A Recommender system
Based on Interactive Evolutionary Computation

SEAL

Sungkyunkwan Evolutionary Algorithm Lab

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Introduction

What is This ?

In daily life...

I'm wondering
which one is **BEST** for me?

It is hard to **make decision**.
Is there any one who **help** me?

Recommender System *said...*

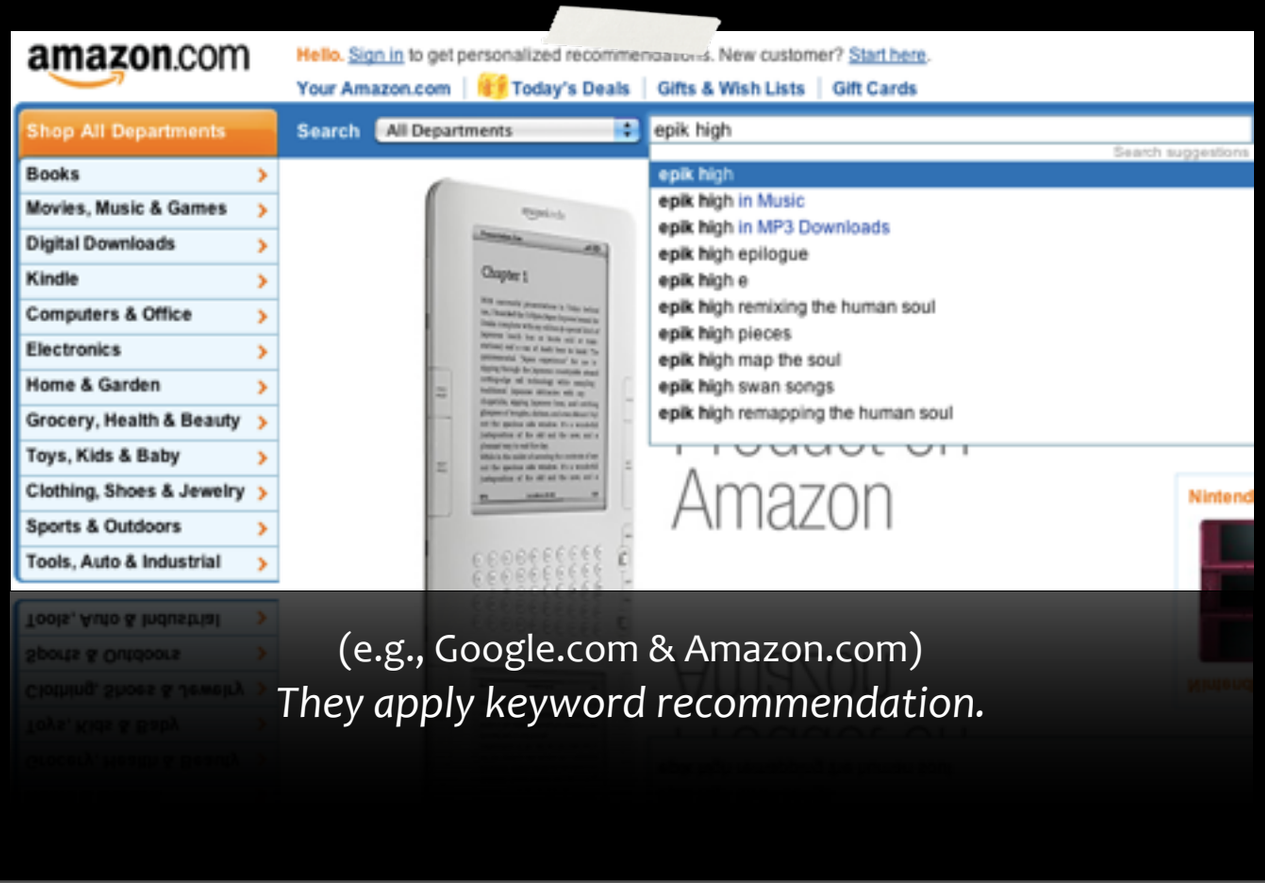
Don't worry! I can help you.

What is This ?

Recommender System

This System's Purpose is that

- recognizes user's preference
- recommends items that are interesting and useful to user.



(e.g., Google.com & Amazon.com)

They apply keyword recommendation.

System Overview

System Overview

Purpose of the system

Motivations

- Using mechanism of genetic inheritance for individuals (e.g., music tracks)

- Is it possible ?

