Universität Leipzig

Institut für Informatik

Winter Term 2022/2023

Modul: Introduction to Digital Humanities

Prof. Manuel Burghardt

Stylometric analysis of transcripts in zombies-themed video games

Submitted by: Doan Minh Quang Bui

Matrikel-Nr: 3768926

E-Mail: ut48nege@studserv.uni-leipzig.de

Kommunikations- und Medienwissenschaft B.A, 3. FS

Date of submission: 10.03.2023

Index

1. Introduction

In the age of digitalization, there comes a young but fast-growing discipline that forms a bridge between the traditional humanities and computer science. This discipline is known as Digital Humanities. Digital Humanities (DH) is an interdisciplinary field that studies cultural artifacts and human behavior by combining traditional humanities scholarship with computational methods. DH scholars analyze, visualize, and interpret data from sources such as literature, historical records, art, music, and other cultural expressions using a wide range of digital tools and technologies. The emphasis on collaboration, experimentation, and the use of technology to explore new research questions and uncover new insights distinguishes the field (cf. Berry, 2011). Unlike traditional humanities, which focus on the interpretation of texts and other artifacts to study human culture, Digital Humanities takes a more data-driven and quantitative approach to study culture. Computational tools are used by DH scholars to analyze large amounts of data, detect patterns, and visualize relationships that may not be obvious from a close reading of a text. Digital Humanities can help to reveal new insights and connections that would not have been possible using traditional methods alone by combining traditional methods of interpretation with computational analysis (cf. Gold, 2012). Regarding the field of Digital Humanities, I have decided to explore more on the method of Stylometry with the topic called “Stylometric analysis of transcripts in zombies/survival horror video games” in this project. My main source of inspiration for this topic is the fact that, because of the success of the TV show "The Last of Us," people have come to realize that video games are just as powerful and effective in narrative and storytelling as other traditional forms of media and that the excellent video game writers deserve more recognition of their work. Seeing the success of the franchise “The Last of Us” has me wondering about how the writing style of it differs from other famous zombies-themed games such as Resident Evil, to see if it is truly unique or if its style is similar to other games in the genre. Stylometry, a technique commonly used in literary studies and digital humanities, provides the perfect tool to take on this matter. This project deals with a specific aspect of humanities, in the fact that we are looking into these video games transcript as a form of language arts. Video game transcripts share many characteristics with scripts of movies or plays, such as featuring various characters, and describing action and dialogues in the scenes, which is why this project can be categorized as the language and performing arts discipline.

2. Research agenda

In this project, I aim to apply stylometric techniques to analyze the language used in the transcripts of video games that feature zombies as a central theme. Stylometry is a method of studying the written language that entails analyzing patterns in the language used by an author or group of authors, and it can be used to identify distinctive features of a specific writing style. By applying stylometric analysis to the transcripts of some of the most well-known zombies-themed video games such as The Last of Us or Resident Evil etc., we can try to identify patterns in the language used by the characters in the games, which could reveal insights into the narrative, character development, and overall themes of the game. Through this analysis, my target is to identify similarities and

differences in the narrative between different games in the same zombie genre, which could shed light on the evolution of storytelling and writing style in video games. This project aims to contribute to our understanding of language usage in video games and shed light on the relationship between language and video games. The stylometric analysis therefore can be applied to uncover deeper insights into the narratives and themes of these games. For this project, I decided to work on the transcripts of 14 different zombie games which are: The Last of Us 1&2, Resident Evil 1 Remake, Resident Evil 2 (2019), Resident Evil 3 (2020), Resident Evil 4-7, Resident Evil Village, Dying Light, Days Gone, Dead Space 1&2. These transcripts are collected from these two blogs and games forums: Game Scripts Wiki Blog: https://game-scripts-wiki.blogspot.com/ and GameFAQs: https://gamefaqs.gamespot.com/.

3. Data overview

The data for this project consists of transcripts extracted from various sources, including blogs and gaming forums such as Game Scripts Wiki Blog and GameFAQ. There are 14 game transcripts in total. As mentioned above, the games selected are The Last of Us 1&2, Resident Evil 1 Remake, Resident Evil 2 (2019), Resident Evil 3 (2020), Resident Evil 4-7, Resident Evil: Village, Dying Light, Days Gone, Dead Space 1&2. The main reason behind these choices was that they are all single-player zombie games that feature a linear script to an extent, therefore making them great examples when comparing them together. It's worth mentioning here that the game The Walking Dead by Telltale Games which features a well-written script but unfortunately was removed due to its nature of a branching storyline which proves to be challenging to conduct the analysis. Other famous zombie games like Left 4 Dead, Back 4 Blood, etc. are more focused on the multiplayer experience and therefore don't feature a meticulous and detailed storyline like the games mentioned above. Consequently, the size of the data could not be as extensive as expected but these games would still be expected to give some meaningful results to work on at the end. The transcripts are expected to provide insight into the language used by characters in the game and therefore we can hopefully find out some similarities or differences between the games in the same zombie genre. Due to the nature of being written by fans and gamers, the transcripts could be subject to human errors, perhaps lacking a few details from the original writer's perspective and intention, they possibly may even contain some biases towards certain characters.

