Data Analysis with R Philolab: stylometry applied to philology

Plan de Innovación y Mejora Docente

ID2018/152

2018-2019

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2018-2019

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Stylometry applied to Philology

1. What is Stylometry?
2. Why? - Resource for Humanists
3. How to use it?
4. Research Project sample

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1. What is Stylometry?

WHAT?

- Analyze to authorial writing style

HOW?

- R: programming language for statistical computing
- Word Frequency - statistics
- Attractive interface: graphical visualization
- DATA possible exportation

...and...WHY STYLO?

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digital.humanities @ oxford

2. Why?- Resource for Humanists

- Digital Humanities
- Traditional research topics
- Scientism to your humanist job!
- Spread your Creativity

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New Test. Stud. 54, pp. 139–159. Printed in the United Kingdom © 2008 Cambridge University Press
DOI:10.1017/S0028688508000088

Recent Advances in Computational Linguistics and their Application to Biblical Studies*

J. JOSÉ ALVIAR
Faculty of Theology, University of Navarra, 31080 Pamplona, Spain

Soc. Sci. **2015**, *4*, 758–799; doi:10.3390/socsci4030758

OPEN ACCESS

social sciences

ISSN 2076-0760
www.mdpi.com/journal/socsci

Article

Hierarchical and Non-Hierarchical Linear and Non-Linear Clustering Methods to "Shakespeare Authorship Question"

Refat Aljumily

School of English Literature, Language and Linguistics, University of Newcastle, Newcastle upon Tyne, Tyne and Wear NE1 7RU, UK; E-Mail: refat.aljumily@ncl.ac.uk; Tel.: +44-191-208-6233

Academic Editor: Martin J. Bull

Received: 1 July 2015 / Accepted: 6 September 2015 / Published: 17 September 2015

Did Shakespeare write his plays? - TED talk by Natalya St. Clair and Aaron Williams

2. Resource for Humanists

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The Classical Quarterly 66.2 645–672 © The Classical Association (2017)
doi:10.1017/S0009838816000768

Justin Stover & Mike Kestemont (2017)

FIGURE 17: Bootstrap Consensus Tree (3000-word samples)

REASSESSING THE APULEIAN CORPUS: A COMPUTATIONAL APPROACH TO AUTHENTICITY

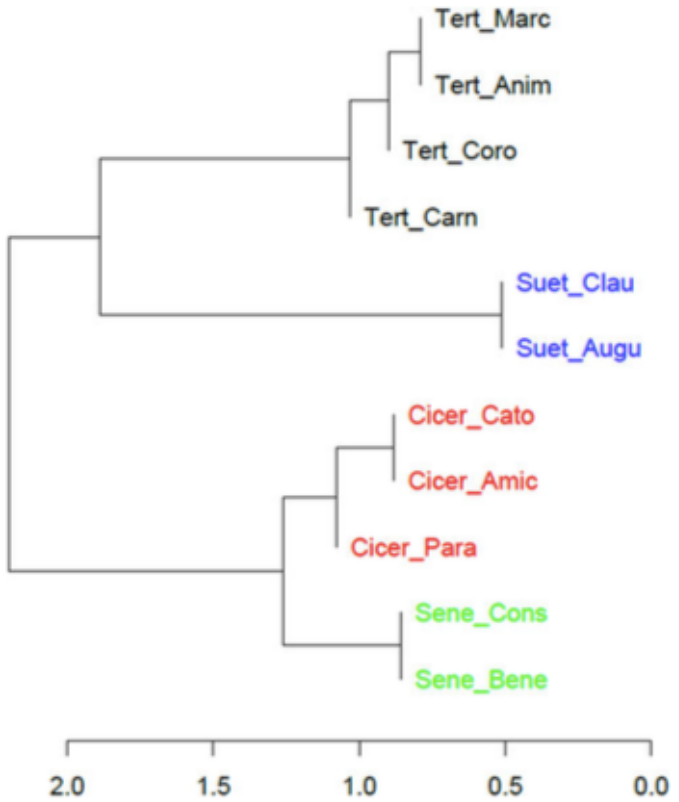

FIGURE 1: Cluster Analysis Dendrogram (no sampling), 100 MFW

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3. How to Stylo?

PhiloLab: Laboratory of Philology

- Authorship verification
- Genres verification: **BIG** dendrograms
- TOP Project!:
  'Chemical Linguistics: between linguistics and organic chemistry'
- Functions:
  - stylo()
  - rolling.classify ()
  - rolling.delta()
  - stylo.network()
  - oppose()
  - rolling.delta()

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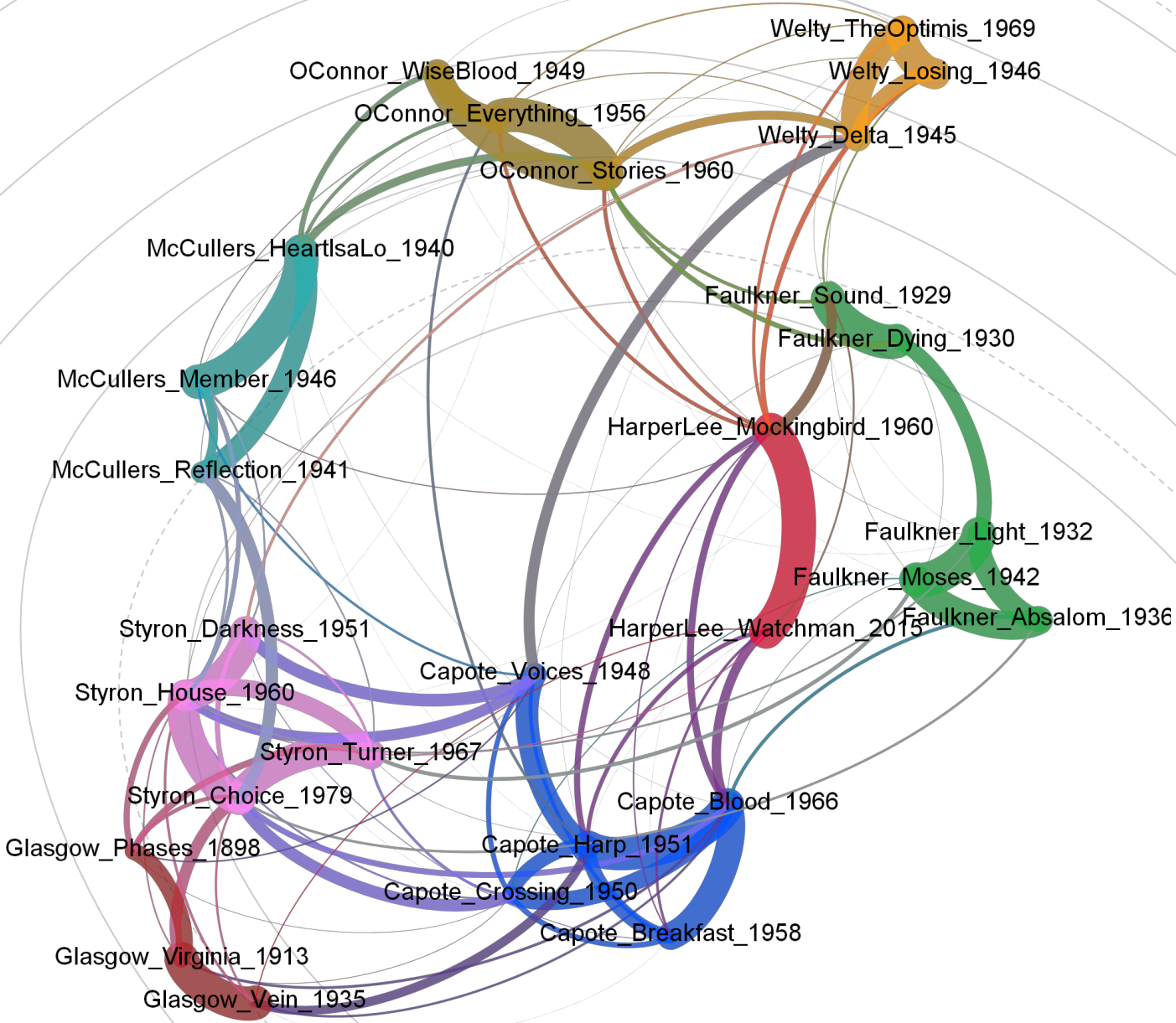

Authorship verification ~~'Go Set A Watchman while we Kill the Mockingbird in Cold Blood'~~