The offsprings are inherited parent's properties.

In other words,
the offsprings may have some properties that user likes.

System Overview

Structure of the system

Our Proposed System are composed 3 Phases.

1) Preprocessing

Initialize Population

Feature Extraction

Data Grouping

2) User Evaluation

Update List

Item List

Evaluation

Human (subjective)

3) Interactive EC

Generate New Population

Content-Filtering

Genetic Operators

System Overview

Process of the system

1) Preprocessing

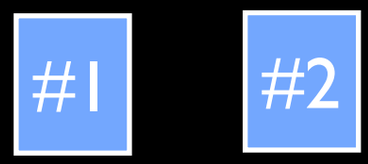
2) User Evaluation

3) Interactive EC

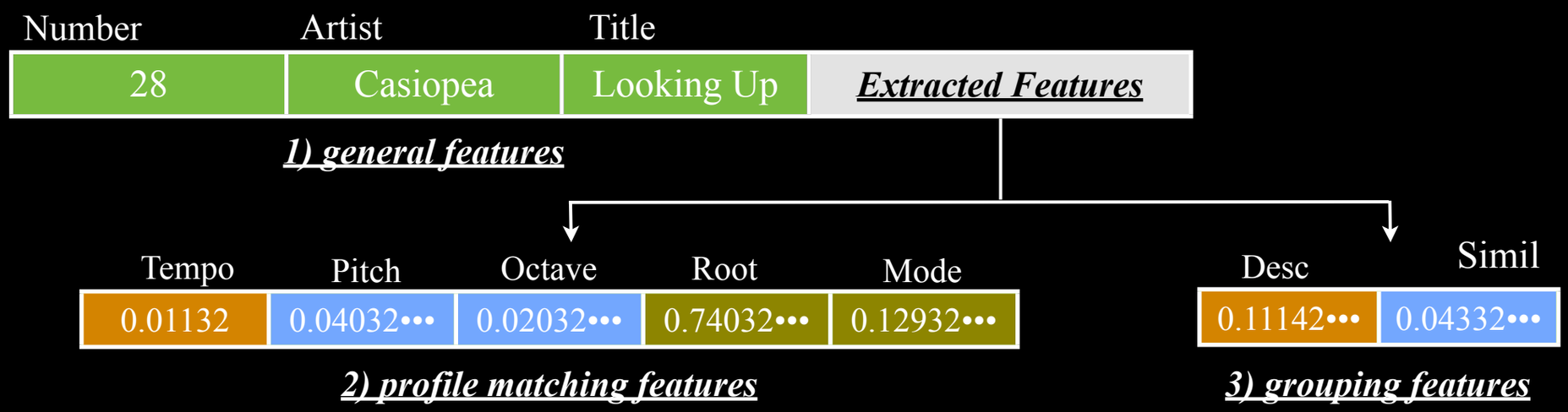
Music Objects

CLAM**

Musical Feature Extraction Tool



Initial Individuals



Experiment

Experiment

In the previous work

In the previous work, we tried to perform the experiment on the web-site.

- http://arkii.skku.edu:8080/mrs/

No	Artist Name	Song Title	Rating	Listen
25	Lyn	My love (Feat. MC Mong)	★ ★ ★ ★ ★	
34	K.Will	Love 119 (Feat. MC Mong)	★ ★ ★ ★ ★	
55	Someday	Did you know that?	★ ★ ★ ★ ★	
78	Super Junior	Sorry Sorry	★ ★ ★ ★ ★	
3	Big Bang	Day by day	★ ★ ★ ★ ★	
67	4 Minuate	Muzik	★ ★ ★ ★ ★	
9	After School	Diva	★ ★ ★ ★ ★	
13	Dynamic Duo	Beyond The Wall	★ ★ ★ ★ ★	
25	SG Wannabe	I love you	★ ★ ★ ★ ★	
11	Kara	Hoeny	★ ★ ★ ★ ★	

