

Lyricon

-Visualization of music structure by automatic multiple icon selection-

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1. ABSTRACT

This paper presents “Lyricon”, a technique that automatically selects multiple icons of tunes block-by-block, and effectively displays the icons. Here, Lyricon selects icons based on not only musical features, but also lyrical features, because lyrics are very important on recent popular hit songs. In other words, Lyricon can reflect not only the mood of the tunes but also the story of lyrics on its icon selection. Users can understand both impression of the sounds and the content of the lyrics, and they can choose songs which is suitable for their feeling based on the visual impression of the icons. Besides, embedding Lyricon on GUIs of music players is convenient for partial play of tunes.

2. PRESENTED TECHNIQUE

2.1 Preparation

We prepare 1) “categories” as $C = \{c_1, \dots, c_{Nc}\}$, where Nc is the number of categories, 2) sets of multiple keywords belonging to c_i as $K_i = \{k_{i1}, \dots, k_{iNki}\}$, where Nki is the number of keywords belonging to c_i , and 3) icons belonging to c_i as $X_i = \{x_{i1}, \dots, x_{iNxi}\}$, where Nxi is the number of icons belonging to c_i . The words in the keywords group K_i are related to the word of category c_i . And icons X_i express the meaning of the word c_i . Each icon has a tag of adjectives $A_{ij} = \{a_{ij1}, \dots, a_{ijNaij}\}$, where $Naij$ is the number of adjectives of icon x_{ij} . They express the icon impression. Current our implementation prepares 23 categories which we subjectively selected; however, we will improve and rearrange the categories based on our future feasibility studies.

2.2 Lyrical Analysis

Since Lyricon assigns icons block-by-block, we would like to use lyrics divided based on blocks of the songs. We used “Lyric Master” [1] to obtain lyrics of Japanese hit songs which are divided block-by-block.

Lyricon then analyzes morphologic of each block and divides the block of the lyric into words. We use “Chasen” [2] for this process. Let us describe a set of words in a block as $W = \{w_1, \dots, w_N\}$. If a word w_k completely matches to the keyword k_{ij} , Lyricon determines that the block is related to the category c_i . In this case Lyricon treats the set of icons X_i as the candidates to be assigned to the block, and finally one of the icons x_{ij} is assigned to the block by musical features, as described in Section 2.3.

2.3 Musical Feature Analysis

Lyricon uses MIRtoolbox [3], working on MATLAB, for musical feature calculation. We calculate 3 features,

“Tempo”, “Percentage of high-tone range”, and “Percentage of in-harmonic tones”. Lyricon then selects the adjectives of the song from the selected 6 adjectives, as shown in Table 1, which are also applied to A_{ij} . When multiple icon candidates in a same category are extracted for a block, Lyricon selects one of the icons by matching the adjectives pre-assigned to the icons and the adjectives selected according to the feature values.

Table 1. Used features and adjectives.

Feature	Adjectives
Tempo	slow, fast
Percentage of high-tone range	simple, rich
Percentage of inharmonic tones	primitive, complex

2.4 Display

We developed a visualization component to display the icon selection results. Figure 1 shows an example of visualization.

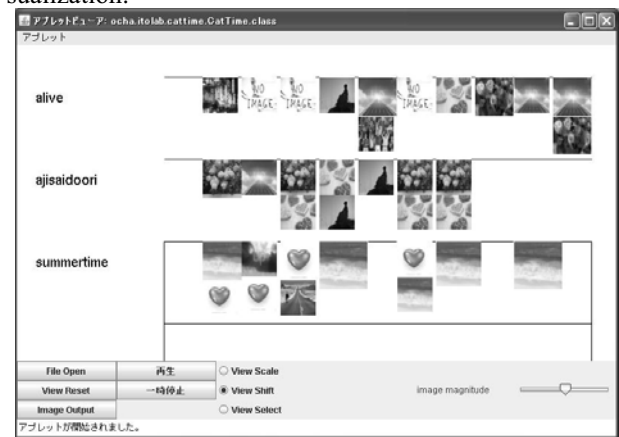


Figure 1. Visualization of the selected icons.

3. FUTURE WORK

We would like to discuss how to calculate the importance of the words. Also, we would like to reexamine the icons and keywords so that we will give users proper impression of the songs.

4. REFERENCES

- [1] K. Maehashi, Lyric Master, <http://www.kenichimaehashi.com/lyricsmaster/>
- [2] Chasen, <http://chasen.naist.jp/hiki/Chasen/>
- [3] O. Lartillot, MIRtoolbox, <http://www.jyu.fi/hum/laitokset/musiikki/en/research/coe/materials/mirtoolbox>