by

Maciej Eder and Jan Rybicki

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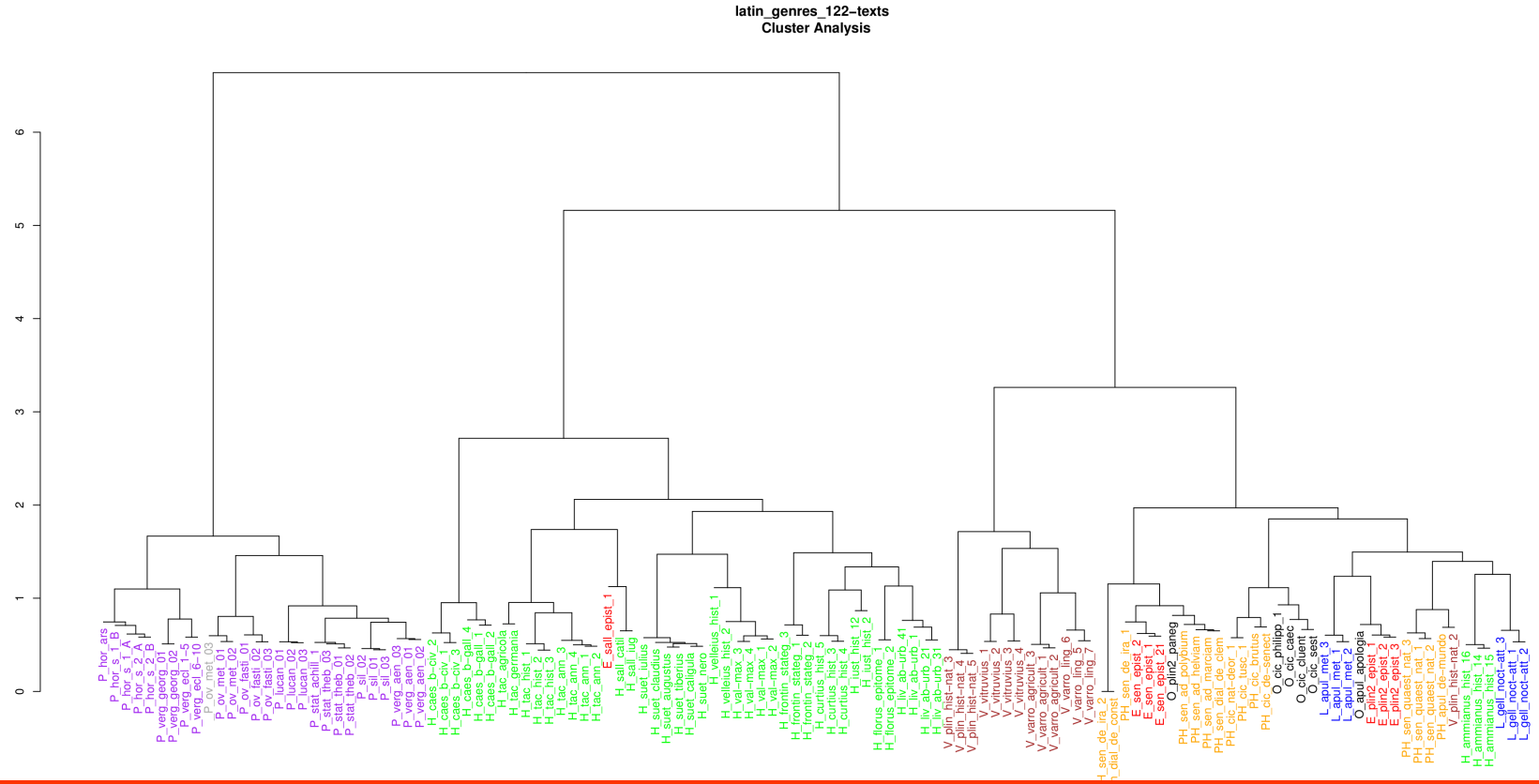

testing BIG dendrograms
by Computational Stylistics Group

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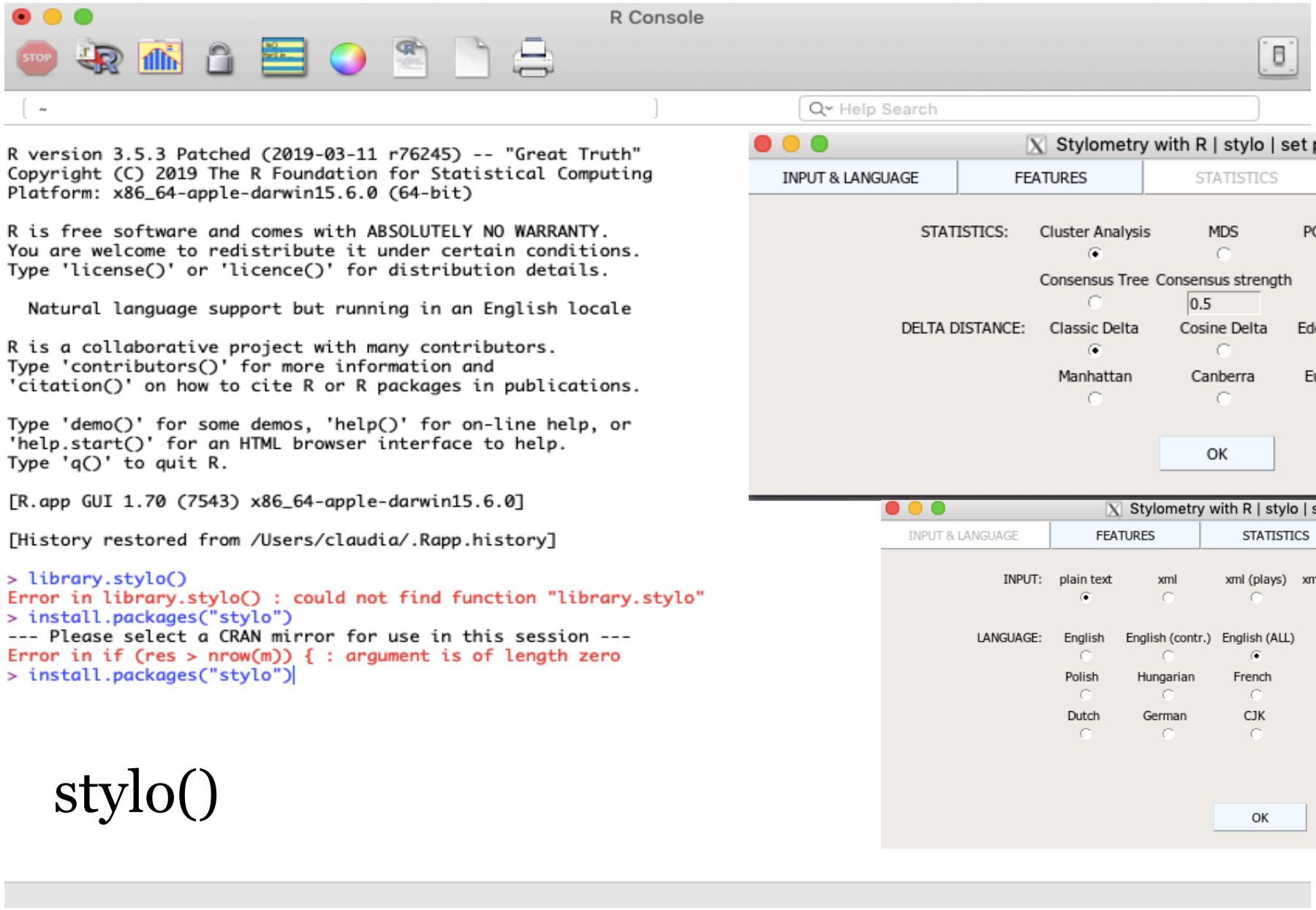

stylo()

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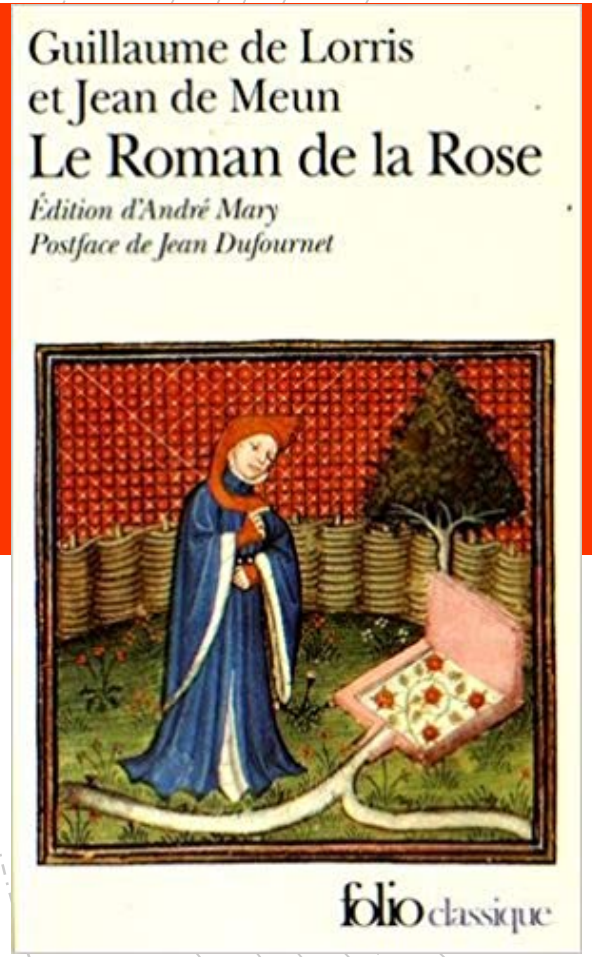
rolling.classify ()



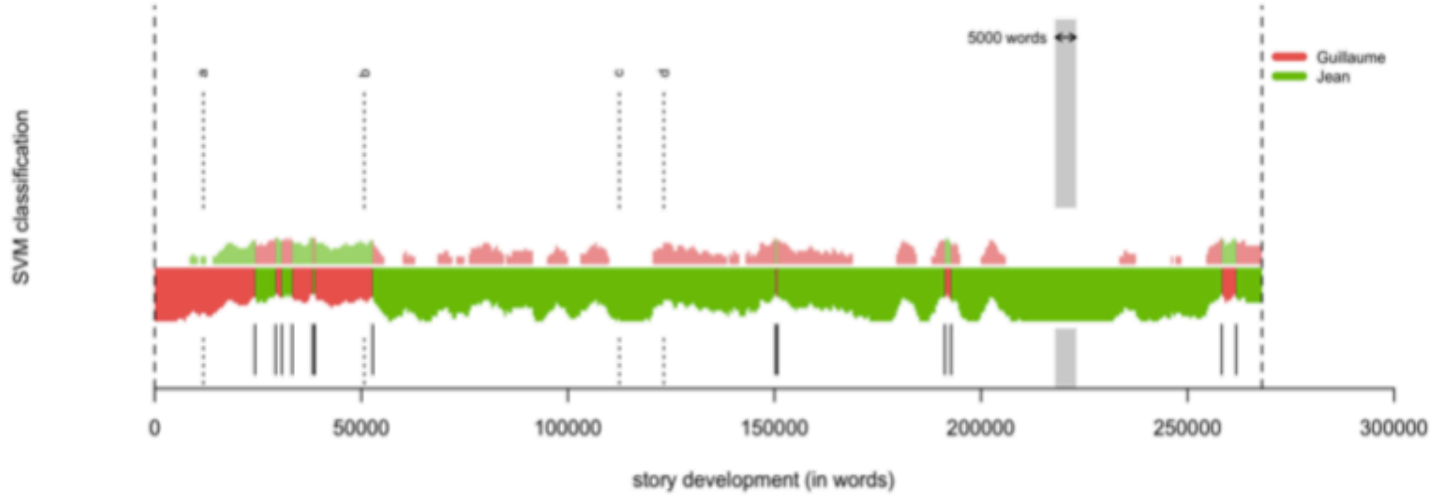


Figure 4: The Rolling Stylometry visualization. The medieval French allegoric story *Roman de la Rose* assessed using Rolling SVM and 100 MFWs; window size: 5,000 words, sample overlap: 4,500 words. Sections attributed to Guillaume de Lorris are marked red, those attributed to Jean de Meun are green. The level of certainty of the classification is indicated by the thickness of the bottom stripe. The commonly-accepted division into two authorial parts is marked with a vertical dashed line 'b'.