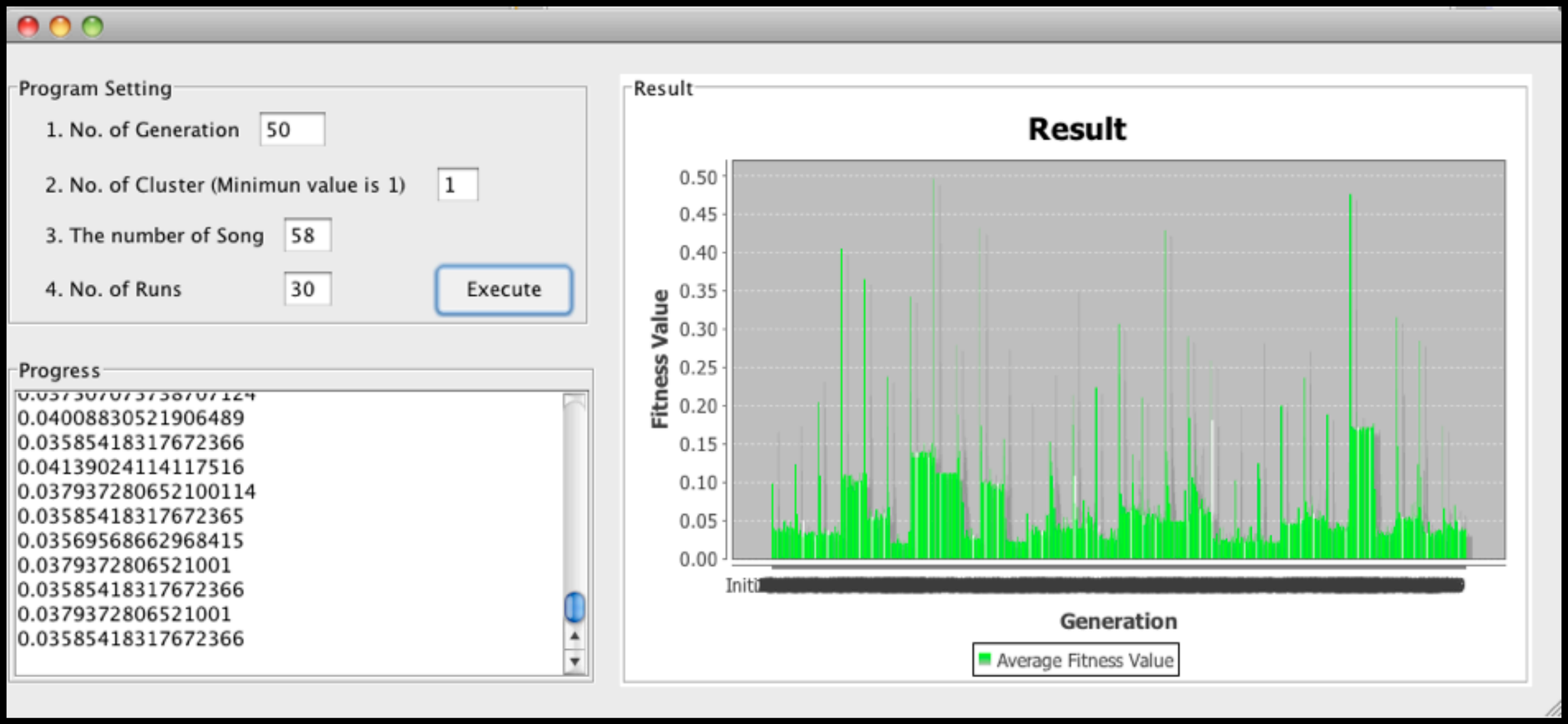
Go Next

The experiment website (In the previous work)

Experiment

The test agent

The test agent has developed for the experiment.



