

Nextone Player: A Music Recommendation System Based on User Behavior



Yajie Hu and Mitsunori Oghara

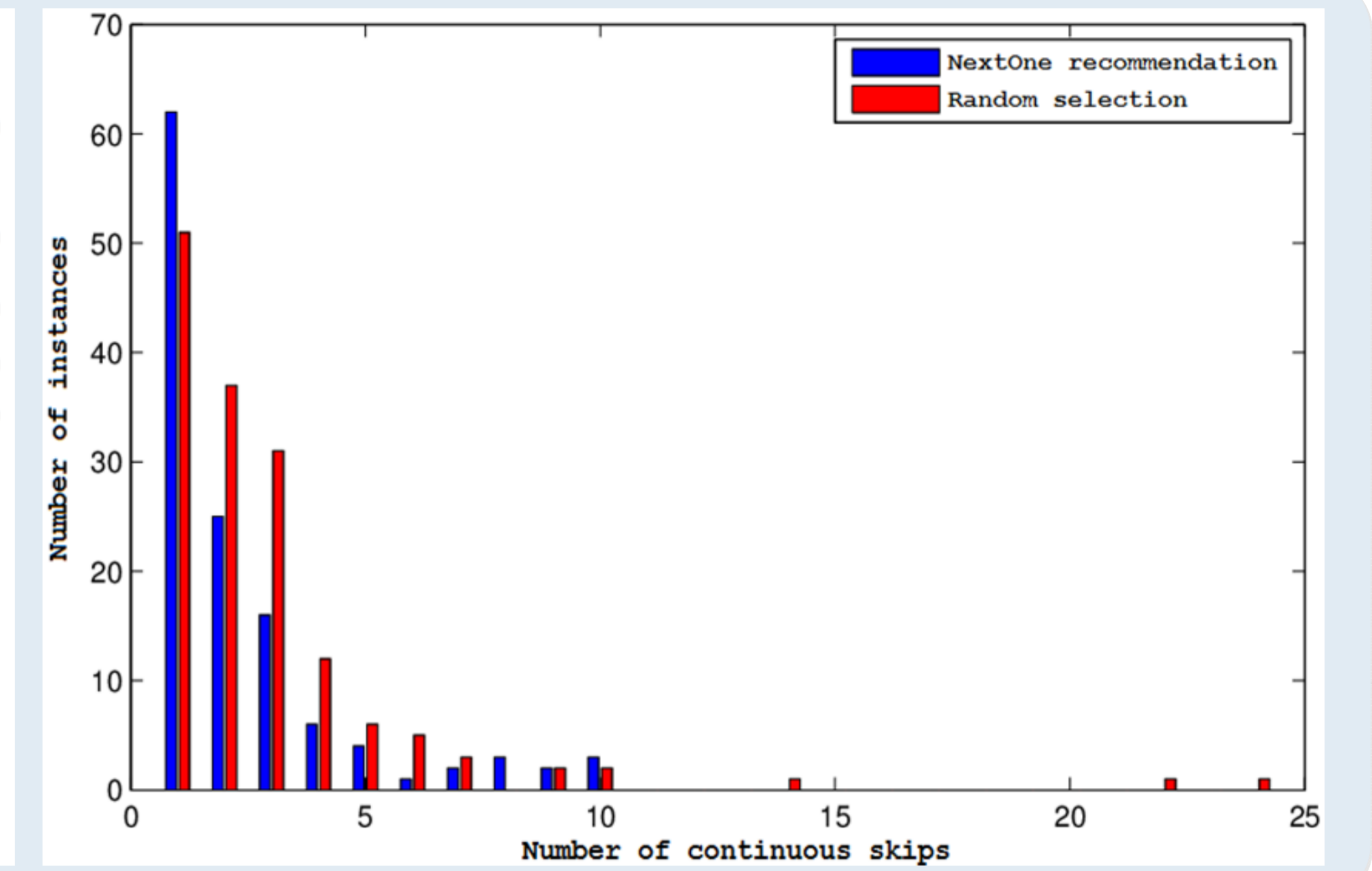