4. Method overview

As mentioned above the method going to be conducted in this project is Stylometry. Stylometry is a method of analyzing a text's writing style to identify its authorship, categorize it, or study changes in the author's writing style over time. The method is based on the idea that a writer's writing style can be defined by a set of measurable characteristics such as word choice, sentence structure, and punctuation. The theoretical foundations of stylometry can be traced back to the early days of literature when scholars like Aristotle and Cicero studied different authors' styles to identify their distinguishing features. However, it wasn't until computers and the development of text-

analysis algorithms that stylometry became a widely used method in literary and linguistic research. In practice, stylometry entails analyzing a text or set of texts with computational tools to extract features that are unique to the author's writing style. These characteristics can range from word frequency and sentence length to complex syntactic patterns. Following the extraction of the features, statistical techniques such as clustering or classification algorithms can be used to identify patterns and group texts based on their similarity. Literary studies, forensic linguistics, and computational social science are just a few of the fields where stylometry has been used. Stylometry has been used in literary studies to determine the authorship of disputed texts, to study the evolution of an author's style over time, and to categorize texts into different genres or literary movements. Stylometry has also been used in forensic linguistics to help solve crimes by analyzing a suspect's writing style and comparing it to that of a known author, and in computational social science to study online communities and identify patterns of communication and influence.[1]

5. Related work

In this area of game language research, there are some noticeable works of other researchers. One of which is called "The Language of Gaming: A Socio-Cultural and Linguistic Perspective" (2011) by Prof. Astrid Ensslin. Astrid Ensslin's book provides an in-depth examination of the relationship between language and gaming. The book provides a socio-cultural and linguistic perspective on various aspects of gaming, such as game design, game narratives, and the social interactions that occur within gaming communities. According to Ensslin, language is important in the gaming experience, both in terms of game design and in the social interactions that occur within gaming communities. She investigates how language is used to create immersive game worlds and convey complex narratives. Ensslin, for example, examines how language is used in video game cutscenes, dialogue, and other game elements that contribute to the overall narrative. Furthermore, the book investigates the linguistic characteristics of gaming communities, such as the use of jargon, slang, and other forms of language unique to gaming cultures. According to Ensslin, these linguistic characteristics are important in the formation of group identities and the establishment of social hierarchies within gaming communities. For example, gamers who use a specific language, such as "leet speak," may be perceived as more knowledgeable or experienced than those who do not. The book by Ensslin also investigates the social and cultural implications of language use in gaming communities. She discusses, for example, how gender, race, and other identity factors influence how language is used in gaming communities. Language use in gaming, according to Ensslin, can both reinforce and challenge social norms and stereotypes.

Another example of research worth mentioning is "A Narrative Theory of Games" (2012) by Espen Aarseth. This work challenges the traditional understanding of narrative in video games. According to Aarseth, the linear and predetermined sequence of events that characterizes traditional narrative does not apply to games because games

[1] This paragraph was created with the help of ChatGPT. Later some adjustments were made.

are an interactive medium that requires active participation from the player. Aarseth instead proposes a new narrative model that emphasizes the dynamic and emergent nature of the gameplay. Aarseth's theory is based on the concept of "ergodic literature," which he defines as literature that requires the reader to exert non-trivial effort to traverse. This concept is especially relevant in games that require the player's active participation and decision-making to progress. Aarseth claims that it is this active participation that gives games their distinct narrative qualities and that traditional narrative models fail to capture how games create meaning. Aarseth illustrates his theory with examples from a variety of games, including text-based adventures, first-person shooters, and role-playing games. He contends that games are more than just a "lesser" form of narrative art, but a distinct and valuable form of cultural expression with its own distinct qualities and potentials. Aarseth's theory has influenced the discourse surrounding games and narrative, and it has been cited by numerous game studies scholars.

"Narrative, Games, and Theory" (2007) by Jan Simons is another noticeable work. The article investigates the various ways in which narrative is present in games and provides a critical examination of the theoretical frameworks used to comprehend this relationship. Simons begins by delving into the concept of narrative and its role in game definition. He contends that narrative is a fundamental aspect of games and that games create meaning and engage players through narrative. In games, Simons distinguishes three types of narrative: procedural narrative, which emerges from game mechanics and rules, emergent narrative, which emerges from the player's actions and decisions, and authored narrative, which is pre-designed by the game's developers. The article also delves into the various theoretical frameworks developed to understand the relationship between narrative and games, such as ludology, narratology, and game studies. Simons criticizes each of these approaches, claiming that they are frequently incapable of capturing the complex interplay between narrative and gameplay. He instead proposes a new theoretical framework emphasizing the dynamic and interactive nature of narrative in games. Simons also investigates the role of the player in shaping a game's narrative. He contends that the player's actions and choices are essential to the storytelling process, and that player agency and choice help to create a meaningful and engaging game experience. He discusses how games can subvert traditional narrative structures, leading to new and innovative forms of storytelling.