The test agent for experiment

Experiment

Test Case #1

The experimental condition

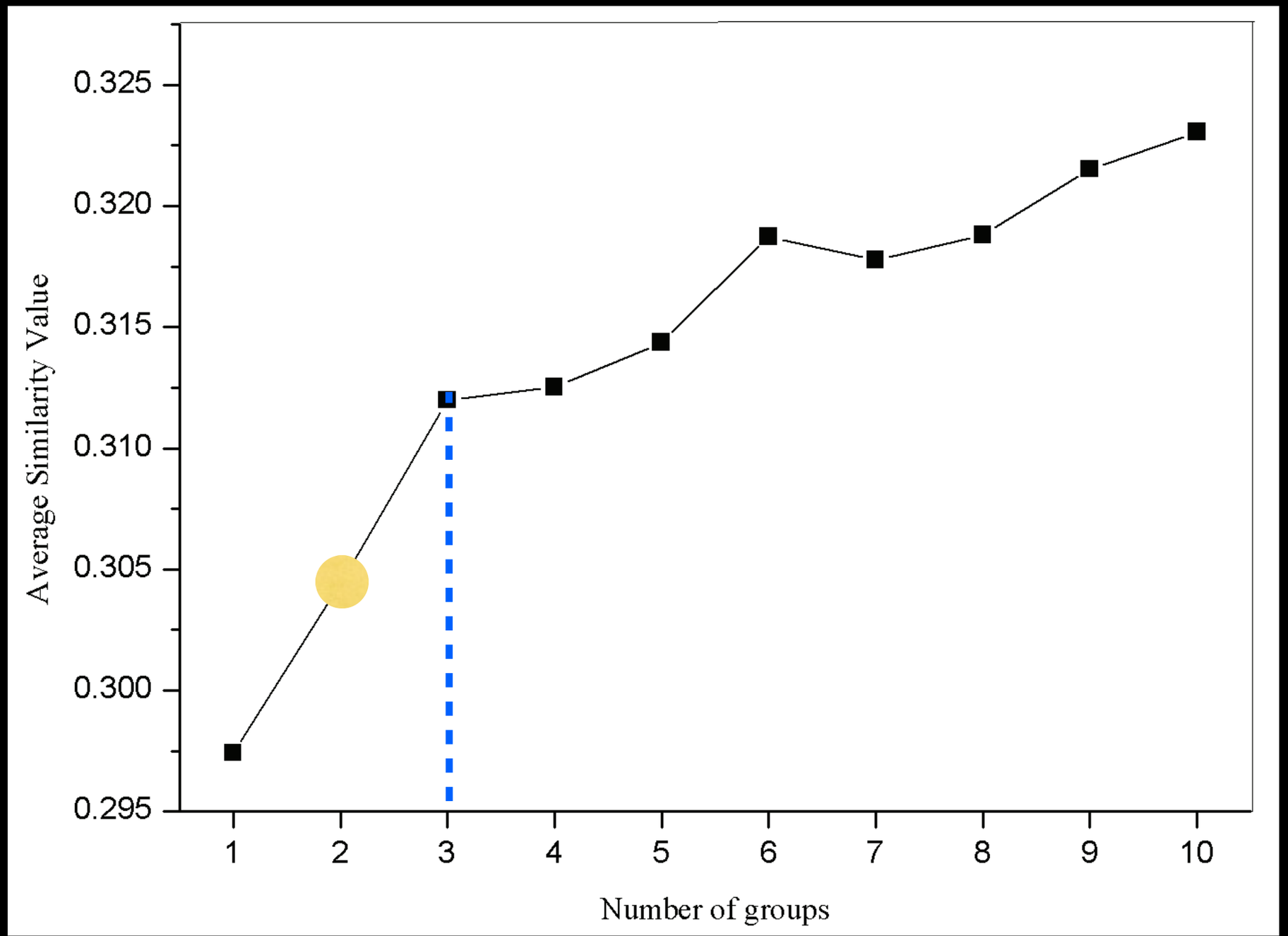
- 400 music tracks
- A list contains 10 items (i.e., music tracks)
- Run 100 times and 50 lists
- Num. of cluster : 1 ~ 10

Criteria (to minimize)

- Average Similarity Value (using Euclidian distance)
- Execution Time (ms)