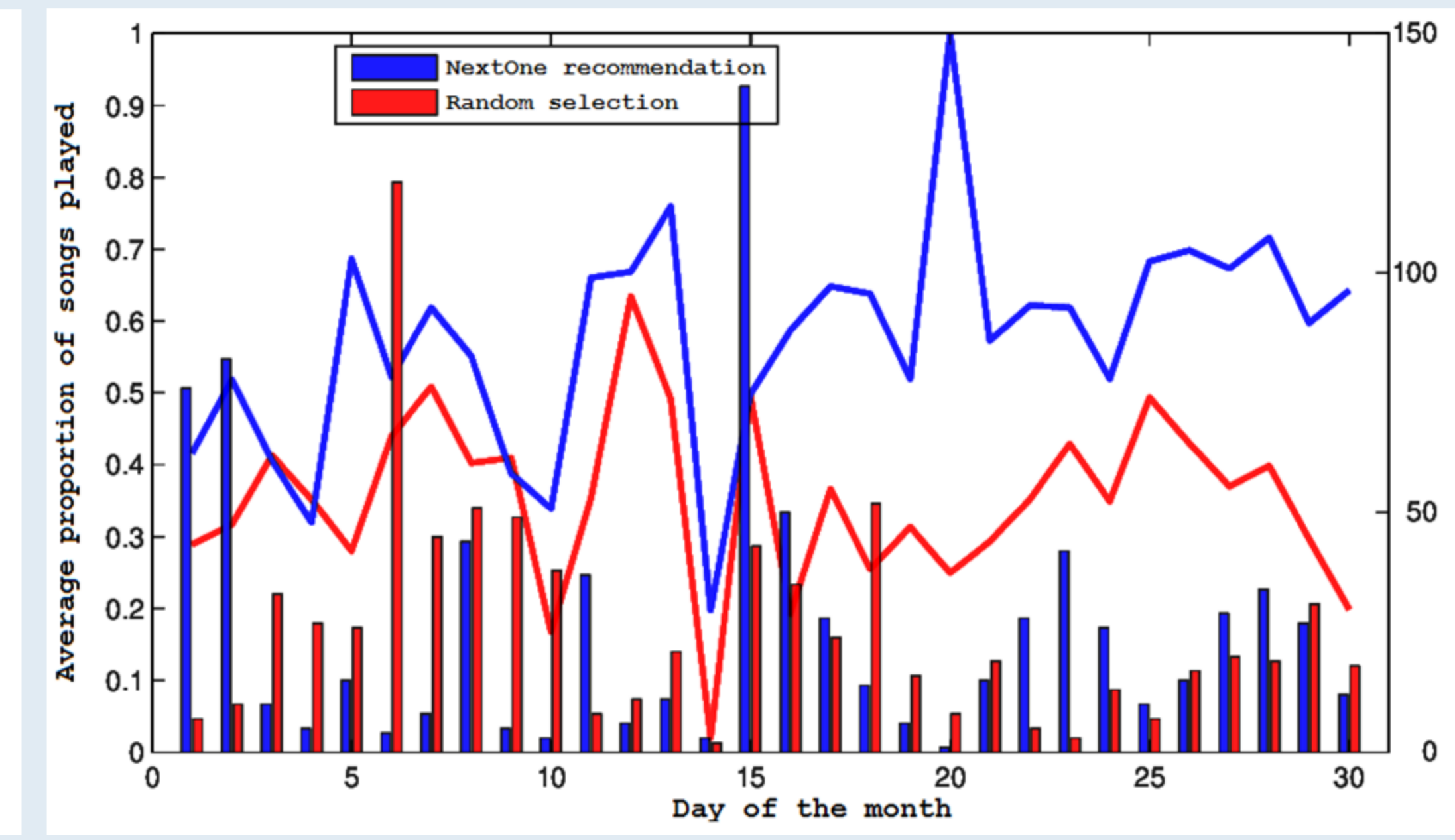
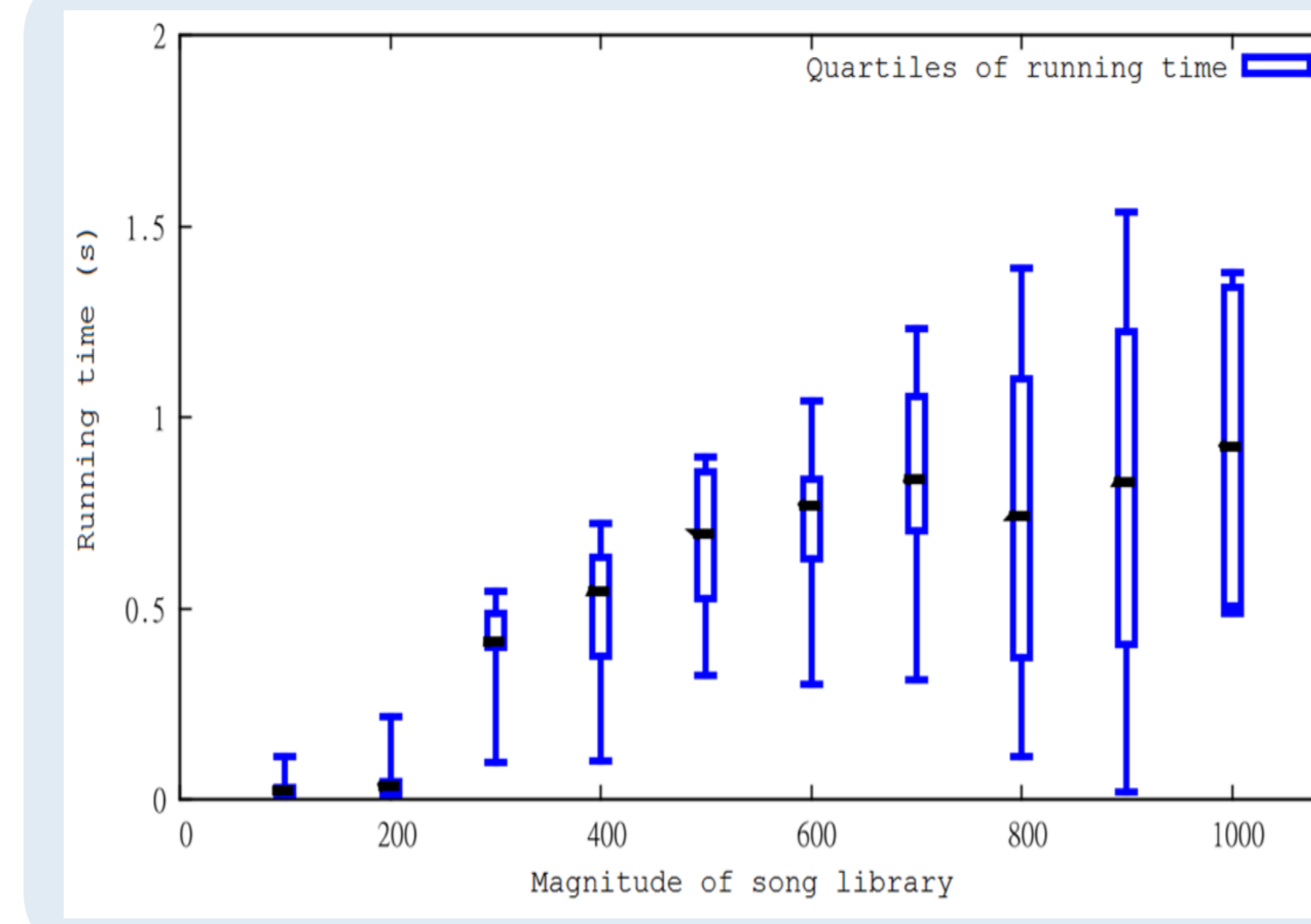
yajie.hu@umail.miami.edu | oghara@cs.miami.edu