Source ☞
Computational Stylistics Group

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```
'help.start()' for an HTML browse
Type 'q()' to quit R.

[R.app GUI 1.70 (7543) x86_64-app

[History restored from /Users/cla

> help()
starting httpd help server ... do
> stylo()
Error in stylo() : could not find
>  install.packages("tcltk2")
--- Please select a CRAN mirror f
trying URL 'https://cran.rediris.
Content type 'application/x-gzip'
==================================
downloaded 946 KB


The downloaded binary packages ar
    /var/folders/ty/h9hk3p355c1gx
>     install.packages("ape")
trying URL 'https://cran.rediris.
Content type 'application/x-gzip'
==================================
downloaded 2.5 MB


The downloaded binary packages ar
    /var/folders/ty/h9hk3p355c1gx
>     install.packages("class")
trying URL 'https://cran.rediris.
Content type 'application/x-gzip'
==================================
downloaded 92 KB


The downloaded binary packages are in
    /var/folders/ty/h9hk3p355c1gxfb0m4y4mmlc0000gn/T//RtmphAXumk/downloaded_packages
>     install.packages("e1071")
trying URL 'https://cran.rediris.es/bin/macosx/el-capitan/contrib/3.5/e1071_1.7-1.tgz'
Content type 'application/x-gzip' length 896841 bytes (875 KB)
==================================================
downloaded 875 KB


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>     install.packages("pamr")
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```

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trying URL 'https://cran.rediris.es/bin/macosx/el-capitan/contrib/3.5/tsne_0.1-3.tgz'
Content type 'application/x-gzip' length 21437 bytes (20 KB)
==================================================
downloaded 20 KB

The downloaded binary packages are in
    /var/folders/ty/h9hk3p355c1gxfb0m4y4mmlc0000gn/T//RtmpD6MIHp/downloaded_packages
> stylo()
Error in stylo() : could not find function "stylo"
> stylo()
Error in stylo() : could not find function "stylo"
> library.stylo()
Error in library.stylo() : could not find function "library.stylo"
>   library(stylo)

### stylo version: 0.6.9 ###

If you plan to cite this software (please do!), use the following reference:
    Eder, M., Rybicki, J. and Kestemont, M. (2016). Stylometry with R:
    a package for computational text analysis. R Journal 8(1): 107-121.
    <https://journal.r-project.org/archive/2016/RJ-2016-007/index.html>

To get full BibTeX entry, type: citation("stylo")
Warning message:
In system2("/usr/bin/otool", c("-L", shQuote(DSO)), stdout = TRUE) :
  running command ''/usr/bin/otool' -L '/Library/Frameworks/R.framework/Resources/library/tcltk/libs//tcltk.so'' had status 1
sty
> stylo()
using current directory...

!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Hey! The working directory should contain the subdirectory "corpus"
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!