An example of a study that applies the method of stylometric analysis in practical use is “Stylometric Analysis of Bloggers’ Age and Gender” (2009) by Sumit Goswami, Sudeshna Sarkar, and Mayur Rustagi. This study utilizes the use of stylometric features to predict the age and gender of bloggers. The research looked at 100 blogs written by both male and female bloggers of various ages. To extract textual features from the blogs, the authors used a combination of traditional and novel stylometric features, such as n-grams, function words, and part-of-speech tags. These characteristics were then used to train different machine learning models, such as support vector machines (SVM) and decision trees, to predict the bloggers' age and gender. The results revealed that the SVM model was the most accurate in predicting blogger gender, with an accuracy of 75.5%, while the decision tree model was the most accurate in predicting blogger age, with an accuracy of 54.6%. Certain stylometric features,

such as the use of personal pronouns and adjectives, were also found to be more predictive of gender, while sentence length and the use of conjunctions were found to be more predictive of age. All in all, the study demonstrates the utility of using stylometric analysis to predict the age and gender of bloggers, which has implications for a variety of applications such as targeted marketing, content recommendation systems, or cybersecurity.

Another study that features the method of Stylometry is: "Stylometric Analysis of Scientific Articles" (2012) by Shane Bergsma, Matt Post, and David Yarowsky. The study focuses on the issue of scientific plagiarism, which is becoming increasingly prevalent in academic circles. The study's research question is whether stylometric features can be used to differentiate between original and plagiarized scientific articles. To answer this question, the authors assembled a dataset of original and plagiarized scientific articles, from which they extracted a variety of stylometric features. Among these features were word n-grams, part-of-speech tags, and syntactic features. The authors then used stylometric features to train several machine learning models, including support vector machines (SVM) and decision trees, to classify articles as original or plagiarized. Certain stylometric features were found to be highly indicative of plagiarism in the study. The study discovered that plagiarized articles used fewer common words and phrases than original articles, and they also used certain grammatical constructions more frequently. The study discovered, for example, that plagiarized articles tended to use more passive voice constructions than original articles. The authors also discovered that various types of plagiarism could be identified using various stylometric features. Self-plagiarism, for example, could be identified by analyzing sentence structure and the use of specific phrases, whereas patchwriting (where an author rewrites another author's work without proper citation) could be identified by analyzing the use of specific words and phrases. Overall, the research shows that stylometric analysis can be a useful tool for detecting scientific plagiarism. To ensure the accuracy of the results, the authors recommend that stylometric analysis be used in conjunction with other methods of plagiarism detection, such as manual review by experts.

Last but not least, a study called "Stylometric analysis for authorship attribution on Twitter" (2013) by Bhargava, Mehndiratta, and Asawa utilizes the method of Stylometry to help them investigate the effectiveness of using stylometric features for authorship attribution on Twitter. Authorship attribution refers to the process of identifying the author of a particular text, and it has various applications such as identifying cybercriminals or detecting plagiarism. The authors collected a dataset of tweets posted by ten different users to conduct the study. Each user tweeted at least 1,000 times, for a total of 10,322 tweets in the dataset. The tweets were gathered using Twitter's search API, and only publicly available tweets were included in the dataset. Following that, the authors extracted various stylometric features from the tweets. These characteristics were classified into three types: lexical features, syntactic features, and structural features. The frequency of words, characters, and hashtags in tweets were lexical features. The use of punctuation marks, sentence length, and the frequency of specific parts of speech such as verbs and adjectives were all syntactic features. The use of retweets, mentions and emoticons in tweets were

structural features. The authors used machine learning algorithms to test the effectiveness of these stylometric features for authorship attribution. The algorithms were trained on a subset of the dataset before being tested on the remaining tweets to see how accurately they could attribute the tweets to the correct author. The experiments revealed that combining stylometric features improved the accuracy of authorship attribution. The most effective syntactic features were found to be the use of punctuation marks and sentence length. The authors also noted that as more features were included in the analysis, the accuracy of authorship attribution improved. The study did, however, highlight the limitations of the stylometric analysis. One of the most significant limitations is the requirement for a large amount of data in order to achieve accurate results. Furthermore, stylometric analysis can occasionally produce false positives when different authors have similar stylometric profiles. All in all the study demonstrated that stylometric analysis can be a useful tool for attribution of authorship investigation, however, caution should be exercised when interpreting the findings, and more research is required to further refine the techniques used in the study.

