***May 16, 2012***

*Similarity score* is the cosine similarity between the scores of terms extracted from the article and the scores of terms representing the matching category.

- In probability ratios score, notice the huge difference in similarity between documents in the training set and documents not in that set. This is probably because I created the latter set by manually copying text from Wikipedia articles, removing only the table of contents and all footnotes, and thus introducing a lot of noise.

The cases of Napoleon and O.J. Simpson are particularly interesting. We’d expect Napoleon’s bio to be classified as either "Politics",  "Warfare", or "Royalty", and apparently it's writing style resembles the latter the most. O.J. Simpson’s bio is even more intriguing, as it was classified as “Politics” (perhaps because of the trial references; we don’t have a Law category), with “Sport” coming in second (0.00485) and “Media” third (0.00462). Both examples demonstrate how our tool can be used to identify the tone (better word?) of an article.

- Should look at the most frequent terms for O.J. and figure out to which category they belong.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **TF\*IDF** |  |  | **Probability** |  |  |
| **Article** | **Category** | **Similarity Score** | **Time** | **Category** | **Similarity Score** | **Time** |
| AC/DC |  |  |  | Music | 0.0937 | 8.596 |
| Cillian Murphy | Media | 0.028  (2.029e-05) | 6.75  (5.94) | Media | 0.1787 | 8.527 |
| Tim Duncan | Sport and recreation | (5.567e-05) | (10.12) | Sport and recreation | 0.1471 | 10.215 |
| Anton Chekhov |  |  |  | Literature and theatre | 0.1088 | 5.356 |
| Tiger Woods | Sport and recreation | 0.0158  (1.729e-05) | 10.515  (10.69) | Sport and recreation | 0.0078 | 10.644 |
| Karl Marx |  |  |  | Politics and government | 0.0079 | 13.281 |
| Agatha Christie |  |  |  | Literature and theatre | 0.0085 | 9.374 |
| Toni Blair |  |  |  | Politics and government | 0.0027 | 11.423 |
| Napoleon | Warfare | 0.068  (6.54e-06) | 18.02  (20.72) | Royalty, nobility and heraldry | 0.0126 | 18.791 |
| O. J. Simpson | Sport and recreation | -0.0437  (9.55e-06) | 5.213  (5.27) | Politics and government | 0.0076 | 5.188 |

Highlighted articles are in the training set.

Values in () were achieved after replacing Term Count with Term Frequency (i.e., dividing number of occurrences in a document by total number of words in a document)

***May 17, 2012***

Using the new String/Regex cleaner, we get almost the same results at a fraction of the time it takes the POS cleaner. String/Regex actually did better on Agatha Christie! This is even before removing proper nouns (i.e., capitalized words not at the beginning of a sentence) using String/Regex and Unicode support.

Two features that probably help the Regex cleaner get better results are:

1. The former discards tokens containing non-English characters, unlike the latter, which occasionally stores fragments of such characters that only add noise.
2. The former converts all characters to lowercase.

It’s main drawback, however, is the lack of proper noun removal.

I’m pretty happy with the results, but we need to evaluate more articles.

**Using String/Regex cleaner**

Time to compute TF-IDF for entire corpus: 2.24 sec

|  |  |  |  |
| --- | --- | --- | --- |
| **Article** | **STREX Suggested Category** | **Sim Score** | **Elapsed time** |
| Cillian Murphy | Media | (1.900e-05) | 0.056 |
| AC/DC | Music | (2.173e-05) | 0.132 |
| Anton Chekhov | Literature and theatre | (3.438e-05) | 0.188 |
| Tim Duncan | Sport and recreation | (4.681e-05) | 0.254 |
| Tiger Woods | Sport and recreation | (1.274e-05) | 0.321 |
| Karl Marx | Literature and theatre | (4.317e-06) | 0.398 |
| Agatha Christie | Literature and theatre | (5.552e-06) | 0.463 |
| Toni Blair | Politics and government | (5.485e-06) | 0.537 |
| Napoleon | Warfare | (5.296e-06) | 0.625 |
| O. J. Simpson | Sport and recreation | (6.115e-06) | 0.683 |