Error in stylo() : Corpus prepared incorrectly
>
```

help( )

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4. Research Project Sample

'The many faces of an author's style'

...Forthcoming publication

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How a Computer Program Helped Show J.K. Rowling write A Cuckoo's Calling

Author of the *Harry Potter* books has a distinct linguistic signature

Hypothesis

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Fernando_Pessoa ()

- Heteronimia: Fernando Pessoa, Ricardo Reis, Bernardo Soares, Alvaro de Campos, Alberto Caeiro
- Aims:
- 1) Hypothesis
- 2) Testing author's style
- 3) Testing Stylo

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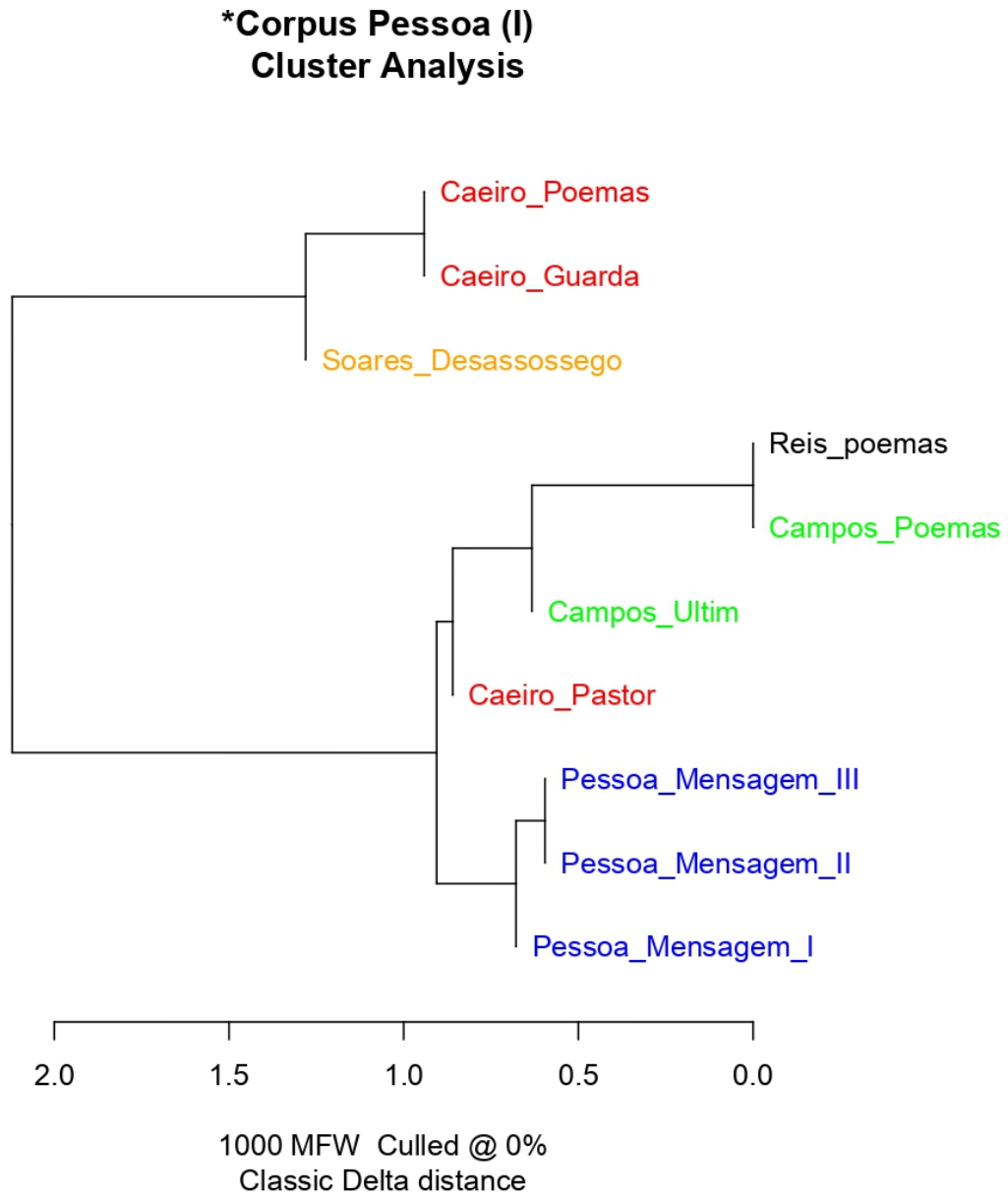
Mind your corpus

1. Open Access Pessoa's work	Gutenberg Projects OCR Corpora– think about sharing it at GitHub!
2. **Read** and prepare it	Collatio – 'Crítica Textual' Txt. Name your corpus
3. Remember the steps!	Parametres
4. Good practices	Be good and honest


Caeiro_Guarda.txt
Caeiro_Pastor.txt
Caeiro_Poemas.txt
Campos_Poemas.txt
Campos_Ultim.txt
Pessoa_Mensagem_I.txt