6. Experiment design

Firstly, all the texts of game transcripts are scraped and collected from the website to serve the process of stylometric analysis. With the help of the inspect function on browsers, I was able to extract the text and convert them to txt. files, which later will be used in the analysis. Then some inspections of the text are made to remove unwanted data, leaving the texts with only the core dialogue and transcript. Using the stylo package in R studio I began to conduct the analysis process. Before the analysis, we should consider a few factors that could possibly alter the result of the analysis. Firstly, all the transcripts are not official documents from the game developer. Instead, they were the work of individuals or groups of passionate gamers who play through the games and then manually write down the scripts. Therefore, human errors or even misinterpretations of the developer's intentions for the scene are inevitable. Secondly, due to the nature of video games, certain dialogues of characters can be different due to the player's actions or decisions, adding a layer of complexity to the video game transcripts. Therefore, some slight alterations of dialogues or languages used by the characters are expected to happen. Most of the games in this list feature a linear storyline so it should not be too problematic but still, it is worth taking into consideration. Thirdly, some small parts of the games feature dialogues in another language apart from English, making it slightly difficult to correctly transcribe or translate them, as we know that the meaning of a text can sometimes be lost in translation. The majority of the collected text is written in English so again should not be too problematic. Lastly, the sample size of my dataset is rather small, only 13, compared to a normal dataset which could contain hundreds of transcripts. As a result, fewer comparisons could be made, making the result rather suitable for reference and educational use only and not properly designed scientific research. Some hypotheses are also developed before the analysis so that the actual result of the analyzing process can prove or contradict these hypotheses. Firstly, it is expected that some of the games in the same franchise share a few similarities or be closely clustered together. Secondly, games that have older release dates are also expected to have some discrepancy in

comparison to modern and new-released titles, mainly due to the change of style in writing or new advancement in voice capturing of characters. Lastly, some studios could take some influence and inspiration from other game titles which could result in some minor or even significant resemblance.

7. Results and discussion

In this section, we will discuss the result of this project. As suggested in the seminar document about Stylometry, I decided to use the stylo package in R studio to create a Principal Component Analysis diagram with the feature of between 1000 to 2000 Most Frequent Words, the distance measure chosen is Classic Delta as it is the most standard one and the pronouns are also deleted from the analysis as in stylometric studies, personal pronouns correlate strongly with the specific topic of the text and can distort the results.

