” “of,” and “you” being fourth through seventh place starting 2010.

Extension 0 / More Analysis

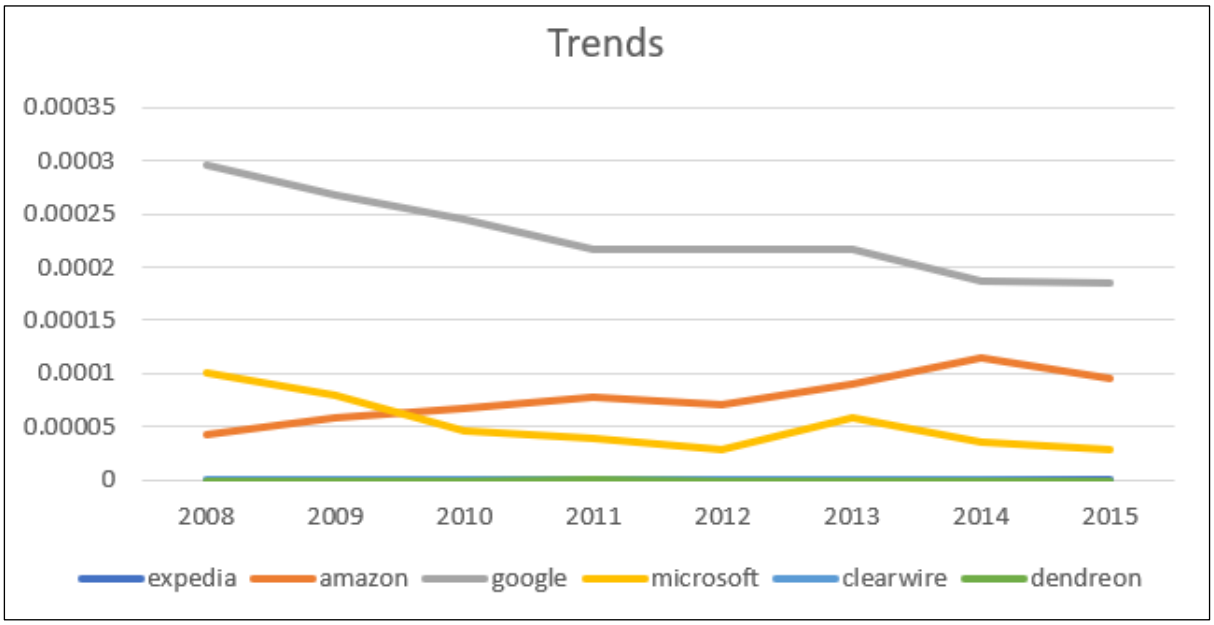
For this extension, I have analyzed trends of custom words and plotted my results:

1. harvard, yale, mit, stanford, nyu, colby



My hypothesis would be that the initial dip seen between 2008 and 2012 is the result of the 2008 financial crisis when it became unaffordable for a lot of people to go to college. However, as the job market picked back up in 2012, people started going to college again, which explains the frequency stabilizing (and even reversing for MIT and Harvard). The 2013 uptick in Colby's searches might be related to the scandal that involved the former Barclays top executive in late 2012.

2. expedia, amazon, google, microsoft, clearwire, dendreon



These are the most popular tech stocks in 2012. As can be seen, Google, Amazon, and Microsoft are much more popular than the other three stocks. While the decrease in Google could just be explained by the fact that the number of other words on Reddit increased, the increase in Microsoft and Amazon coincide with the release of Windows 8 (Oct 2012 which shows in 2013) and the stock market heavily betting on Amazon in 2013 (after Amazon stock started increasing rapidly).

Extension 1

In this extension, I have implemented a new class *CommonWordsFinderArrayList.java* that uses an ArrayList to store words. It is then sorted and the top ten words retrieved. A run-time analysis of this process using a heap and an ArrayList has been done below.

	Heap	ArrayList
2008	0.0031345	0.0646494
2009	0.0038787	0.0782093
2010	0.0027109	0.0771274
2011	0.0028156	0.0869174
2012	0.0028086	0.0579286
2013	0.0036631	0.0485204
2014	0.0052887	0.0576521
2015	0.0040186	0.0686786
Average	0.0035398	0.0674604

As is clear from the data, the ArrayList is almost 20 times slower when compared to the Heap.

References / Acknowledgements

I took no help with the code from any source. The top stocks of 2012 were retrieved from https://www.geekwire.com/2013/nasdaq-top-performers-expedia-takes-flight/ .