Stylometry

WORD-FREQUENCY BASED STYLOMETRY

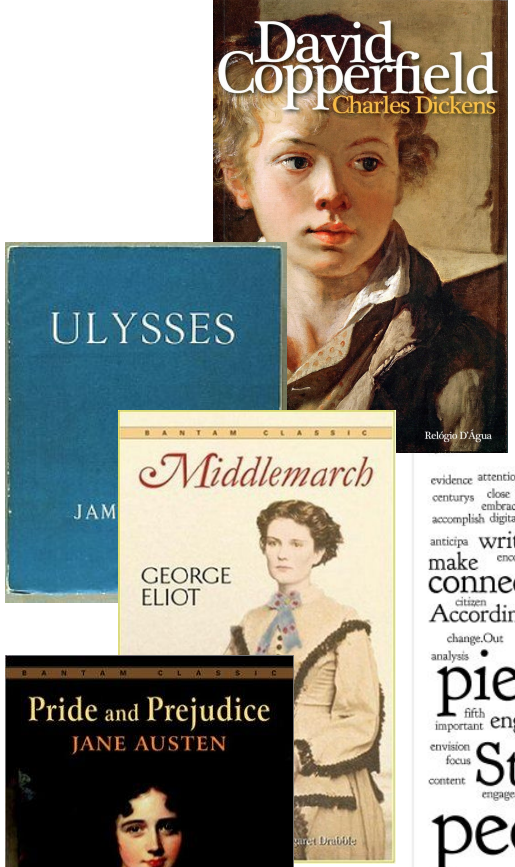
"Literary and Linguistic Computing" 17, no. 3 (2002): 267–87

'Delta': a Measure of Stylistic Difference and a Guide to Likely Authorship[1]

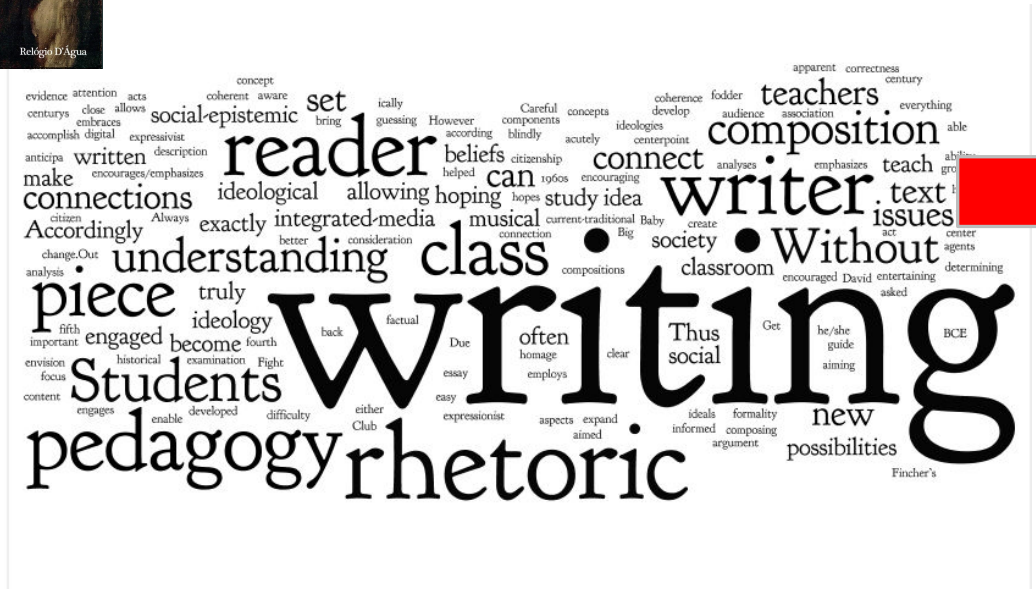
John Burrows
University of Newcastle, Australia