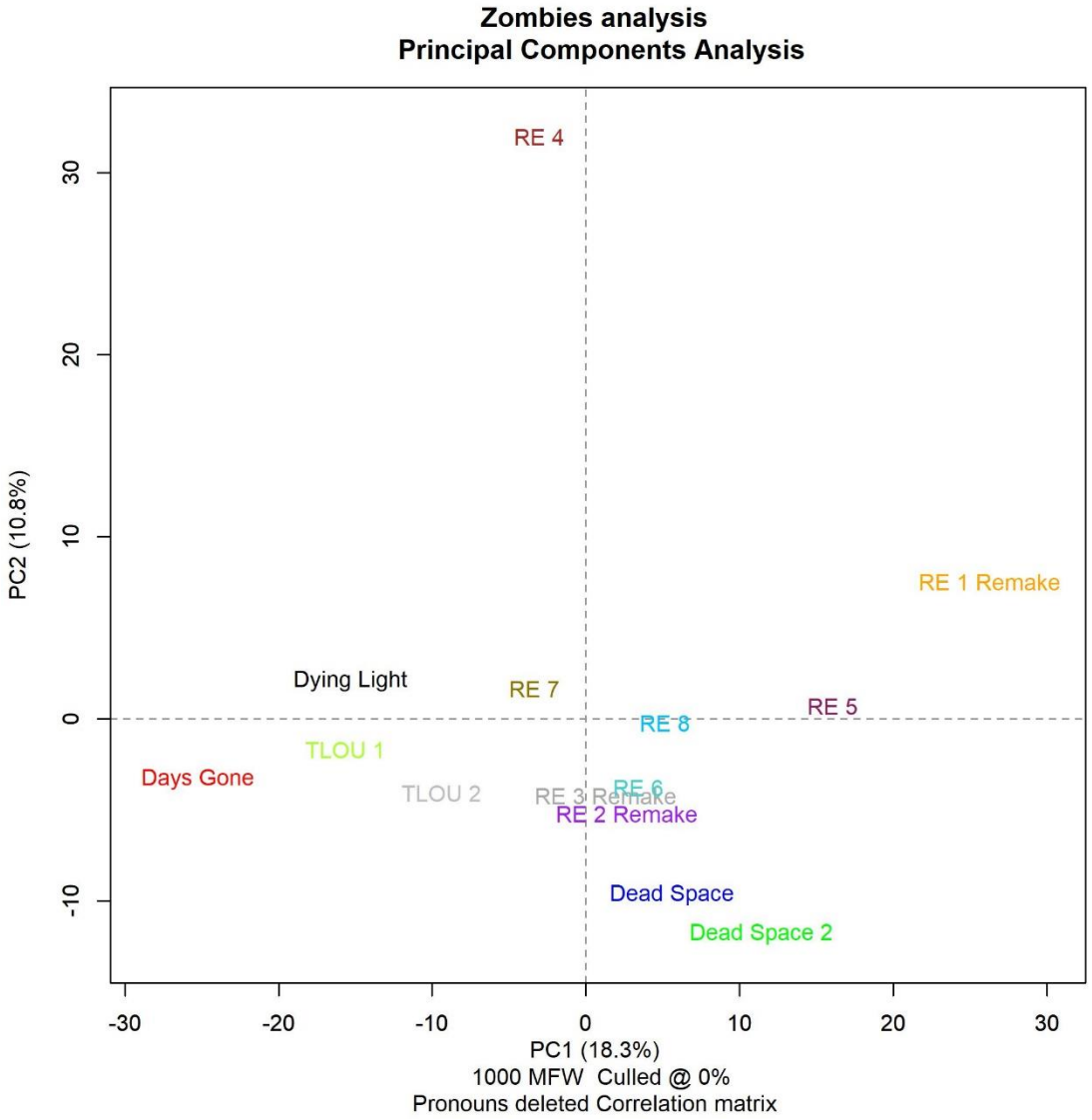

Figure 1: Principal Component Analysis diagram (corr.) with 1000 MFW, Pronouns deleted, Distance measure: Classic Delta (TLOU= The Last of Us, RE= Resident Evil)

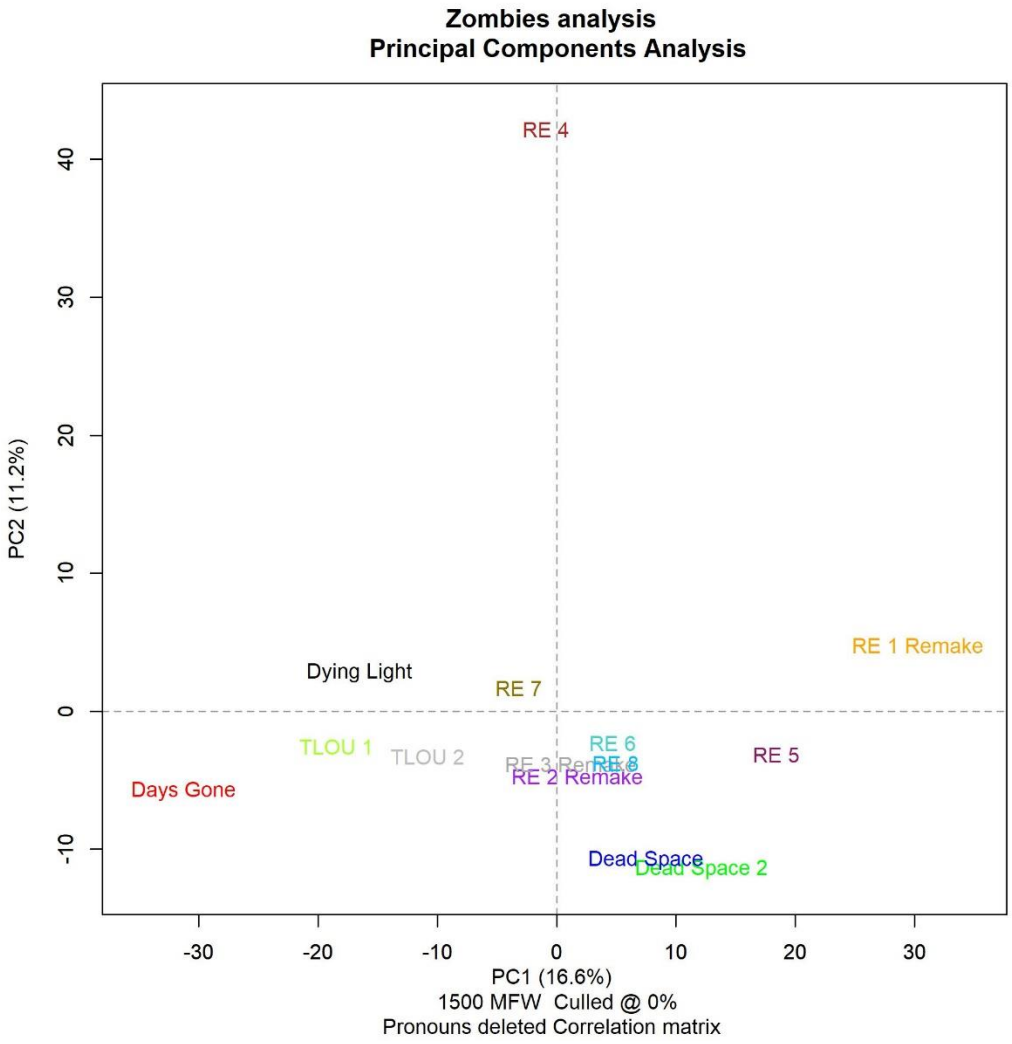

Figure 2: Principal Component Analysis (corr.) diagram with 1500 MFW, Pronouns deleted, Distance measure: Classic Delta (TLOU= The Last of Us, RE= Resident Evil)

