

# UNDERSTANDING MUSIC SIMILARITY IN FLAMENCO MUSIC

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## ABSTRACT

We here present our approach to gather music similarity ratings for flamenco music, targeting both naive listeners and flamenco experts by means of an online game available in different languages such as Spanish, English and Japanese: Spot the Odd Song Out Flamenco.

This project is part of a research project at Universitat Pompeu Fabra Barcelona, and run as part of the CASimIR API at City University London. Flamenco music with its diversity and popularity presents a promising source of music for studies on music perception within culture. Our studies focus on the strategies listeners use to compare flamenco music excerpts and how these relate to our musical and cultural background. We exploit the COFLA corpus containing more than 1800 songs representative from flamenco music.

## 1. INTRODUCTION

Music similarity is a key topic in the Music Information Retrieval (MIR) field. Perception of similarity is a multifaceted phenomenon that also depends on our cultural background.

In [2], we collected and studied human similarity judgements from nave and expert listeners who listened to 11 audio recordings of a cappella flamenco performances from the same flamenco style (*palo* in the flamenco jargon), called *Martinete*. We observed that there were significant differences between both groups in the degree agreement and followed strategies.

In the present work, we try to gather music similarity ratings at a larger scale, including a varied set of flamenco *palos* and addressing participants with different degrees of expertise and exposure to flamenco music. To this end we here employ the game Spot the Odd Song Out [3] which allows participants to hear to music samples in triplets and choose the one which is more dissimilar to the others. We implemented a new style-based module for the game and added the *corpusCOFLA* corpus of flamenco music to its

database. We furthermore provide multilingual versions of the game in English, Spanish, Japanese and more.

## 2. SPOT THE ODD SONG OUT

With the introduction of *Games-With-A-Purpose* (GWAP) as powerful tools to collect human annotations on large datasets, the Culture-Aware Similarity Retriever (CASimIR) Architecture was developed [3] to enable the collection of music annotations, such as music similarity, on the world wide web. Key design goals include modularity, extensibility, dynamic survey scaling to growing participant numbers, and the separation of data collection and task definition from its visual presentation. The *Spot the Odd Song Out*<sup>1</sup> (STOSO) GWAP was built as a first front-end to CASimIR, initially containing modules for odd-one-out similarity, tempo and rhythm data collection. The original odd-one-out similarity trial asks participants to choose the "Odd Song Out", the most different song out of three music clips, and rewards agreement among players without a prescriptive ground truth. The resulting data can be used to parametrise general or group-specific models for music similarity using machine learning. We aim to keep the collected data to be freely accessible in an anonymised form.

In the flamenco version of Spot the Odd Song Out (see figure 2), players are asked "which song is from a different flamenco style" from a set of 3 30-second excerpts of flamenco recordings. Triplets are created in such a way that two songs share the same *palo* while the remaining song has a different *palo*. Players currently play in teams with "AI players" that select the "Odd Song Out" based on the *palo* information, and points are provided on agreement with these players. The points display is presented in figure 3. This screen also shows the artists, titles and different *palos* of the songs in the triplet, and provides links to further meta-data via Musicbrainz<sup>2</sup>. Currently a game or match consists of 10 Flamenco odd-song-out triplets, but the other modules can be reintroduced to make the game more diverse. We aim to use the collected similarity data for investigating the relationship between similarity, style and characteristic features in the (flamenco) music.



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<sup>1</sup> <http://mirg.city.ac.uk/casimir/game>

<sup>2</sup> <http://musicbrainz.org/>

### 3. THE CORPUS COFLA

The corpusCOFLA<sup>3</sup>, has been built by Kroher et al. [1] in the context of the COFLA project on Computational analysis of flamenco music. This musical corpus includes more than 1800 flamenco recordings which are representative of what is considered classical flamenco. The music tracks were selected from 12 well-known commercially available flamenco anthologies in order to minimize a possible bias towards geographic location, singer or record label. The corpus is available for research purposes including editorial meta-information together with the musicBrainz<sup>4</sup> IDs for all tracks as well as the anthologies as XML documents.

#### 3.1 Selected material

The set of three-song triplets initially selected for the game contains 40 songs from five genres (Tonas, Fandangos, Soleares, Alegrias, Bulerias). The songs were used to generate 60 triplets of which each covers two genres. This allows to have 3 triplets for all possible combinations of genres. In CASimIR, triplets are strictly described as sets of songs, which are displayed to users in controlled permutations. When enough data has been collected over this set of triplets, more triplets will be added across the available songs. Likewise, the set of songs and genres can be further extended given sufficient coverage. Furthermore, red-herring control triplets are displayed on random occasions. Such triplets contain two identical songs, therefore the odd song out should be trivial to find, and the triplets can be used to measure data quality.