Abstract

This paper is a companion to my 'Questions of authorship: attribution and beyond', in which I sketched a new way of using the relative frequencies of the very common words for comparing written texts and testing their likely authorship. The main emphasis of that paper was not on the new procedure but on the broader consequences of our increasing sophistication in making such comparisons and the increasing (although never absolute) reliability of our inferences about authorship. My present objects, accordingly, are to give a more complete account of the procedure itself; to report the outcome of an extensive set of trials; and to consider the strengths and limitations of the new procedure. The procedure offers a simple but comparatively accurate addition to our current methods of distinguishing the most likely author of texts exceeding about 1,500 words in length. It is of even greater value as a method of reducing the field of likely candidates for texts of as little as 100 words in length. Not unexpectedly, it



DELTA DISTANCE



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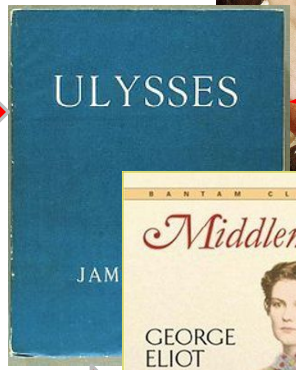

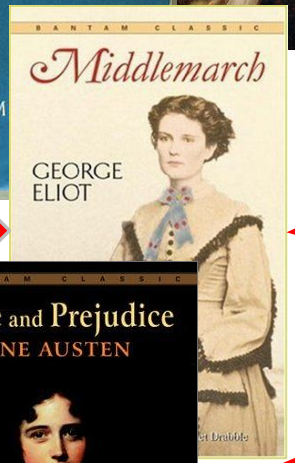

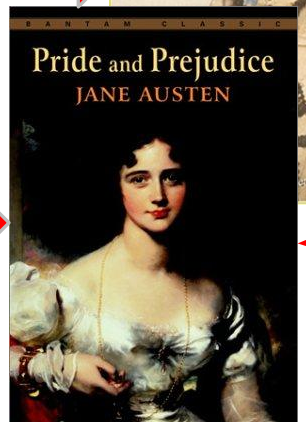

	A	B	C	D	E	F
1		AlessandroManzoni_Adelchi	AlessandroManzoni_IlContediCarmagnola	AlessandroManzoni_InniSacri	AlessandroManzoni_Odi	AlessandroManzoni_Poesiegio
2	AlessandroManzoni_Adelchi	0	0,481290655	0,666926925	0,738545533	0,568
3	AlessandroManzoni_IlContediCarmagnola	0,481290655	0	0,746348745	0,814261157	0,654
4	AlessandroManzoni_InniSacri	0,666926925	0,746348745	0	0,633663965	0,634
5	AlessandroManzoni_Odi	0,738545533	0,814261157	0,633663965	0	0,733
6	AlessandroManzoni_Poesiegiovanili	0,568820863	0,654375023	0,634854567	0,733827682	
7	CarloGoldoni_Gl'Innamorati	0,980786338	0,936018177	1,013723738	1,101305203	0,950