As we can see from the diagram, the area of The Last of Us franchise remains closely clustered, making it somewhat unique in comparison to other famous franchises. It can be said that Days Gone and Dying Light are more similar in the style of narrative to TLOU when compared to the Dead Space Franchise or Resident Evil 1 Remake or Resident Evil 4. This is understandable when we look at the fact that the Dead Space franchise or the RE games mentioned above are leaning more toward the horror-survival style of games, while The Last of Us focuses more on the action and narrative aspects. The dialogue of Dying Light and Days Gone when compared to TLOU also feature lots of curse words and share the same theme of survival in a post-apocalypse world, which could explain the small resemblance here. An interesting finding can also be found when we look at the Resident Evil Game themselves. The game Resident Evil 1 Remake, Resident Evil 4 and Resident Evil 5 seem to have

completely different stylistic approaches when compared to the other games of this franchise. The fact that all these three titles were released long ago, all before 2010 could share some insight into this finding, as the company has changed its game direction in the later titles. Resident Evil 2 and 3 Remake, being the new-released enhanced version of the old games, share some uncanny stylistic resemblance as we see these games closely cluster together. Resident Evil 6 also features in the same cluster too, alongside Resident Evil 7 and 8 straying not so far away. This is explainable by the fact that they are more recent titles and feature new game directions and mechanics. From this diagram we can confirm all the hypotheses mentioned above.

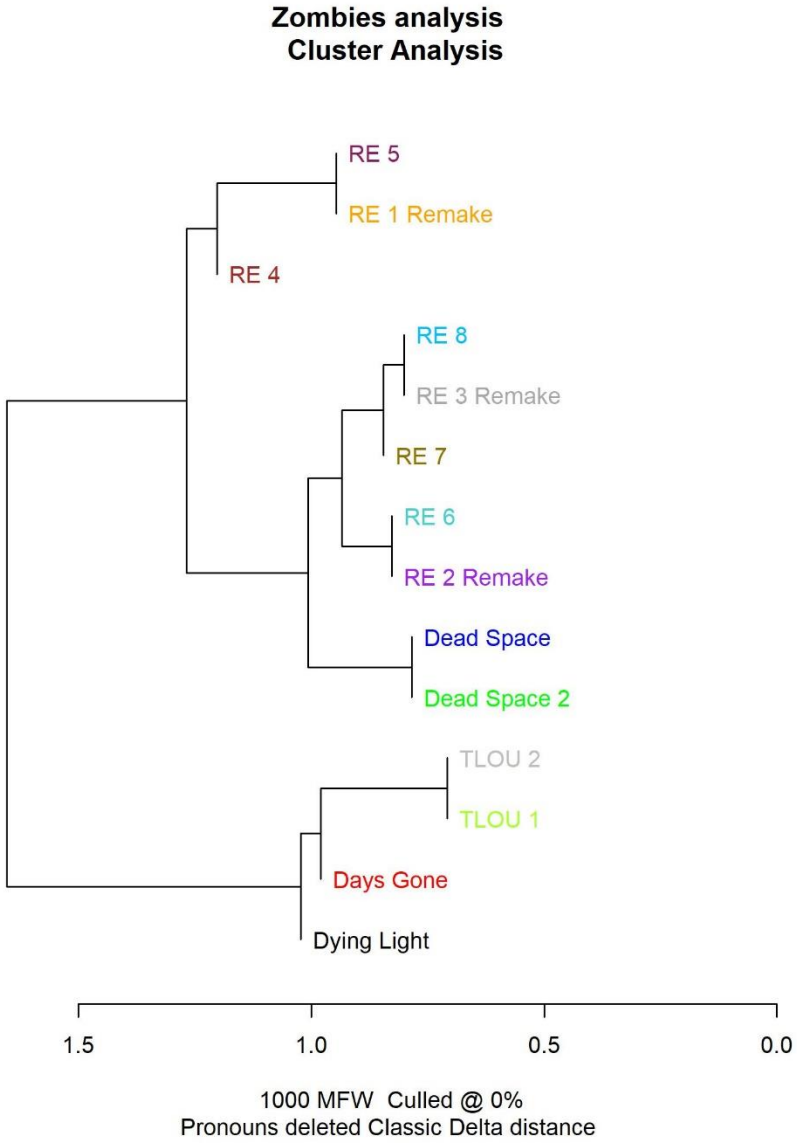

Figure 3: Cluster analysis diagram with 1000 MFW, Pronouns deleted, Distance measure: Classic Delta (TLOU= The Last of Us, RE= Resident Evil)