Pessoa_Mensagem_II.txt
Pessoa_Mensagem_III.txt
Reis_poemas.txt
Soares_Desassossego.txt


Antologia Poética - Fernando Pessoa.txt
Cancioneiro - Fernando Pessoa.txt
Do Livro do Desassossego - Bernardo Soares.txt
Ficções do interlúdio, para além do outro oc...o de Coelho Pacheco - Fernando Pessoa.txt
Mensagem - Fernando Pessoa.txt
O Banqueiro Anarquista - Fernando Pessoa.txt
O Eu profundo e os outros Eus - Fernando Pessoa.txt
O Guardador de Rebanhos - Alberto Caeiro.txt
O Marinheiro - Fernando Pessoa.txt
O pastor amoroso - Alberto Caeiro.txt
Obra Completa - Fernando Pessoa.txt
Poemas de Álvaro de Campos - Fernando Pessoa.txt
Poemas de Fernando Pessoa.txt
Poemas de Ricardo Reis - Fernando Pessoa.txt
Poesias Inéditas - Fernando Pessoa.txt
Primeiro Fausto - Fernando Pessoa.txt



- Caeiro_Guarda.txt
- Caeiro_Pastor.txt
- Caeiro_Poemas.txt
- Campos_Poemas.txt
- Campos_Ultim.txt
- Pessoa_Mensagem_I.txt
- Pessoa_Mensagem_II.txt
- Pessoa_Mensagem_III.txt
- Reis_poemas.txt
- Soares_Desassossego.txt

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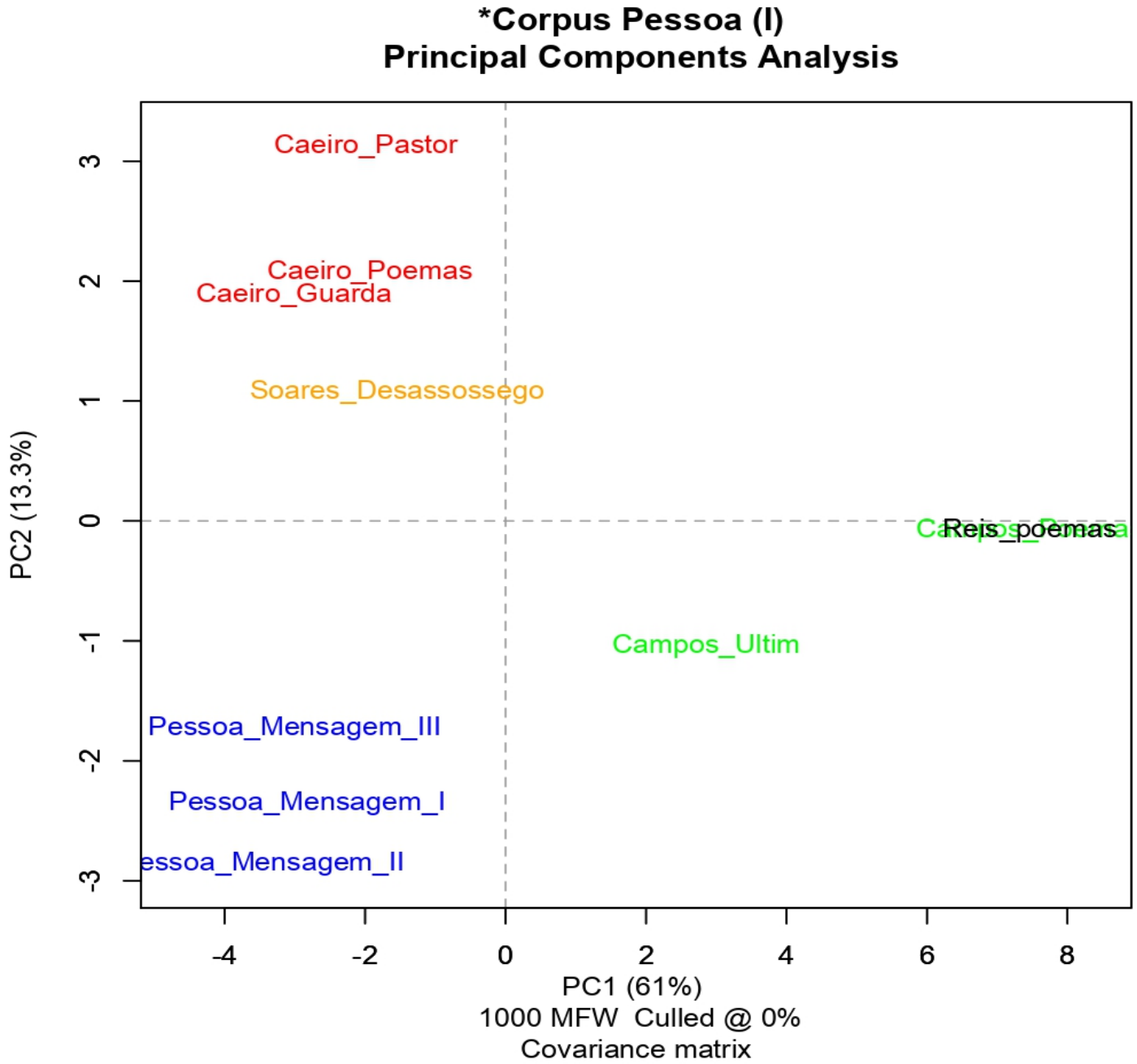

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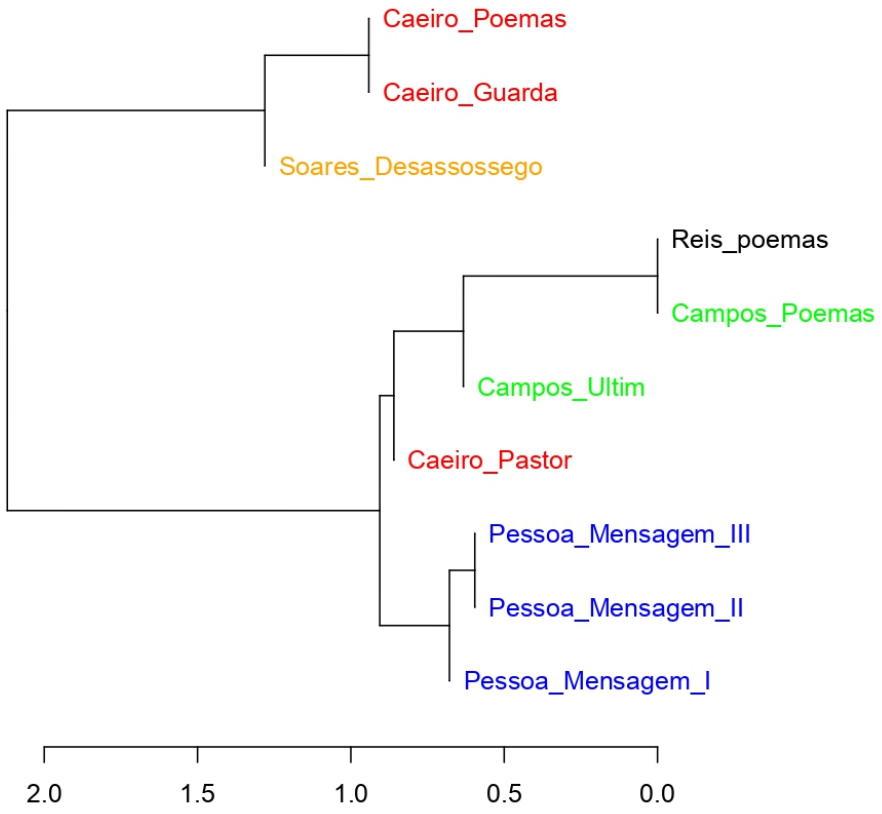