### 4. DEMO

1. English version available at <http://goo.gl/oxX4hR>
2. Spanish version available at <http://goo.gl/kDQzCt>
3. Japanese version available at <http://goo.gl/Nhiovb>

### 5. PRELIMINARY RESULTS

The following are very early results that were partly collected during a testing phase of the game. Nonetheless from this data it seems that quite short excerpts of the music allow for a correct decision on the task.

Until August 9th 2016 we have collected 217 odd-song-out votes from 37 users. These votes cover a total of 157 permutations based on 55 triplets containing 40 songs from all 5 palos. On average, a triplet is answered correctly in 84.5 percent of the cases. Players on average listen to each excerpt for 4 of 30 seconds.

### 6. ACKNOWLEDGEMENTS

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<sup>3</sup> [http://www.cofla-project.com/?page\\_id=170](http://www.cofla-project.com/?page_id=170)

<sup>4</sup> <https://musicbrainz.org/>

number of anthologies	12
total number of CDs	103
total number of tracks	1,812
total number of singers	362
male singers	81%
female singers	19%
total duration	approx. 95 hours
title annotation existent	83%
style annotation existent	94%

The corpus comprises more than 1,800 tracks, with a total duration of approximately 95 hours.

Figure 1. Statistics of the COFLA corpus.

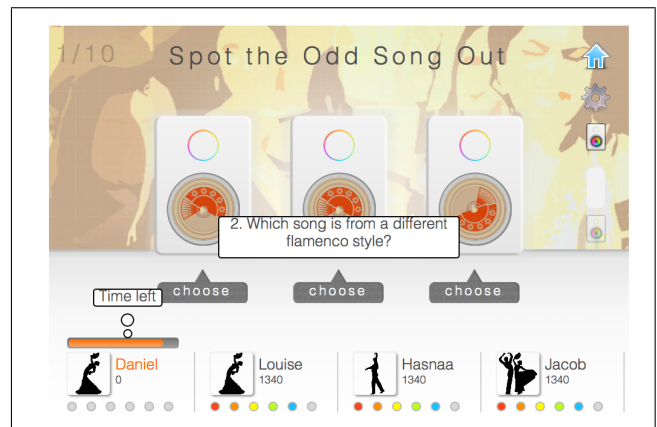


Figure 2. Screenshot of the game: Data entry.

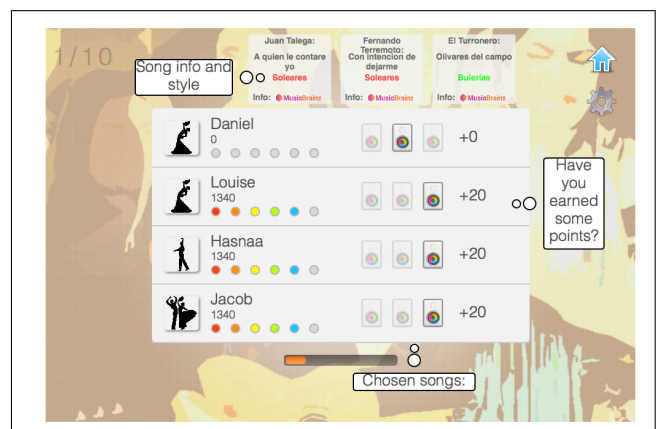


Figure 3. Screenshot of the game: Results display.

## 7. REFERENCES

- [1] Nadine Kroher, José-Miguel Díaz-Báñez, Joaquin Mora, and Emilia Gómez. Corpus cofla: A research corpus for the computational study of flamenco music. *J. Comput. Cult. Herit.*, 9(2):10:1–10:21, May 2016.
- [2] Nadine Kroher, E. Gómez, C. Guastavino, F. Gómez-Martín, and J. Bonada. Computational models for perceived melodic similarity in a cappella flamenco cantes. In *15th International Society for Music Information Retrieval Conference*, Taipei, Taiwan, 27/10/2014 2014.
- [3] Daniel Wolff, Guillaume Bellec, Anders Friberg, Andrew MacFarlane, and Tillman Weyde. Creating audio based experiments as social web games with the casimir framework. In *Proc. of AES 53rd International Conference: Semantic Audio*, Jan 2014.