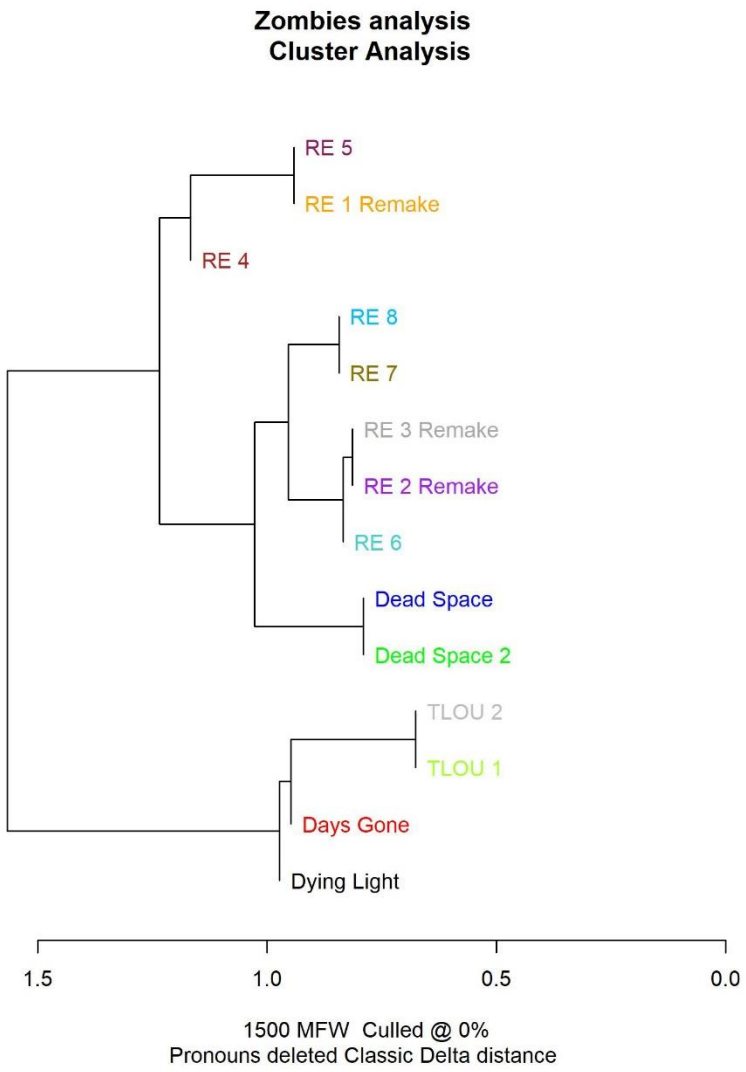

Figure 4: Cluster analysis diagram with 1500 MFW, Pronouns deleted, Distance measure: Classic Delta (TLOU= The Last of Us, RE= Resident Evil)

When looking at these cluster analysis diagrams, we could see the same results here. Of all the games in the analysis, Days Gone and Dying Light share the closest similarities to The Last of Us games. Dead Space games are in their own respective branch due to their uniqueness in story, while the newer Resident Evil titles like Resident Evil 2 and 3 Remake feature in the same branch, with RE 6 also features in a nearby branch. Resident Evil 7 and 8 joint together in a similar branch, while Resident Evil 1 Remake and Resident Evil 4&5 being the older ones are differentiated from other games in the same franchise.

8. Conclusion

In summary, this project provided me with interesting insights into the world of Digital Humanities and was my very first attempt at using the method of Stylometry. The dataset featured in this project consists of some of the most famous zombie games in the gaming world and with the help of the method of Stylometry we have gathered

some interesting insights about their similarities and difference in narrating and in writing styles. From the result, I can support the argument that of all the games collected in the list, Days Gone and Dying Light are the two games that share the closest resemblance to the famous and trending franchise of The Last of Us. Some noticeable disparities were found in the scripts of the franchise Resident Evil, showing us that the company Capcom is always ahead and on the move of changing and adapting the storyline, the narrative to be more suitable for the players' liking. Nonetheless, the project also highlighted some limitations of the stylometric analysis, such as the need for a large amount of data to achieve accurate results. In this instance due to the limit in resources and being a one-man project, this requirement proves to be very challenging. As such the results are only rather suitable for normal and educational purposes and not as a concrete finding in normal scientific research. Another limitation is that the study focused only on certain types of stylometric features such as structural features from words and sentences and ignored some semantic features of these words. Future research can explore the effectiveness of incorporating these other types of features. It should also be noted that the study only looked at zombie-themed video games. The findings may not be applicable to other types of video game genres. As a result, caution should be exercised when interpreting the study's findings and extrapolating them to other contexts. Overall, while the study provides useful insights into the efficacy of stylometric analysis in identifying similarities and differences of transcripts in zombie-themed video games, the study's limitations should be acknowledged and addressed in future research.

