

02.137DH Introduction to Digital Humanities

Did **Genshin Impact** cross ethical or legal copyright lines in terms of level of similarity of art style and musicology to **The Legend of Zelda: Breath of the Wild**? Did miHoYo perform plagiarism against Nintendo, or was this imitation simply a sincere form of flattery?



Introduction

Genshin Impact, an open-world role-playing game (RPG) by miHoYo, has become the 29th top revenue-generating mobile game globally despite its recent release on 28 September 2020, generating about \$6 million a day on average so far. However, when the game was released, a huge controversy was sparked regarding the close similarity to The Legend of Zelda: Breath of the Wild (BOTW), with some even suggesting Genshin Impact to be a clone of BOTW, especially the visual stylization in particular.

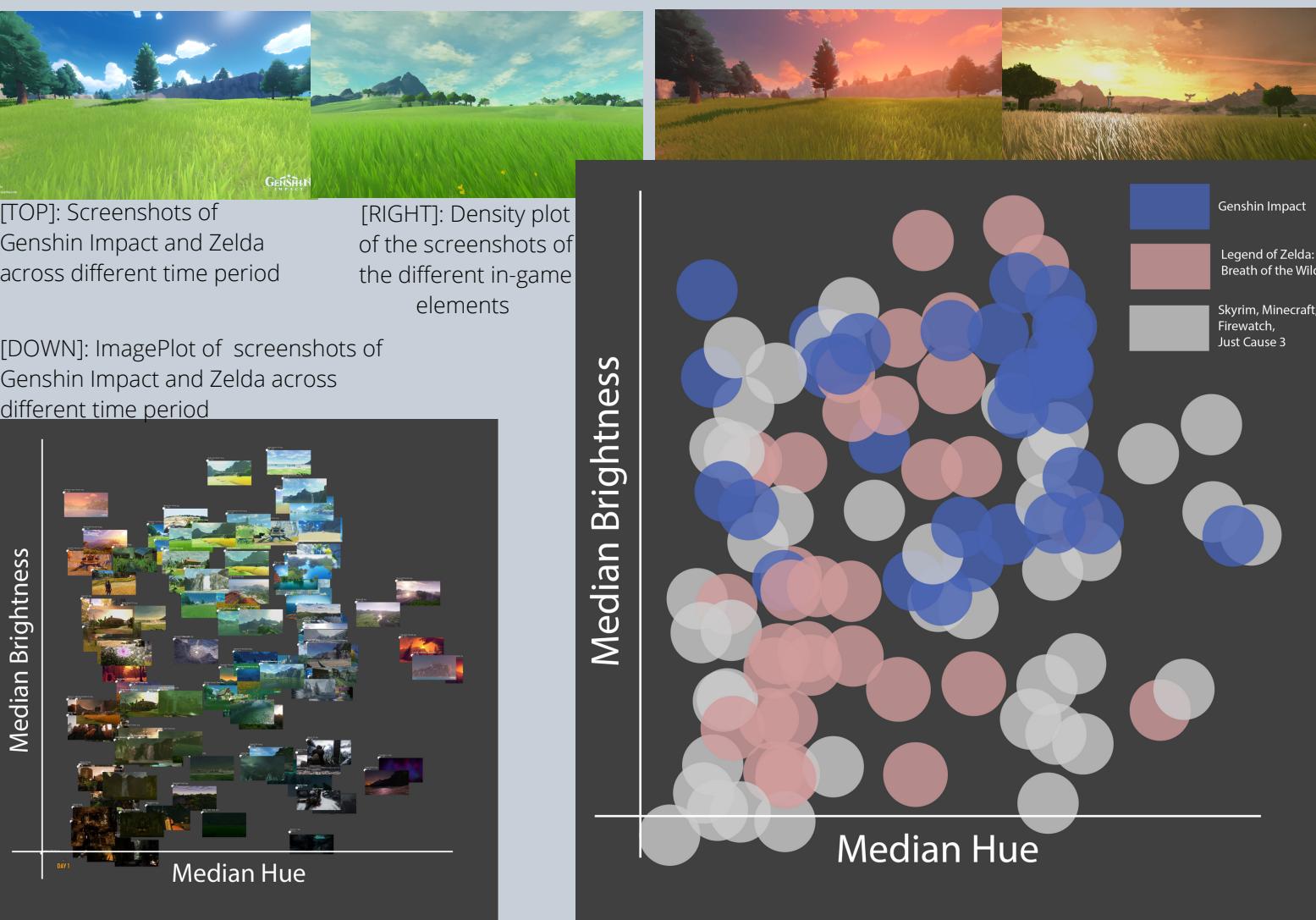
Most comparative studies of this controversy have been done via the critical analysis of the two games' interactions and stylistics, similar to "close reading" of literary texts, without any references to other open-world RPG games. This led us to wonder if there was a possibility of analyzing stylometry of games via computational methods which can thus enhance time efficiency as well as the objectivity of the study similar to how 'distant reading' is able to do so.