**Using POS cleaner**

Time to compute TF-IDF for entire corpus: 3.45548892021

|  |  |  |  |
| --- | --- | --- | --- |
| **Article** | **Suggested Category** | **Sim Score** | **Elapsed time** |
| Cillian Murphy | Media | (2.029e-05) | 8.339 |
| AC DC | Music | (4.024e-05) | 16.478 |
| Anton Chekhov | Literature and theatre | (9.143e-06) | 21.421 |
| Tim Duncan | Sport and recreation | (5.567e-05) | 31.222 |
| Tiger Woods | Sport and recreation | (1.729e-05) | 41.500 |
| Karl Marx | Literature and theatre | (5.819e-06) | 54.521 |
| Agatha Christie | Media | (8.413e-06) | 63.898 |
| Toni Blair | Politics and government | (7.505e-06) | 75.626 |
| Napoleon | Warfare | (6.540e-06) | 93.386 |
| O. J. Simpson | Sport and recreation | (9.550e-06) | 98.410 |

Side by side:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **STREX** |  |  | **POS** |  |
| **Article** | **Category** | **Sim Score** | **time from t0** | **Category** | **Sim Score** | **time from t0** |
| Cillian Murphy | Media | 1.900e-05 | 0.056 | Media | 2.029e-05 | 8.339 |
| AC/DC | Music | 2.173e-05 | 0.132 | Music | 4.024e-05 | 16.478 |
| Anton Chekhov | Literature and theatre | 3.438e-05 | 0.188 | Literature and theatre | 9.143e-06 | 21.421 |
| Tim Duncan | Sport and recreation | 4.681e-05 | 0.254 | Sport and recreation | 5.567e-05 | 31.222 |
| Tiger Woods | Sport and recreation | 1.274e-05 | 0.321 | Sport and recreation | 1.729e-05 | 41.500 |
| Karl Marx | Literature and theatre | 4.317e-06 | 0.398 | Literature and theatre | 5.819e-06 | 54.521 |
| Agatha Christie | Literature and theatre | 5.552e-06 | 0.463 | Media | 8.413e-06 | 63.898 |
| Toni Blair | Politics and government | 5.485e-06 | 0.537 | Politics and government | 7.505e-06 | 75.626 |
| Napoleon | Warfare | 5.296e-06 | 0.625 | Warfare | 6.540e-06 | 93.386 |
| O. J. Simpson | Sport and recreation | 6.115e-06 | 0.683 | Sport and recreation | 9.550e-06 | 98.410 |

**May 17, 2012**

TF\*IDF classification with STREX cleaning. The table shows the 19 biographies (out of 728) that were classified differently than the original classification. In some cases (e.g., John Francis Jackson, WWII pilot) our classification makes more sense than the one by the Wiki community.

|  |  |  |
| --- | --- | --- |
| Name | Suggested Category | Actual Category |
| Rudolph Cartier | Literature and theatre | Media |
| Thrasybulus | History | Warfare |
| John W. Johnston | Politics and government | History |
| Cædmon | Religion, mysticism and mythology | Literature and theatre |
| Ngo Dinh Can | History | Politics and government |
| Jesse L. Brown | Warfare | History |
| Charles Carroll the Settler | Royalty, nobility and heraldry | History |
| Edward VI of England | Religion, mysticism and mythology | Royalty, nobility and heraldry |
| George Andrew Davis, Jr. | Warfare | History |
| Albert Speer | Art, architecture and archaeology | Politics and government |
| Eadbald of Kent | Religion, mysticism and mythology | Royalty, nobility and heraldry |
| Assassination of William McKinley | Politics and government | History |
| Henry Cornelius Burnett | Politics and government | History |
| Pain fitzJohn | Religion, mysticism and mythology | History |
| John Francis Jackson | Warfare | History |
| Stephen, King of England | Religion, mysticism and mythology | Royalty, nobility and heraldry |
| John Balmer | Warfare | History |
| Nguyen Ngoc Tho | Warfare | Politics and government |
| Hygeberht | Royalty, nobility and heraldry | Religion, mysticism and mythology |

***May 18, 2012***

Randomly splitting articles into training (70%) and test (30%) each time.