9. References

Aarseth, E. (2012). A Narrative Theory of Games. In *Proceedings of the international conference on the foundations of digital Games* (pp. 129-133).

Bergsma, S.; Post, M.; & Yarowsky, D. (2012, June). Stylometric analysis of scientific articles. In *Proceedings of the 2012 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies* (p. 327-337). Montréal, Canada. Association for Computational Linguistics.

Berry, D. M. (2011). The computational turn: Thinking about the digital humanities. *Culture machine*, 12(1), p. 1-22.

Bhargava, M., Mehndiratta, P., & Asawa, K. (2013). Stylometric analysis for authorship attribution on twitter. In *Big Data Analytics: Second International Conference, BDA 2013, Mysore, India, December 16-18, 2013, Proceedings 2* (pp. 37-47). Springer International Publishing.

Ensslin, A. (2011.). *The Language of Gaming*. Bloomsbury Publishing.

Gold, M. K. (Ed.) (2012). *Debates in the Digital Humanities*. University of Minnesota Press.

Goswami, S., Sarkar, S., & Rustagi, M. (2009, March). Stylometric analysis of bloggers' age and gender. In *Proceedings of the International AAAI Conference on Web and Social Media*, 3(1), p. 214-217.

Simons, J. (2007). Narrative, Games, and Theory. *Game studies*, 7(1).

Dataset:

Shotgunnova. The Last of Us – Game Script (2014, January 10.). Retrieved 03.03.2023 from https://gamefaqs.gamespot.com/ps3/652686-the-last-of-us/faqs/68485

Game Scripts Wiki Blog. The Last of Us Part II Full Transcript (2020, October 7.). Retrieved 03.03.2023 from https://game-scripts-wiki.blogspot.com/2020/10/the-last-of-us-part-ii-full-transcript.html

Aquashark. Resident Evil – Game Script (2020, June 7.). Retrieved 03.03.2023 from https://gamefaqs.gamespot.com/gamecube/535836-resident-evil/faqs/20008

Game Scripts Wiki Blog. Resident Evil 2 (2019) Full Transcript (2019, July 12.). Retrieved 03.03.2023 from https://game-scripts-wiki.blogspot.com/2019/07/resident-evil-2-2019-full-transcript.html

Game Scripts Wiki Blog. Resident Evil 3 (2020) Full Transcript (2020, April 3.). Retrieved 03.03.2023 from https://game-scripts-wiki.blogspot.com/2020/04/resident-evil-3-2020-full-transcript.html

MrDaravon. Resident Evil 4 – Game Script (2005, October 26.). Retrieved 03.03.2023 from https://gamefaqs.gamespot.com/gamecube/535840-resident-evil-4/faqs/34828

bibliomaniac15. Resident Evil 5 – Game Script (2009, September 28.). Retrieved 03.03.2023 from https://gamefaqs.gamespot.com/xbox360/929197-resident-evil-5/faqs/56254

Game Scripts Wiki Blog. Resident Evil 6 Transcript (2021, June 8.). Retrieved 03.03.2023 from https://game-scripts-wiki.blogspot.com/2021/06/resident-evil-6-transcript.html

Game Scripts Wiki Blog. Resident Evil 7 Full Transcript (2018, December 17.) Retrieved 03.03.2023 from https://game-scripts-wiki.blogspot.com/2018/12/resident-evil-7-full-transcript.html

Game Scripts Wiki Blog. Resident Evil 8 Village Full Transcript (2021, May 15.) Retrieved 03.03.2023 from https://game-scripts-wiki.blogspot.com/2021/05/resident-evil-8-village-full-transcript.html

dnextreme88. Dying Light Game Script (2017, October 5.) Retrieved 03.03.2023 from https://www.neoseeker.com/dying-light/faqs/2860273-script.html

Shotgunnova. Days Gone – Game Script (2021, June 22.). Retrieved 03.03.2023 from https://gamefaqs.gamespot.com/ps4/191628-days-gone/faqs/79330

Game Scripts Wiki Blog. Dead Space Full Transcript (2021, July 7.) Retrieved 03.03.2023 from https://game-scripts-wiki.blogspot.com/2021/07/dead-space-full-transcript.html

Game Scripts Wiki Blog. Dead Space 2 Full Transcript (2022, August 24.). Retrieved 03.03.2023 from https://game-scripts-wiki.blogspot.com/2022/08/dead-space-2-full-transcript.html

Affidavit

I hereby certify that the submitted work is wholly my own work, and that all quotations and lines of reasoning from primary and secondary sources have been acknowledged. Plagiarism and other unacknowledged debts will be penalized and may lead to failure in the whole examination and degree.

Date and signature: __Leipzig, 10.03.2023_____Quang_____