ABSTRACT

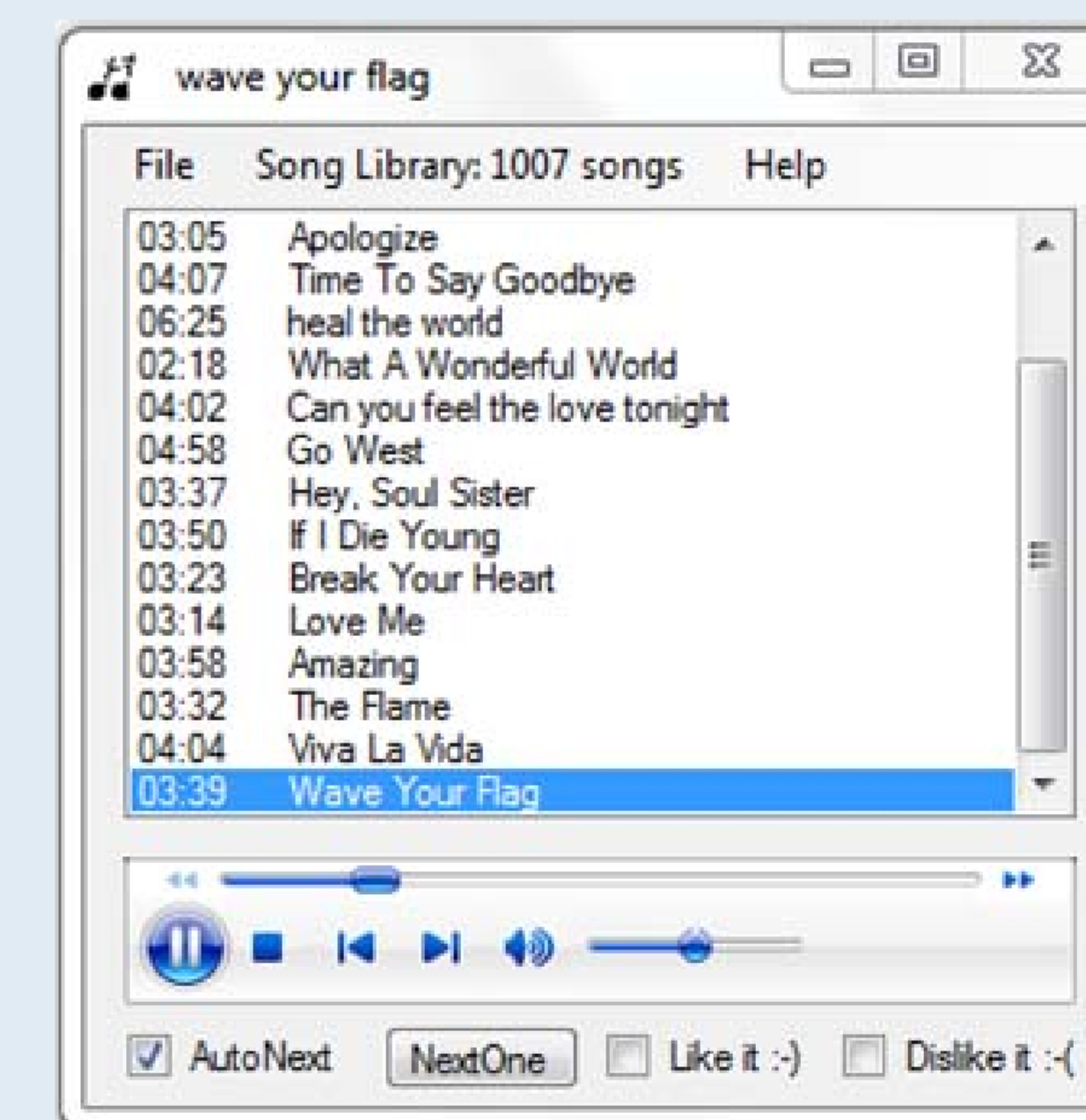
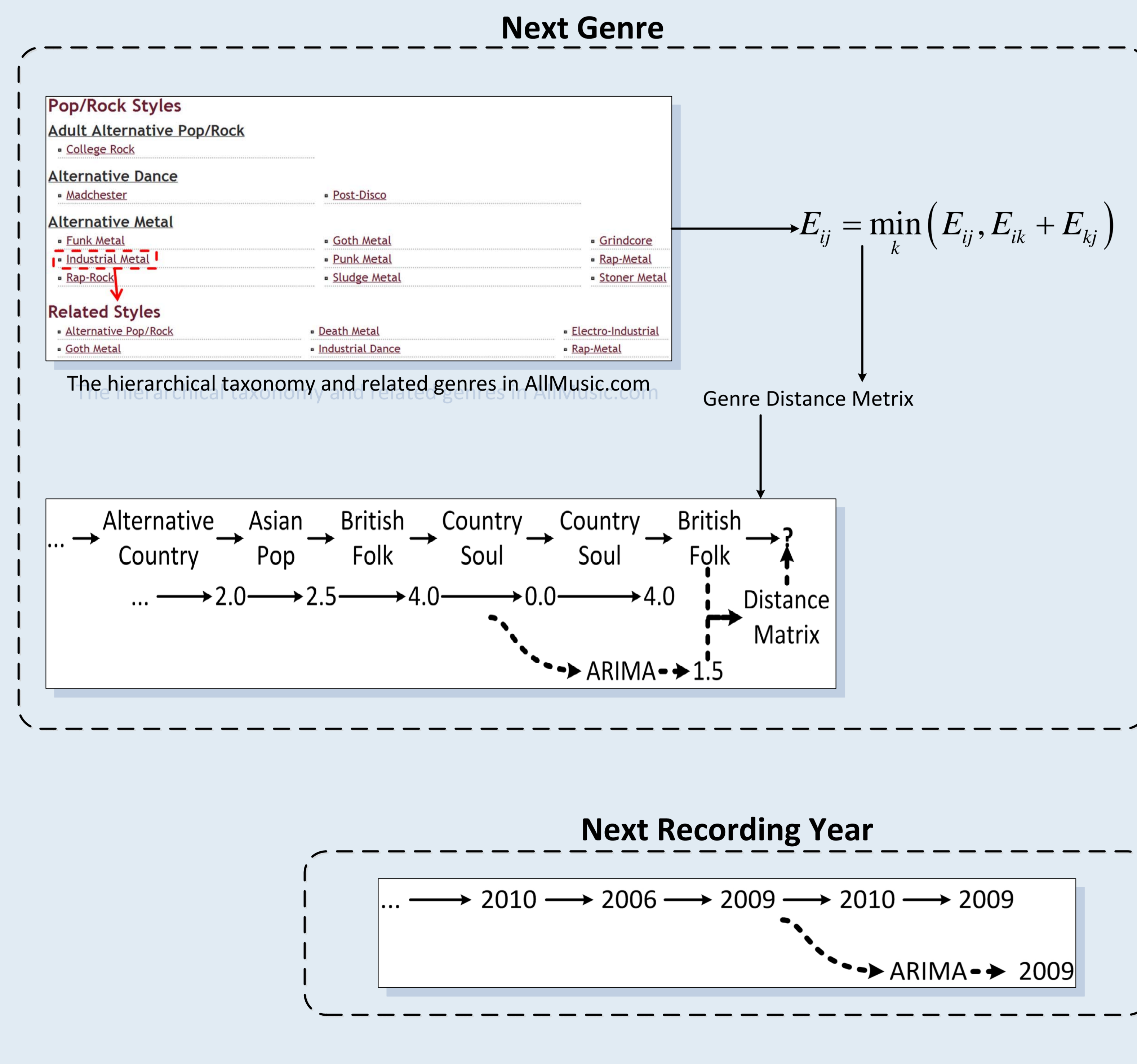
We present a new approach to recommend suitable tracks from a collection of songs to the user. The goal of the system is to recommend songs that are favored by the user, are fresh to the user's ear, and fit the user's listening pattern. We use Forgetting Curve to assess freshness of a song and evaluate "favoredness" using user log. We analyze user's listening pattern to estimate the level of interest of the user in the next song. Also, we treat user behavior on the song being played as feedback to adjust the recommendation strategy for the next one. We develop an application to evaluate our approach in the real world. The user logs of trial volunteers show good performance of the proposed method.