***Corpus Pessoa (I)**
Cluster Analysis



1000 MFW Culled @ 0%
Classic Delta distance

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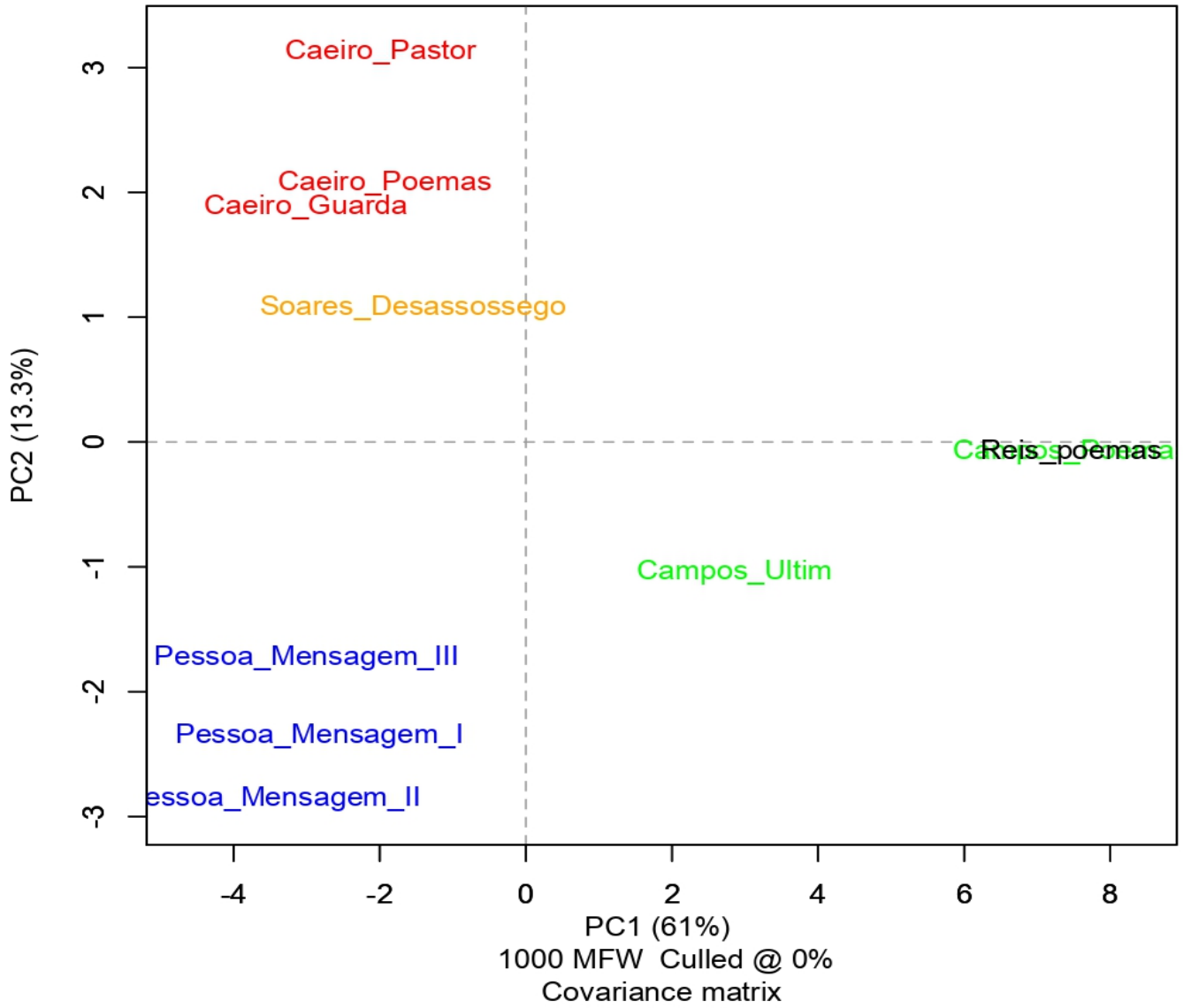
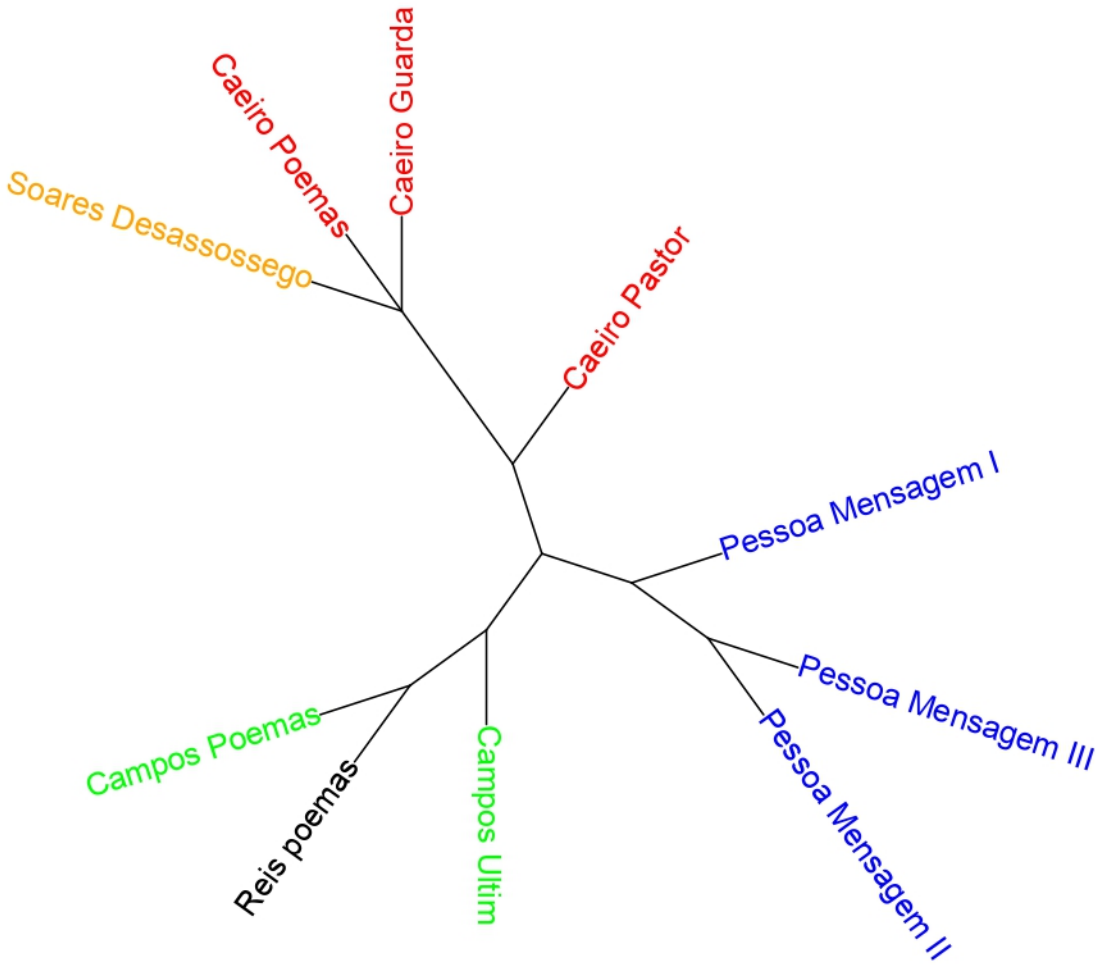
***Corpus Pessoa (I)**
Principal Components Analysis



1000 MFW Culled @ 0%
Covariance matrix

***Corpus Pessoa (I)**
Bootstrap Consensus Tree



100-1000 MFW Culled @ 0%
Classic Delta distance Consensus 0.5

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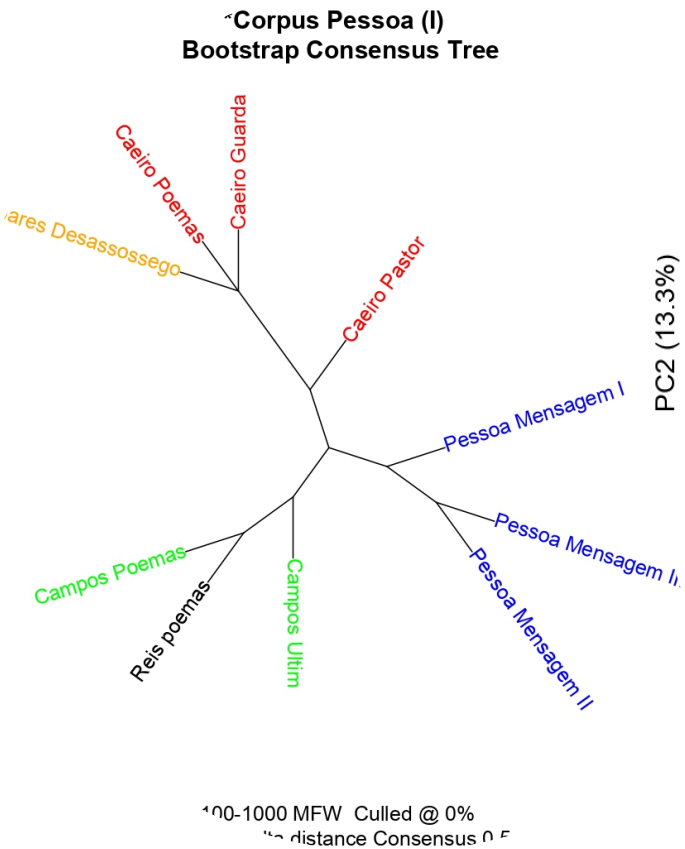

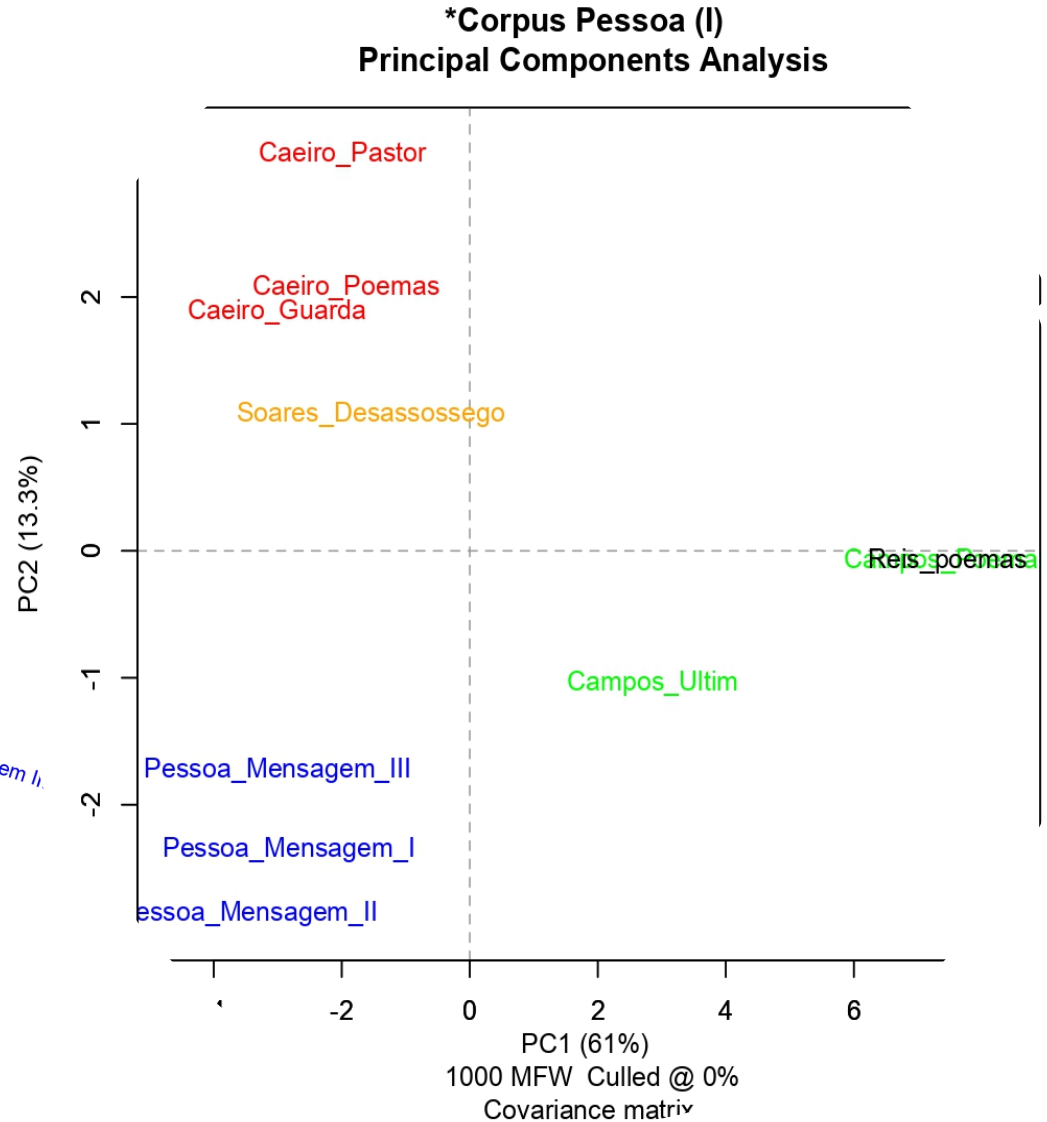

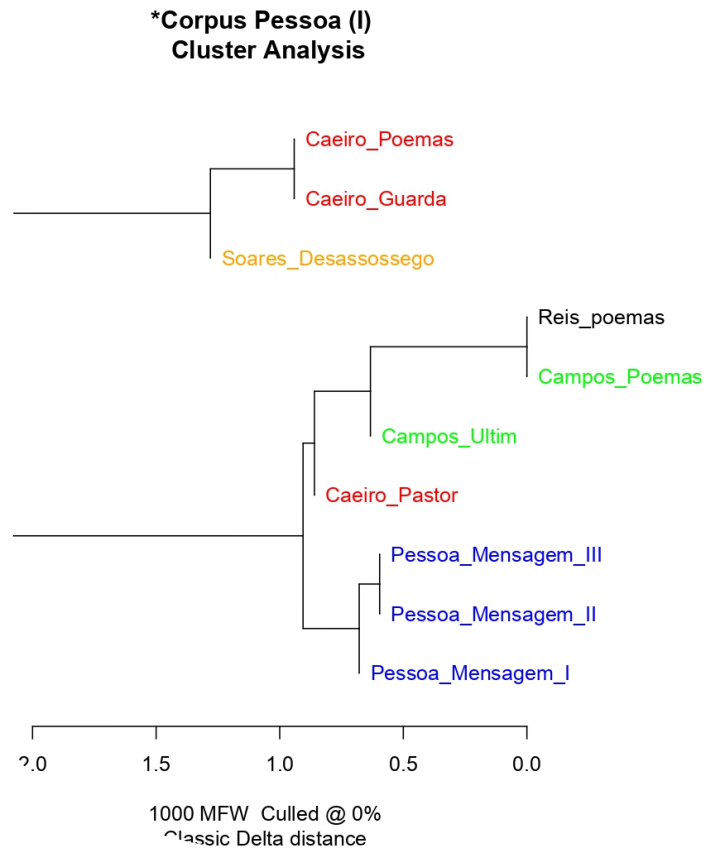

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- Antologia Poética_Pessoa.txt
- Caeiro_Guarda.txt
- Caeiro_Pastor.txt
- Caeiro_Poemas.txt
- Campos_Poemas.txt
- Campos_Ultim.txt
- Cancioneiro_Pessoa.txt
- Ficções_Pessoa.txt
- O Banqueiro Anarquista_Pessoa.txt
- O Eu profundo e os outros Eus_Pessoa.txt
- O Marinheiro_Pessoa.txt
- Pessoa_Mensagem_I.txt
- Pessoa_Mensagem_II.txt
- Pessoa_Mensagem_III.txt
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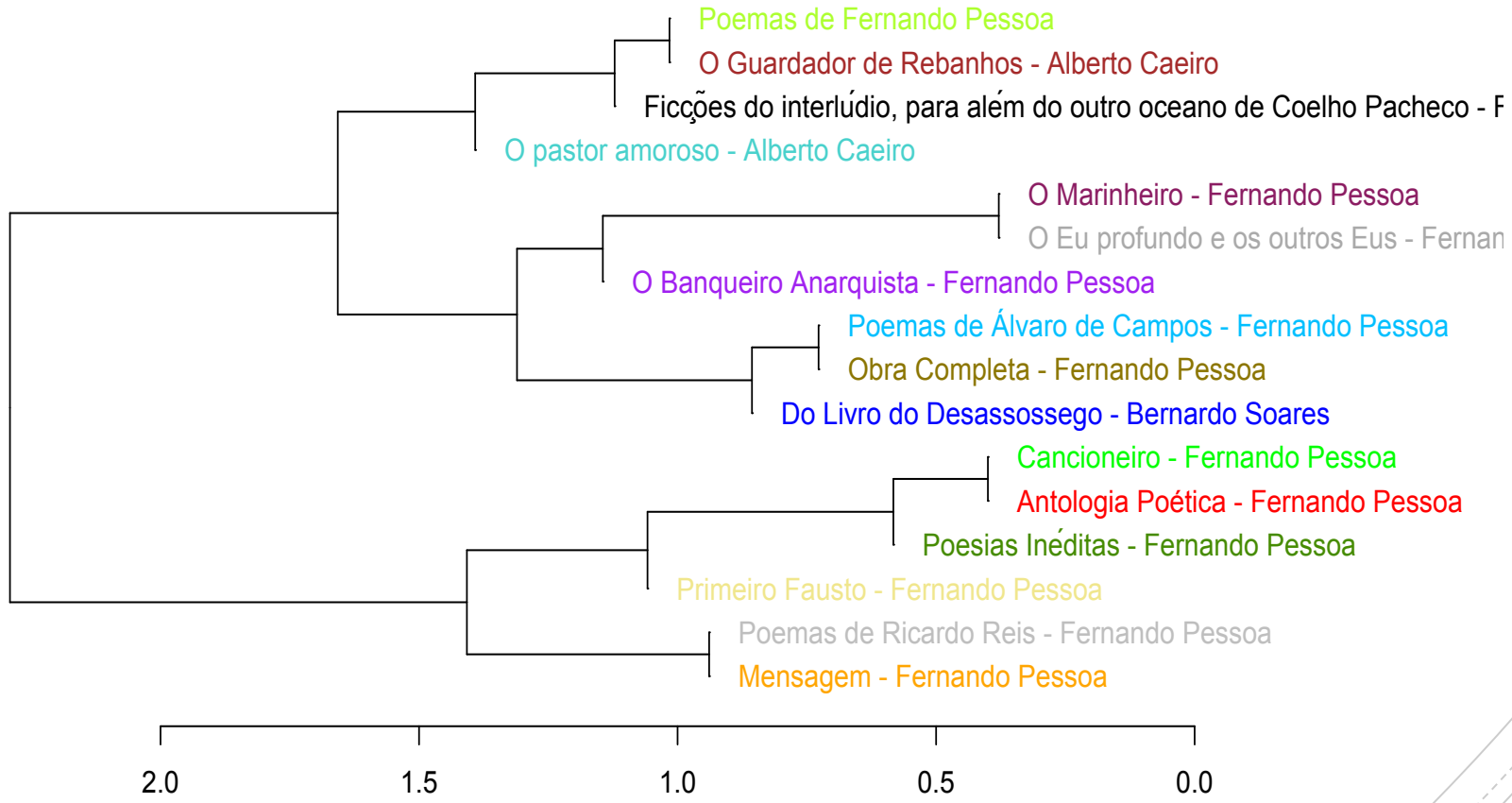
