Can you predict how courts decide in plagiarism cases?

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Any hard and fast rules?

- The 2-second rule
- The 1-bar rule
- The 5-notes rule

It is more complicated than that!

Two songs or song parts must be similar and share unique musical components
Example 1: Bright Tunes VS. Harrisongs (1976)

- The Chiffons He’s So Fine, 1963
  - No. 1 in US, UK highest position 11

- George Harrison, My Sweet Lord
  - Single published in 1971
  - No.-1-Hit in US, UK & (West-)Germany

- Ronald Selle, “Let It End”

Questions

- How can we measure the similarity between melodies?
- What do we mean by *sharing unique features*?
- When is similarity dangerous?
- Can we use a computer for all this?
Measuring similarity in context

1. Break melodies up into features

2. Consider pop music history as context

3. Compute similarity based on unique features shared
1. Breaking melodies up into features

Features: melody-types (short phrases) similar to words in language

And then?

Count melody-types!

<table>
<thead>
<tr>
<th>Word Type</th>
<th>Frequency f(t),</th>
<th>Melodic Type τ (pitch interval, length 2)</th>
<th>Frequency f(τ),</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twinkle</td>
<td>2</td>
<td>0, +7</td>
<td>1</td>
</tr>
<tr>
<td>little</td>
<td>1</td>
<td>+7, 0</td>
<td>1</td>
</tr>
<tr>
<td>star</td>
<td>1</td>
<td>0, +2</td>
<td>1</td>
</tr>
<tr>
<td>How</td>
<td>1</td>
<td>+2, 0</td>
<td>1</td>
</tr>
<tr>
<td>I</td>
<td>1</td>
<td>0, -2</td>
<td>3</td>
</tr>
<tr>
<td>wonder</td>
<td>1</td>
<td>-2, -2</td>
<td>1</td>
</tr>
<tr>
<td>what</td>
<td>1</td>
<td>-2, 0</td>
<td>2</td>
</tr>
<tr>
<td>you</td>
<td>1</td>
<td>0, -1</td>
<td>1</td>
</tr>
<tr>
<td>are</td>
<td>1</td>
<td>-1, 0</td>
<td>1</td>
</tr>
</tbody>
</table>
2. Consider pop music history as context

Count melody-types in Goldsmiths database of 14,000 pop songs:

- Common melody-types => low weights
- Rare and unique melody-types => high weights
3. Compute similarity over unique features shared

\[ \sigma(s,t) = \frac{f(s_n \cap t_n)}{f(s_n \cap t_n) + \alpha f(s_n \setminus t_n) + \beta f(t_n \setminus s_n)} \], \alpha, \beta \geq 0

Amos Tversky’s ratio model of similarity (1977)

Looks at:
- Proportion of features shared: \textit{ratio}
- Uniqueness of features: \textit{f()}

Does this actually work?

Study Müllensiefen & Pendzich (2009):

- 20 cases from US courts

- Task: Predict how court rules by applying Tversky’s ratio model to melodies

- Results:
  - 90% of cases predicted correctly
We can measure musical similarity using computer algorithms.

Rare musical features are important for similarity perception.

If too many rare features are shared you might be in trouble.

Computers help us with the statistics of pop history.
Can we actually predict how courts rule in cases of plagiarism?
Can you predict how courts decide in plagiarism cases?

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