8	CarloGoldoni_IlCampiello	1,016924762	1,031300757	1,018625104	1,092680684	0,929
9	CarloGoldoni_IlServitorediduePadroni	0,94860233	0,926662976	0,976288639	1,080804722	0,918
10	CarloGoldoni_IlTeatrocomico	0,915941412	0,896367382	0,971870697	1,085346366	0,898
11	CarloGoldoni_IlVentaglio	1,011953514	1,00041649	1,074888328	1,131792245	0,997
12	CarloGoldoni_IRusteghi	1,089096895	1,124315967	1,047451935	1,1240649	0,977
13	CarloGoldoni_LaBottegadelcaffé	0,997940632	0,980781404	1,069965126	1,139058754	0,993
14	CarloGoldoni_LaFamigliadell'Antiquario	0,97647637	0,968110166	1,038499373	1,080510085	0,953
15	CarloGoldoni_LaLocandiera	0,97946604	0,952399004	1,052505983	1,110322738	0,956
16	CarloGoldoni_LeBaruffechiozzotte	1,051753673	1,103993387	1,018834132	1,082447143	0,942
17	CarloGoldoni_LeFemminepuntigliose	0,940334542	0,938723973	1,008461186	1,076438004	0,917
18	CarloGoldoni_LeSmanieperlaVilleggiatura	1,023938091	0,964832878	1,056736183	1,148650567	1,007
19	CarloGoldoni_UnadelleultimeserediCarnovale	1,045847956	1,085480986	1,047945641	1,10681856	0,948
20	VittorioAlfieri_Agamennone	0,684514153	0,743793265	0,829452563	0,905939302	0,7
21	VittorioAlfieri_Antigone	0,73781244	0,801189414	0,824156384	0,91495815	0,721
22	VittorioAlfieri_Brutosecondo	0,675393312	0,675937144	0,830722082	0,910174086	0,668
23	VittorioAlfieri_Filippo	0,69672213	0,73856813	0,806194725	0,93419818	0,669
24	VittorioAlfieri_MariaStuarda	0,693145931	0,715015202	0,806081448	0,948928306	0,673
25	VittorioAlfieri_Merope	0,735463235	0,783055974	0,855979157	0,971583955	0,709
26	VittorioAlfieri_Mirra	0,76329317	0,819104452	0,864045202	0,9659327	0,760
27	VittorioAlfieri_Oreste	0,70530237	0,777981376	0,829335057	0,930970217	0,715
28	VittorioAlfieri_Ottavia	0,762895099	0,791949819	0,874379901	0,96265065	0,722
29	VittorioAlfieri_Saul	0,645417404	0,735038238	0,760393582	0,871007648	0,666
30						