85% accuracy, though some the “mistakes” actually make sense:

Bishop Alexis Bachelot as Religion, mysticism and mythology vs. History

Some don’t: Executioner William Calcraft Literature and theatre vs. History

**To do:**

Remove proper names. Change the split ratio?

**May 20, 2012**

|  |  |  |
| --- | --- | --- |
| **Action** | **Time, not lemmatized (sec)** | **Time, Lemmatized (sec)** |
| Clean training corpus of 505 articles | 5.618 | 14.619 |
| TF\*IDF weights\* | 1.778 | 1.535 |
| Classify 223 articles | 12.682 | 14.516 |
|  |  |  |

\* Shouldn’t be affected by change

Results, not-lemmatized

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Category | Precision | Recall | F-measure | Support |
| Politics and government | 0.760 | 0.826 | 0.792 | 23 |
| Religion, mysticism and mythology | 0.652 | 0.938 | 0.769 | 16 |
| Warfare | 0.871 | 1.000 | 0.931 | 27 |
| Sport and recreation | 1.000 | 0.974 | 0.987 | 39 |
| Media | 0.917 | 1.000 | 0.957 | 11 |
| Art, architecture and archaeology | 1.000 | 0.875 | 0.933 | 8 |
| Music | 0.963 | 0.963 | 0.963 | 27 |
| Royalty, nobility and heraldry | 0.867 | 0.897 | 0.881 | 29 |
| Literature and theatre | 0.824 | 0.824 | 0.824 | 17 |
| History | 1.000 | 0.500 | 0.667 | 26 |
| **Total** | **0.895** | **0.879** | **0.875** | **223** |

**Results, lemmatized**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Category | Precision | Recall | F-measure | Support |
| Politics and government | 0.760 | 0.826 | 0.792 | 23 |
| Religion, mysticism and mythology | 0.682 | 0.938 | 0.789 | 16 |
| Warfare | 0.871 | 1.000 | 0.931 | 27 |
| Sport and recreation | 0.974 | 0.974 | 0.974 | 39 |
| Media | 1.000 | 1.000 | 1.000 | 11 |
| Art, architecture and archaeology | 1.000 | 0.750 | 0.857 | 8 |
| Music | 1.000 | 1.000 | 1.000 | 27 |
| Royalty, nobility and heraldry | 0.844 | 0.931 | 0.885 | 29 |
| Literature and theatre | 0.833 | 0.882 | 0.857 | 17 |
| History | 1.000 | 0.462 | 0.632 | 26 |
| **Total** | **0.899** | **0.883** | **0.877** | **223** |

**May 20, 2012 – take two w/ misses**

|  |  |  |
| --- | --- | --- |
| **Action** | **Time, not lemmatized (sec)** | **Time, Lemmatized (sec)** |
| Clean training corpus of 505 articles | 4.509 | 15.969 |
| TF\*IDF weights\* | 1.571 | 1.571 |
| Classify 223 articles | 14.270 | 15.732 |
| Total accuracy | 0.825 | 0.825 |

**Not lemmatized:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **Precision** | **Recall** | **F-measure** | **Support** |
| Politics and government | 0.760 | 0.826 | 0.792 | 23 |
| Religion, mysticism and mythology | 0.700 | 0.875 | 0.778 | 16 |
| Warfare | 0.788 | 0.963 | 0.867 | 27 |
| Sport and recreation | 1.000 | 0.949 | 0.974 | 39 |
| Media | 0.818 | 0.818 | 0.818 | 11 |
| Art, architecture and archaeology | 1.000 | 0.875 | 0.933 | 8 |
| Music | 0.900 | 1.000 | 0.947 | 27 |
| Royalty, nobility and heraldry | 0.774 | 0.828 | 0.800 | 29 |
| Literature and theatre | 0.706 | 0.706 | 0.706 | 17 |
| History | 0.750 | 0.346 | 0.474 | 26 |
| **Total** | **0.826** | **0.825** | **0.814** | **223** |