EXPERIMENT RESULTS



METHOD

We determine whether a song is to be recommended as the next one in the playlist from five perspectives: **genre**, **recording year**, **favor**, **freshness** and **time pattern**.



Append the song with the highest score in the playlist

Recommendation score

ALGORITHM 1: Adjust weights based on recent recommendation results

Input: Recent k recommendation results $R_t (R_{t-k+1}, R_{t-k+2}, \dots, R_{t-1}, R_t)$ at time t . R_t contains user interaction of this recommendation χ_i , which is like or dislike, and the score of each factor of the recommendation i is Λ_i . Descent step δ , which is positive. Current factor weights, W .

Output: New factor weights, W' .

Process:

```

if  $\chi_i = \text{dislike}$  then
  Initialize an array  $F$  to record the contribution of each factor.
  for  $i = R_{t-k+2}$  to  $R_t$  do
     $\Delta \Lambda_i = \Lambda_i - \Lambda_{i-1}$ 
     $max = \arg \max (\Delta \Lambda_j), 1 \leq j \leq 5$ 
     $min = \arg \min (\Delta \Lambda_j)$ 
    if  $\chi_i = \text{Like}$  then
       $F_{max} = F_{max} + 1$ 
    end
    else
       $F_{max} = F_{max} - 2$ 
       $F_{min} = F_{min} + 1$ 
    end
  end
   $inIndex = \arg \max_j (F)$ 
   $w'_j = \begin{cases} w_j + \delta, & j = inIndex \\ w_j - \delta/4, & otherwise \end{cases}, j = 1, 2, 3, 4, 5$ 
   $delIndex = \arg \min_j (F)$ 
   $w'_j = \begin{cases} w_j - \delta, & j = delIndex \\ w_j + \delta/4, & otherwise \end{cases}, j = 1, 2, 3, 4, 5$ 
end
else
   $W' = W$ 
end
return  $W'$ 

```