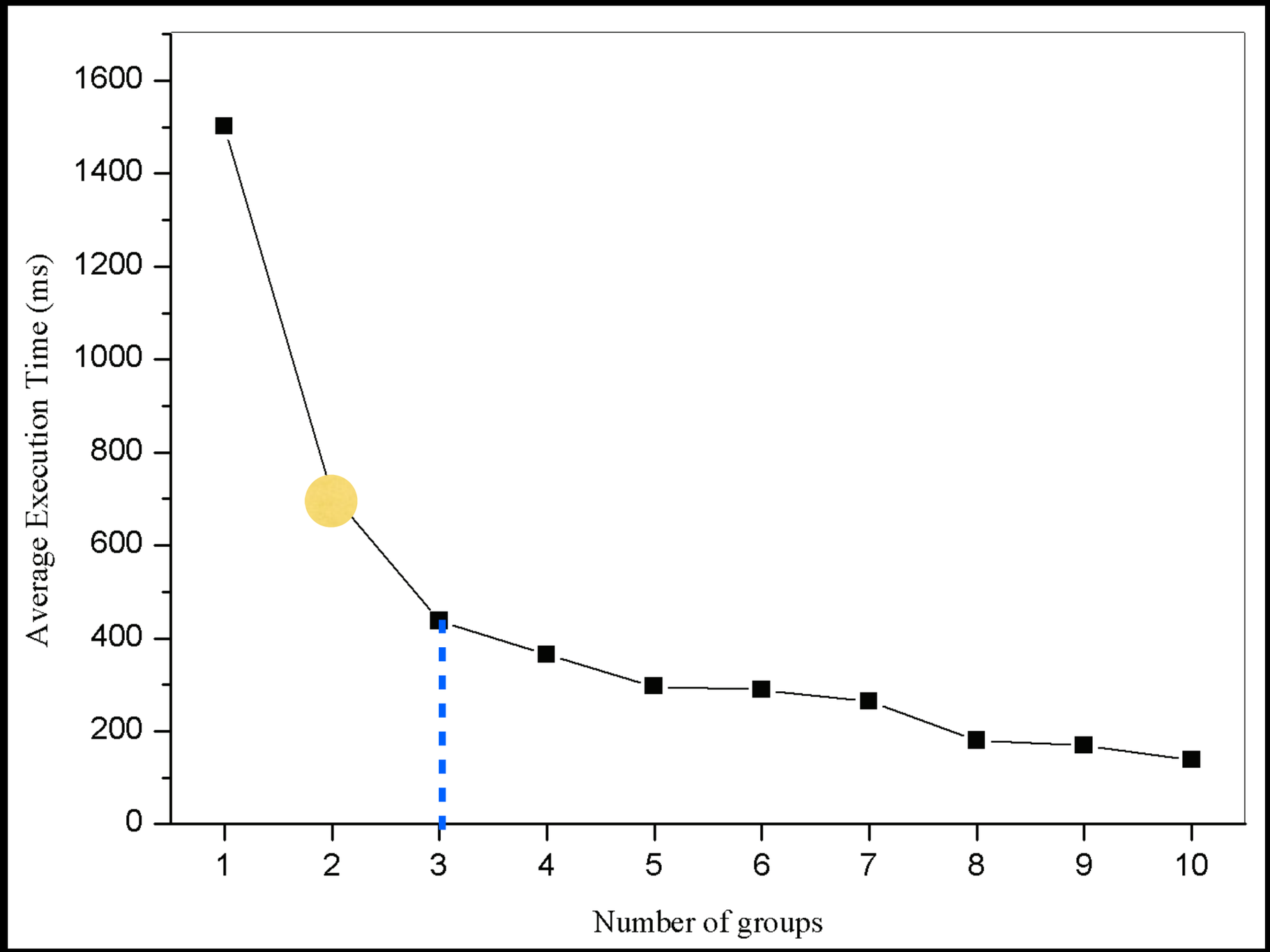
Experiment

Result - Similarity Value



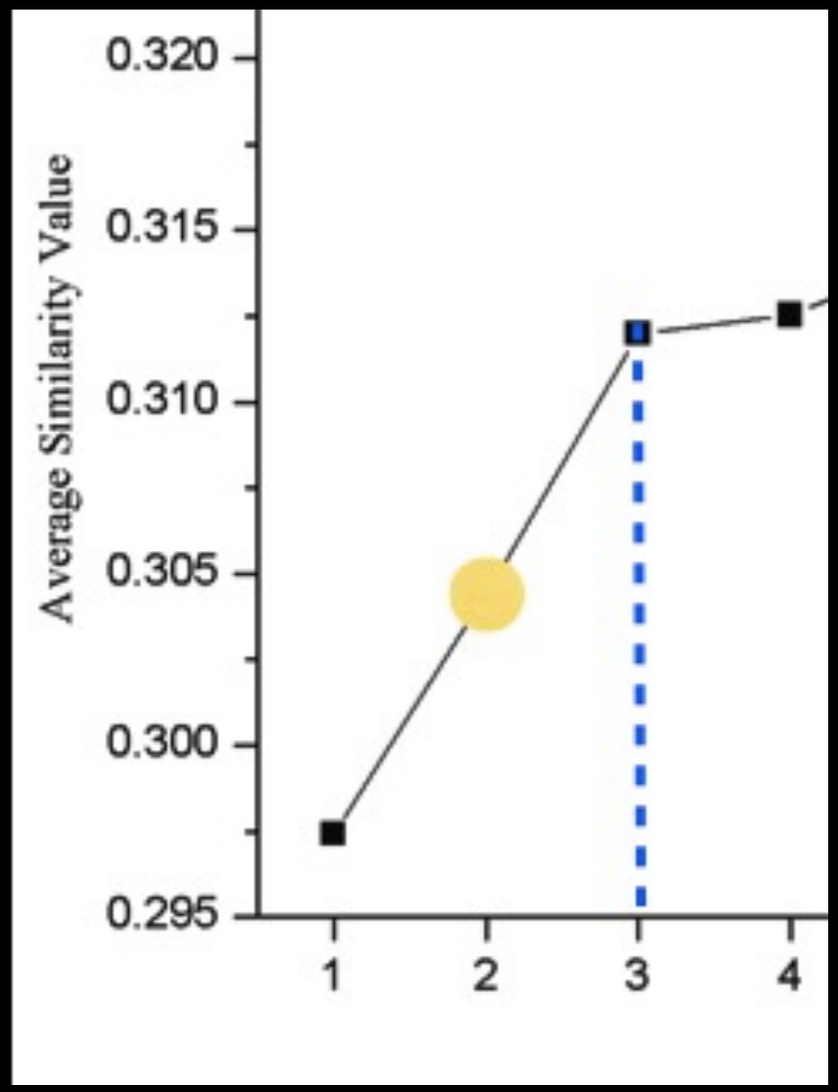
Experiment

Result - Execution Time