**Lemmatized**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Category | Precision | Recall | F-measure | Status |
| Politics and government | 0.750 | 0.783 | 0.766 | 23 |
| Religion, mysticism and mythology | 0.700 | 0.875 | 0.778 | 16 |
| Warfare | 0.788 | 0.963 | 0.867 | 27 |
| Sport and recreation | 1.000 | 0.923 | 0.960 | 39 |
| Media | 0.818 | 0.818 | 0.818 | 11 |
| Art, architecture and archaeology | 1.000 | 0.875 | 0.933 | 8 |
| Music | 0.931 | 1.000 | 0.964 | 27 |
| Royalty, nobility and heraldry | 0.774 | 0.828 | 0.800 | 29 |
| Literature and theatre | 0.684 | 0.765 | 0.722 | 17 |
| History | 0.769 | 0.385 | 0.513 | 26 |
| Total | 0.829 | 0.825 | 0.817 | 223 |

**Misses**

**Both categories:**

|  |  |  |
| --- | --- | --- |
| Ngo Dinh Can | History | Politics and government |
| The Turk | Literature and theatre | Sport and recreation |
| Master Juba | Music | Literature and theatre |
| James Garrard | Politics and government | History |
| W. S. Gilbert | Music | Literature and theatre |
| John Treloar (museum administrator) | Warfare | History |
| Thomas the Slav | Royalty, nobility and heraldry | History |
| Thurisind | Royalty, nobility and heraldry | History |
| Giovanni Villani | Religion, mysticism and mythology | History |
| John W. Johnston  *-- our classification is just as good or even better* | Politics and government | History |
| Harriet Arbuthnot | Royalty, nobility and heraldry | History |
| Edward VI of England | Religion, mysticism and mythology | Royalty, nobility and heraldry |
| Ton That Dinh | History | Warfare |
| Henry Cornelius Burnett | Politics and government | History |
| Rudolph Cartier | Literature and theatre | Media |
| Rudolf Wolters | Politics and government | Art, architecture and archaeology |
| James Bowie | Warfare | History |
| Early life of Joseph Smith | Literature and theatre | Religion, mysticism and mythology |
| Ramón Emeterio Betances | Warfare | History |
| Pain fitzJohn | Religion, mysticism and mythology | History |
| William Cooley | Warfare | History |
| Alice Ayres | Literature and theatre | History |
| George Calvert, 1st Baron Baltimore | History | Royalty, nobility and heraldry |
| Wilfrid | Royalty, nobility and heraldry | Religion, mysticism and mythology |
| Noël Coward | Media | Literature and theatre |
| Pedro Álvares Cabral | Royalty, nobility and heraldry | History |
| Rhys ap Gruffydd | Religion, mysticism and mythology | Royalty, nobility and heraldry |
| John Francis Jackson | Warfare | History |
| Richard Hawes | Politics and government | History |
| George Washington Dixon | Politics and government | Media |
| Rainilaiarivony | Royalty, nobility and heraldry | Politics and government |
| Catherine de’ Medici | Religion, mysticism and mythology | Royalty, nobility and heraldry |
| Rise of Neville Chamberlain | Literature and theatre | Politics and government |
| John Wark | Warfare | Sport and recreation |
| José Paranhos, Viscount of Rio Branco | Royalty, nobility and heraldry | Politics and government |
| Stephen, King of England | Religion, mysticism and mythology | Royalty, nobility and heraldry |

|  |  |  |  |
| --- | --- | --- | --- |
| **Article** | **Test, not lemmatized** | **Test, lemmatized** | **Reference** |
| Dan Leno | Music | Media | Literature and theatre |
| George H. D. Gossip | Sport and recreation | Literature and theatre | Sport and recreation |
| Józef Piłsudski | Politics and government | Warfare | Politics and government |
| William Gibson | Media | Literature and theatre | Literature and theatre |
| Theramenes | Warfare | History | History |