	Berlin	Brussels	Dublin	London	Madrid	Munich	Paris	Rome
Berlin	0	652	1315	930	1868	502	877	1182
Brussels	652	0	773	319	1314	602	261	1171
Dublin	1315	773	0	463	1450	1375	777	1882
London	930	319	463	0	1263	916	341	1431
Madrid	1868	1314	1450	1263	0	1485	1053	1361
Munich	502	602	1375	916	1485	0	685	698
Paris	877	261	777	341	1053	685	0	1106
Rome	1182	1171	1882	1431	1361	698	1106	0

VISUALIZATIONS - DENDROGRAMS

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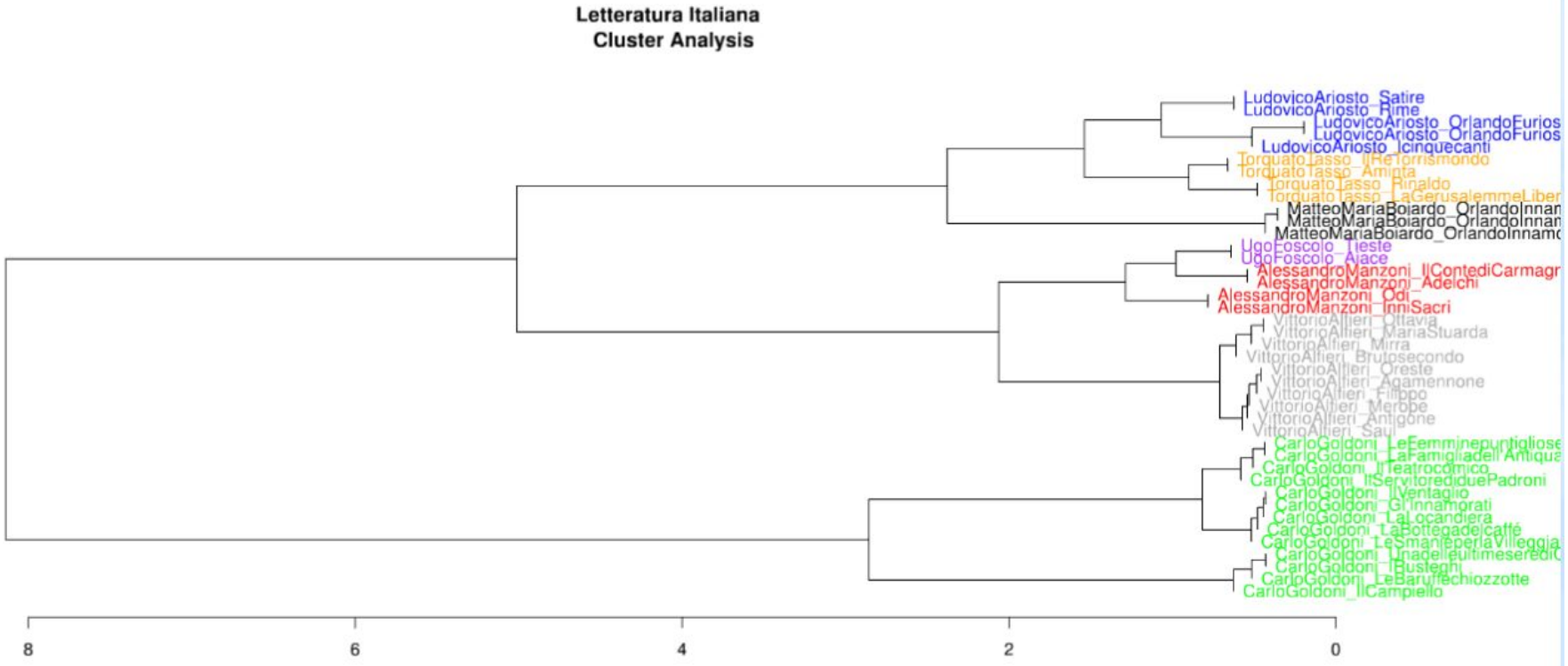
Frequent Word Sequences and Statistical Stylistics

David L. Hoover
New York University, New York, NY, USA

Abstract

This paper investigates the relative effectiveness and accuracy of multivariate analysis, specifically cluster analysis, of the frequencies of very frequent words and the frequencies of very frequent word sequences in distinguishing texts by different authors and grouping texts by a single author. Cluster analyses based on frequent words are fairly accurate for groups of texts by known authors, whether the texts are long sections of modern British and US novels or shorter sections of contemporary literary critical texts, but they are only rarely completely accurate. When frequent word sequences are used instead of frequent words or in addition to them, however, the accuracy of the analyses often improves, sometimes dramatically, especially when personal pronouns are eliminated. Analyses based on frequent sequences even provide completely correct results in some cases where analyses based on frequent words fail. They also produce superior results for small groups of problematic novels and critical texts extracted from the larger