- Primeiro_Fausto_Pessoa.txt
- Reis_poemas.txt
- Soares_Desas.txt

Pessoa Corpus
Cluster Analysis



100 MFW Culled @ 0%
Classic Delta distance

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- Caeiro_pastor amoroso.txt
- Campos_poemas.txt
- Pacheco_ficçoes.txt
- Pessoa_cancioneiro.txt
- Pessoa_Mensagem_I.txt
- Pessoa_Mensagem_II.txt
- Pessoa_Mensagem_III.txt
- Pessoa_O Banqueiro Anarquista.txt
- Pessoa_O Eu profundo e os outros Eus.txt
- Pessoa_O Marinheiro.txt
- Pessoa_Poemas.txt
- Pessoa_Poesias Inéditas.txt
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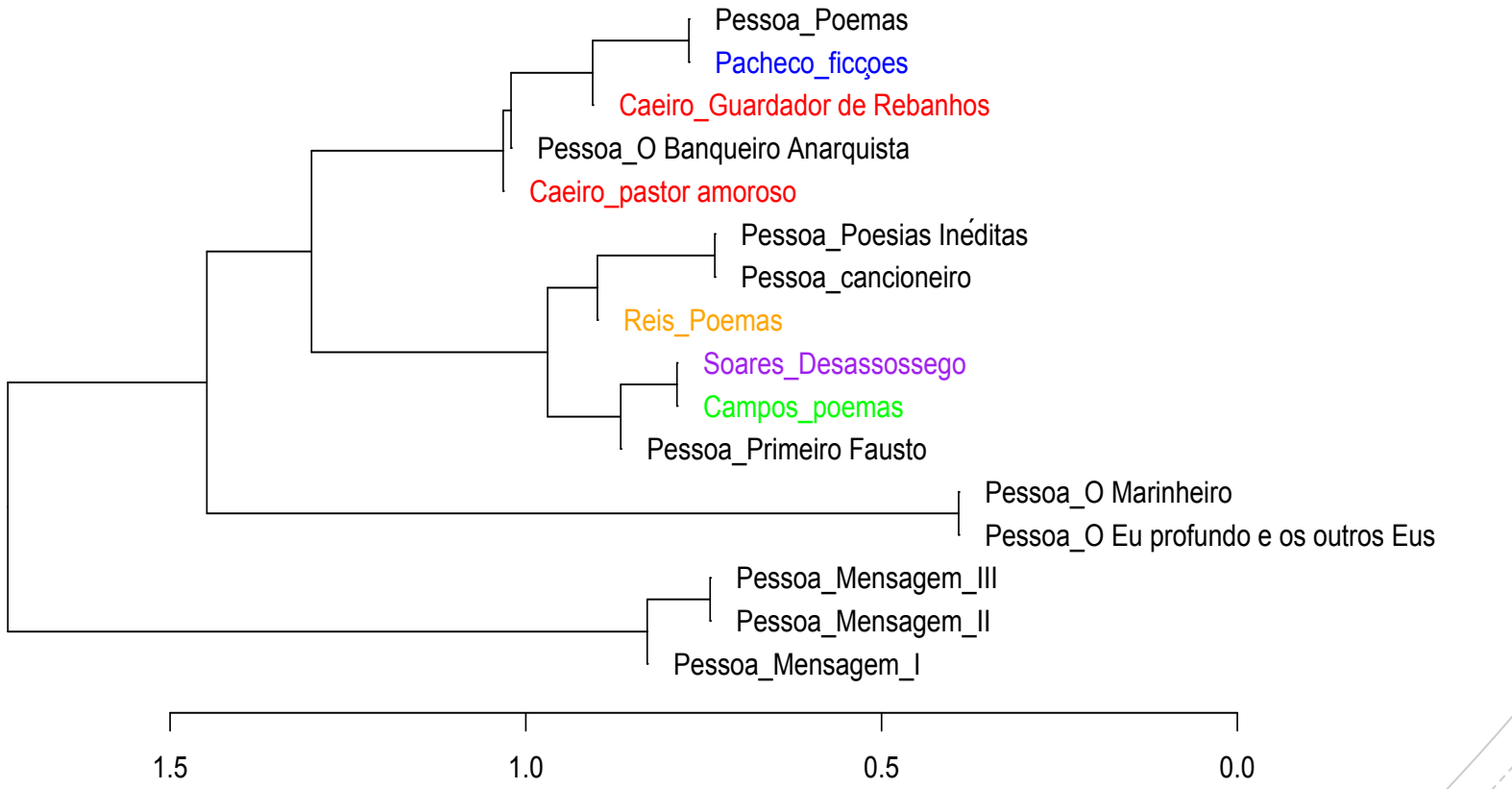
- Reis_Poemas.txt
- Soares_Desassossego.txt

***Corpus_Pessoa(II)**
Cluster Analysis



1000 MFW Culled @ 0%
Classic Delta distance

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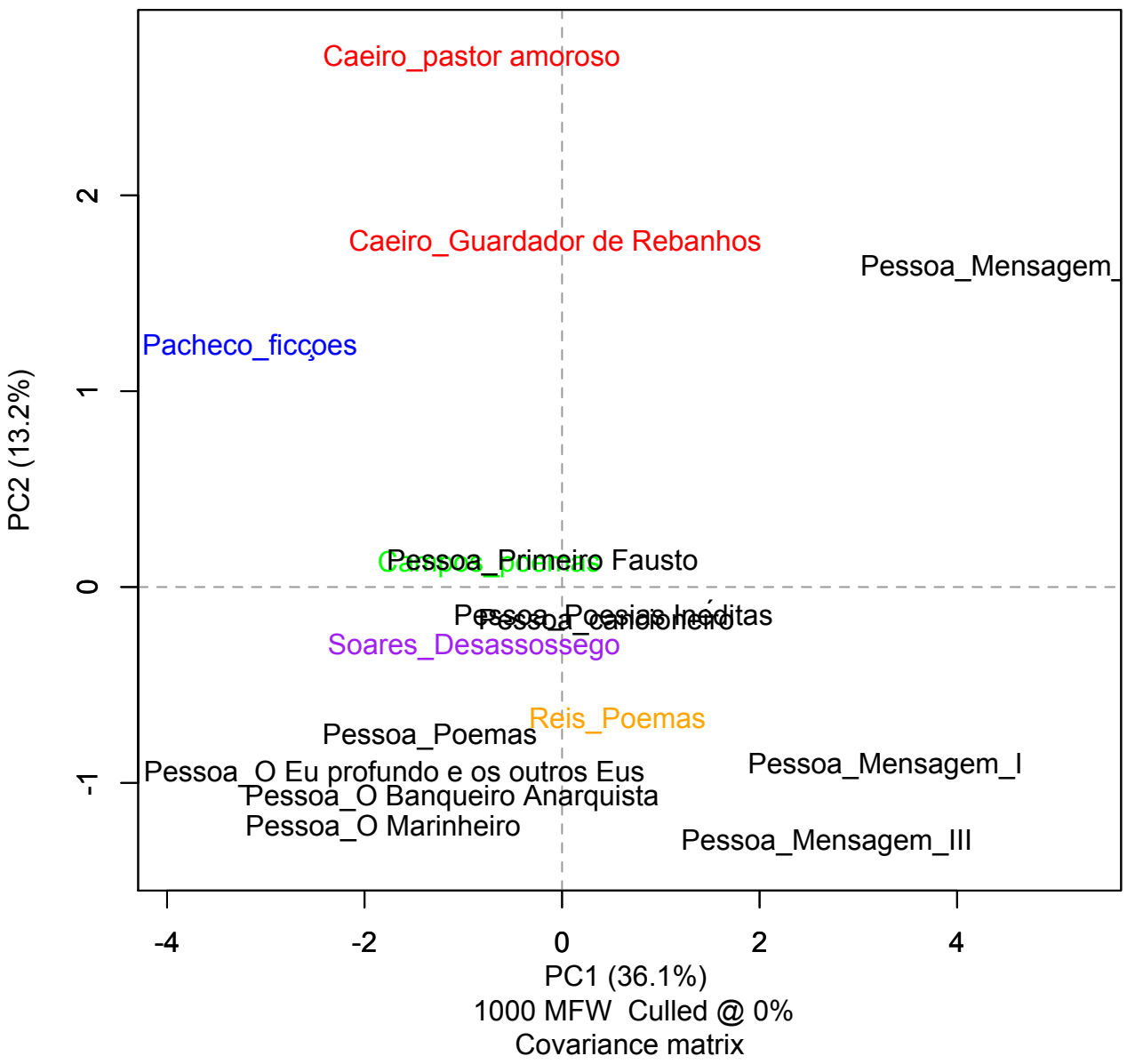

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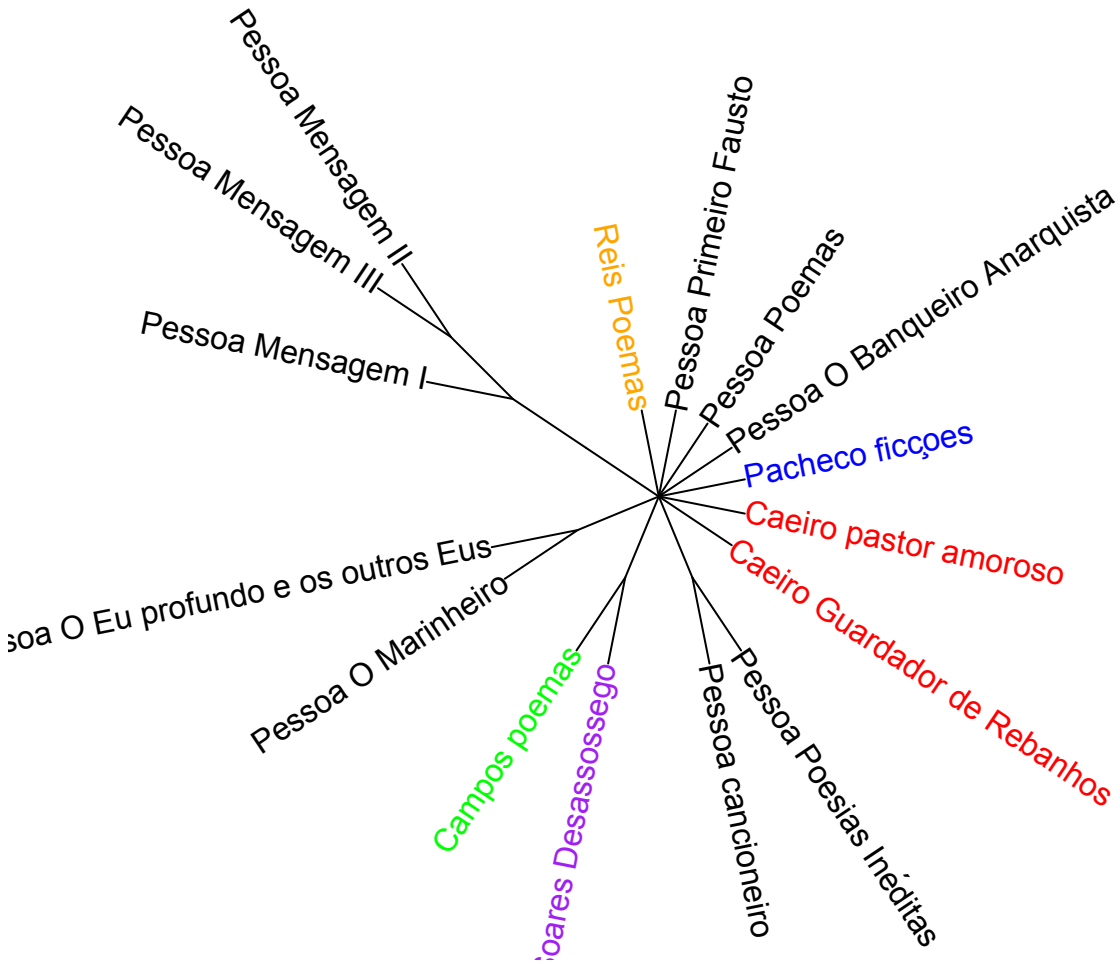
*Corpus_Pessoa(II)
Bootstrap Consensus Tree



100-1000 MFW Culled @ 0%
Classic Delta distance Consensus 0.5

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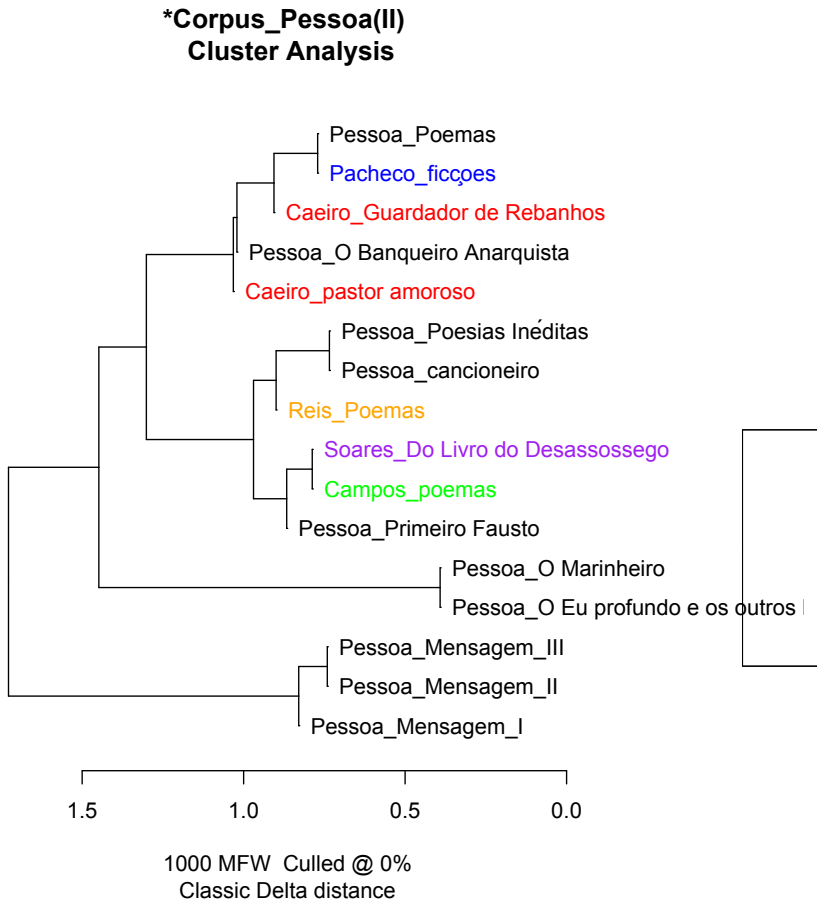