Methodology

Our proposed methodology involves the cross-analysis of in-game screenshots and audio files from both games. In which we select elements of similar attributes for comparison. For stylistic analysis, we manually collect the data by playing the games and taking in-game screenshots of the artistic landscapes in 1080 p resolution. To ensure a fair comparison for the musical analysis part, we were able to obtain audio files from online fandom page.

ImagePlot of In-Game Screenshots

We parsed our screenshot images through ImageJ to obtain information on the brightness, hues, and saturations. Ultimately we choose subjects that are common amongst the two games (e.g. field, waterfalls, houses). In addition, for a more comprehensive analysis, we compare subjects across different time instances (e.g. Dawn, Dusk, Sunset). We used ImagePlot to plot the result of Median Brightness vs Median Hue for all 74 different samples.



Key Findings

The ImagePlot result suggests that there are no significant similarities between both the art style of both games. Genshin Impact seems to adopt a brighter palette in their game as evident by the blue cluster observed in the plot. However, from our plot, we do realize that there are few instances whereby there exists some correlation between screenshots (evident in the intersection of the density plot), however, these differences are not sufficient to be termed as plagiarism of artistic style.

From our amplitude-frequency diagrams, it can be seen that the spectrograms of Zelda music and Genshin Impact music are sufficiently different. Our second method yields a slightly different result. We calculated the cross-correlation values for these music files:

Zelda Field vs Genshin Field: **59.24% correlated**

Zelda Normal Battle vs Genshin Normal Battle: **50.76% correlated**

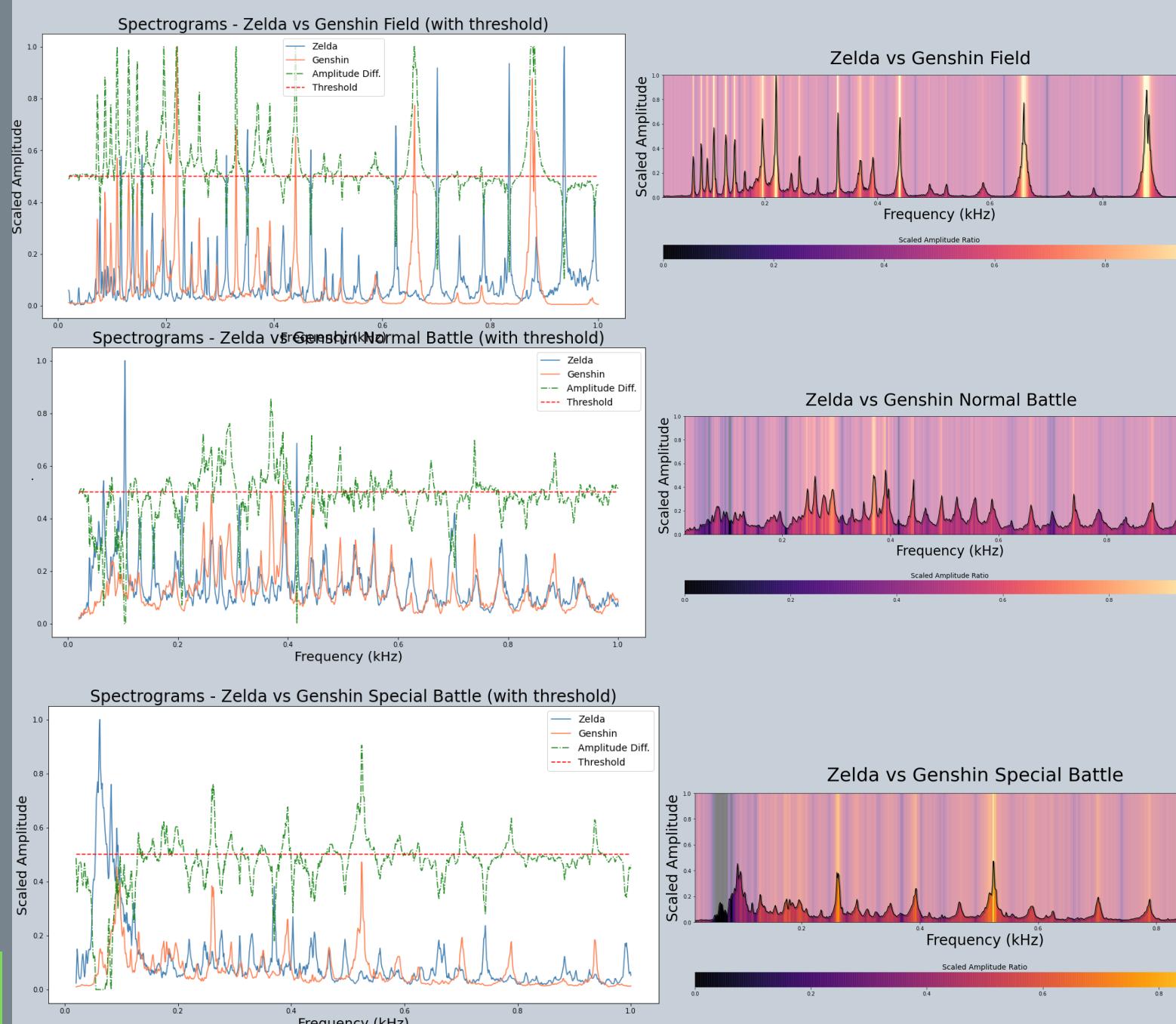
Zelda Special Battle vs Genshin Special Battle: **51.02% correlated**

Limitations

- Screenshots might not be actually a representation of the game itself.
- Comparing only the audio and visual aspects of the games to determine their degree of similarity is a relatively narrow perspective, as it does not fully encompass the interactive experience provided by the game.

Spectrometry Analysis of Audio Files

Audio files were analysed using "Librosa", a Python package, and the Fast Fourier Transform process. The audio files were processed and data on the frequency and amplitude of the audio files were extracted. The frequency data is then processed into spectrum plots and heatmap plots for visualization of data.



We also attempted to measure the cross-correlation between two respective musical pieces. We extract the 'finger-print' of the respective audio files by using a chroma-based representation and the Chromaprint algorithm. We then choose a threshold of 0.5 to indicate when a match has been found. We also generated audio files of silence and white noise to act as a control.

Conclusion

In conclusion, from our results, we could simply hypothesize that Genshin Impact was at least influenced by BOTW to some degree. Nevertheless, Genshin Impact does have its unique style, even in its visual art, as well as its musical elements. Even though a video game's art and music could not wholly represent a video game as a creative work, we could see that some level of inspiration was derived by Genshin Impact from BOTW, even if it might not have crossed legal and ethical lines. This was actually admitted by one of Genshin Impact's developers.