Letteratura Italiana
Cluster Analysis
LudovicoAriosto_Satire
LudovicoAriosto_Rime
LudovicoAriosto_OrlandoFurios
LudovicoAriosto_OrlandoFurios
LudovicoAriosto_Icinquecanti
TorquatoTasso_IlRetorrismondo
TorquatoTasso_Aminta
TorquatoTasso_Rinaldo
TorquatoTasso_LaGerusalemmeLiber
MatteoMariaBoiardo_OrlandoInnam
MatteoMariaBoiardo_OrlandoInnam
MatteoMariaBoiardo_OrlandoInnamo
UgoFoscolo_Ieste
UgoFoscolo_Ajace
AlessandroManzoni_IlContediCarmagr
AlessandroManzoni_Adelchi
AlessandroManzoni_Odi
AlessandroManzoni_InniSacri
VittorioAlfieri_Ottavia
VittorioAlfieri_MariaStuarda
VittorioAlfieri_Mirra
VittorioAlfieri_Brutosecondo
VittorioAlfieri_Oreste
VittorioAlfieri_Agamennone
VittorioAlfieri_Filippo
VittorioAlfieri_Merope
VittorioAlfieri_Antigone
VittorioAlfieri_Saul
CarloGoldoni_LeFemminepuntigliose
CarloGoldoni_LaFamigliadell'Antiqua
CarloGoldoni_IlTeatrocomico
CarloGoldoni_IlServitoreediduePadroni
CarloGoldoni_IlVentaglio
CarloGoldoni_GlInnamorati
CarloGoldoni_LaLocandiera
CarloGoldoni_LaBottegadelcaffè
CarloGoldoni_LeSmanieperlaVilleggia
CarloGoldoni_Unadelleultimeseredi
CarloGoldoni_IRusteghi
CarloGoldoni_LeBaruffechiozzotte
CarloGoldoni_IlCampiello
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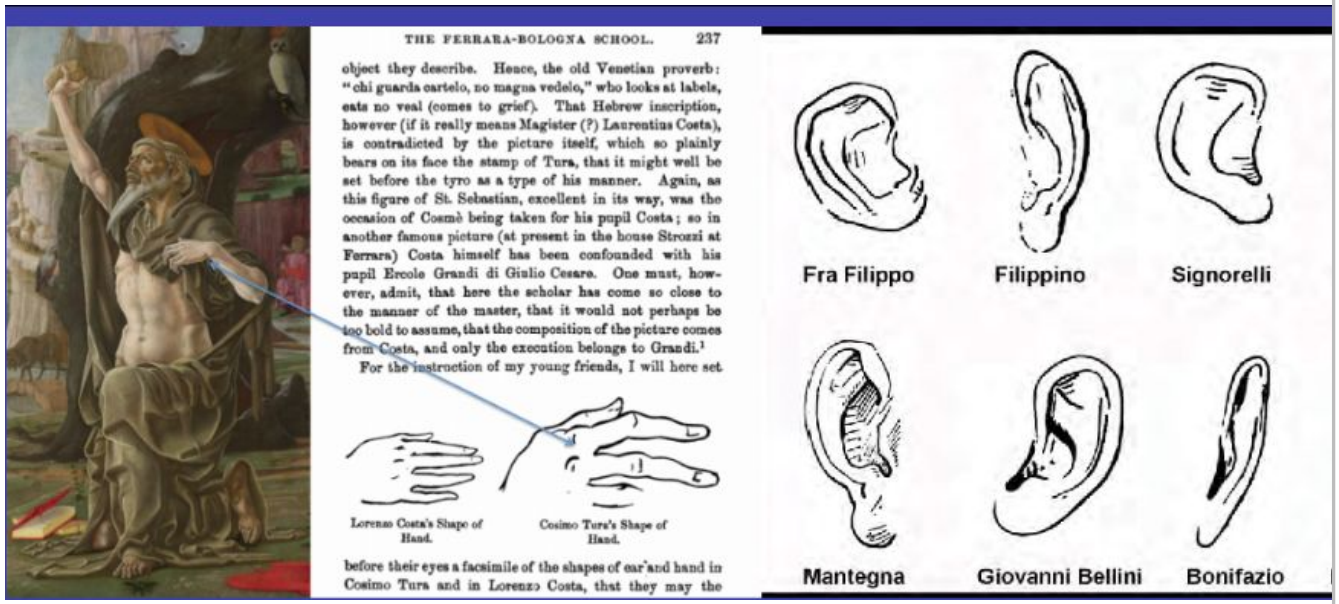
Burrows Delta
with 100 most frequent words (MFW)

WHY DOES IT WORK?



"It has been noted that the switch from content words to function words in authorship attribution studies has an interesting historic parallel in art-historic research. […] Giovanni Morelli (1816-1891) was among the first to suggest that the attribution of, for instance, a Quattrocento painting to some Italian master, could not happen based on 'content' […] Morelli thought it better to restrict an authorship analysis to discrete details such as ears, hands and feet" (Kestemont 2014)

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