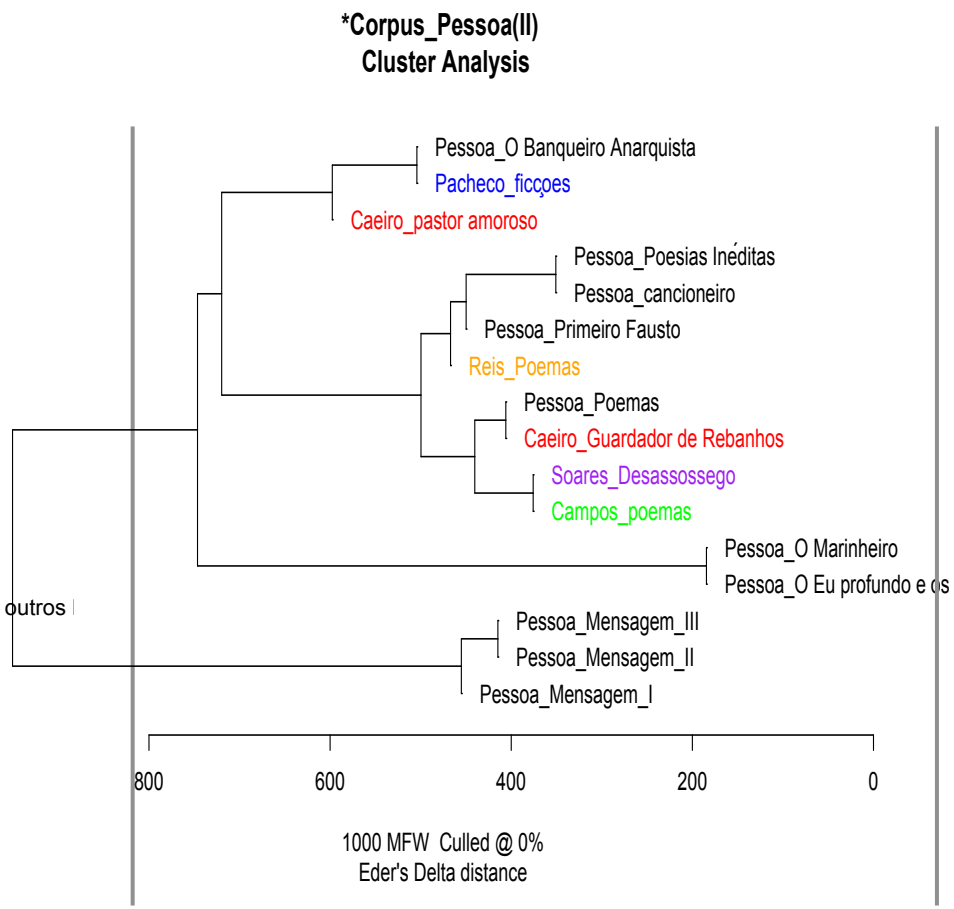

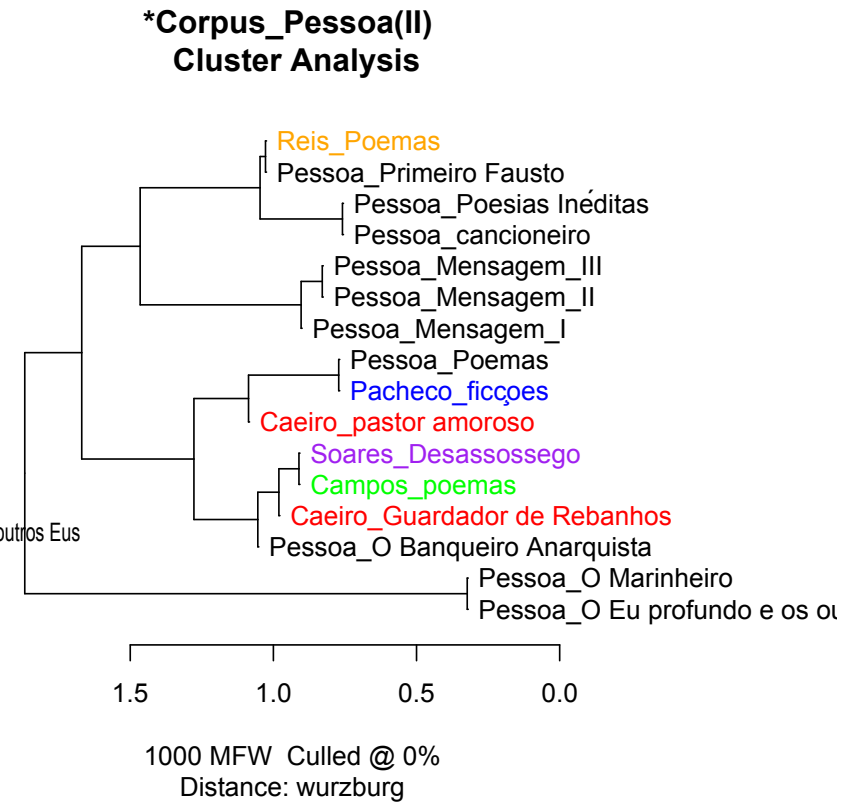

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3. Enjoy visualization

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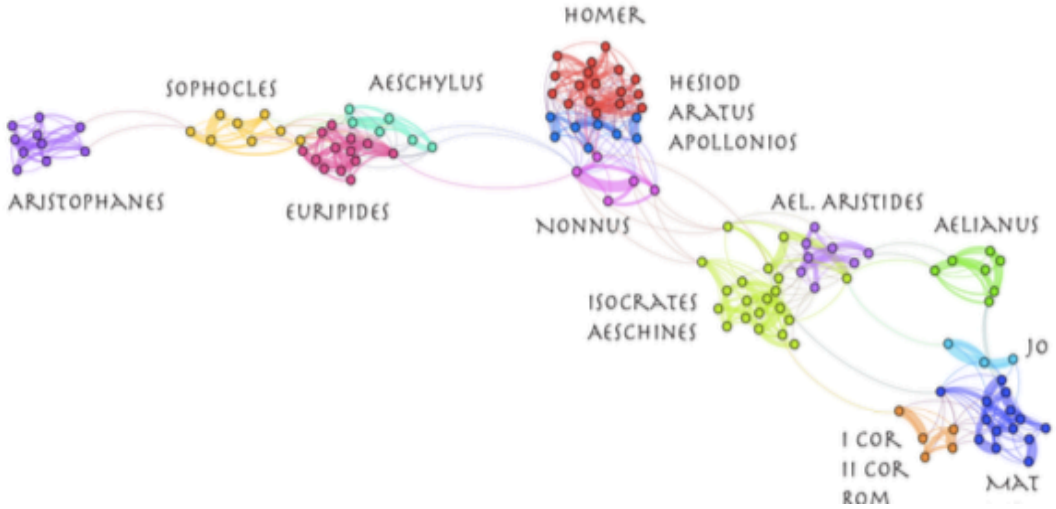
Gephi

visualization software



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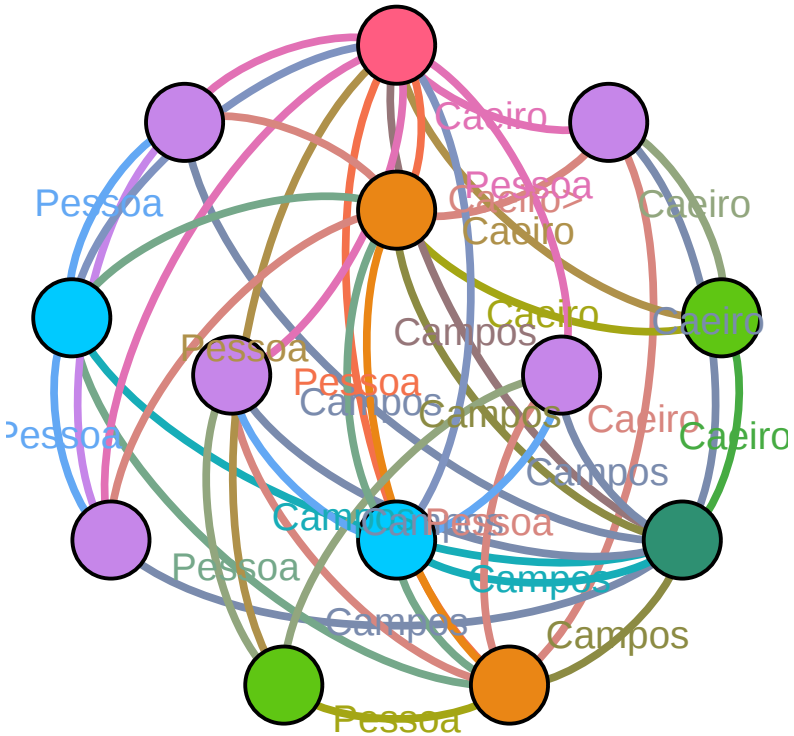

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References

- Eder, M. ; Rybicki, J. & Kestemont, M. (2016): 'Stylometry with R: A Package for Computational Text Analysis', *The R Journal*, vol. 8
- Best material for learning ☞ Computational Stylistics Group
- 'Culture & Technology' European Summer University in Digital Humanities, University of Leipzig
- Digital Humanities Oxford
- 'How a Computer Pogram Helped Show J.K. Rowling write A Cuckoo's Calling', by Patrick Juola, 08/20/2013
- Máster Patrimonio Textual y Humanidades Digitales

THANK YOU FOR YOUR ATTENTION! ANY QUESTIONS?

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Claudia Garcia-Minguillan Researchgate

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