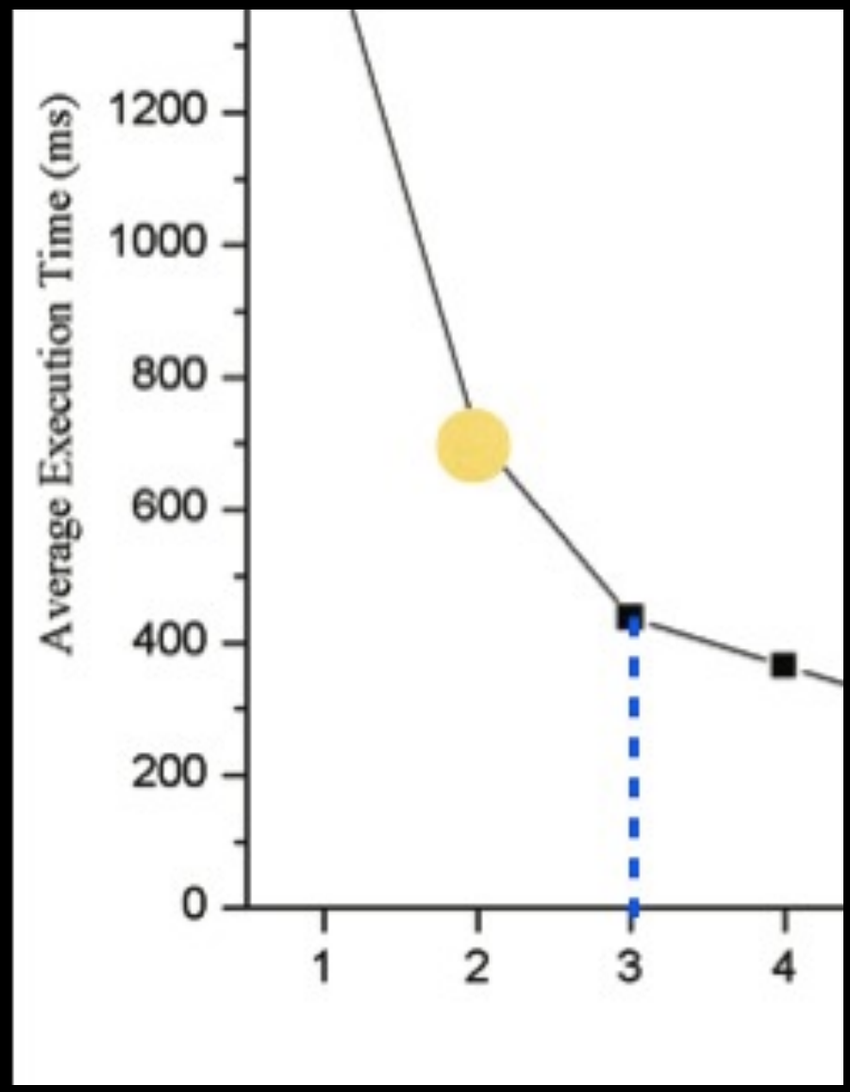


Experiment

Result - Fitness value and Time



- Ave. Similarity value



- Ave. Execution time

Experiment

Test Case #2

The experimental condition

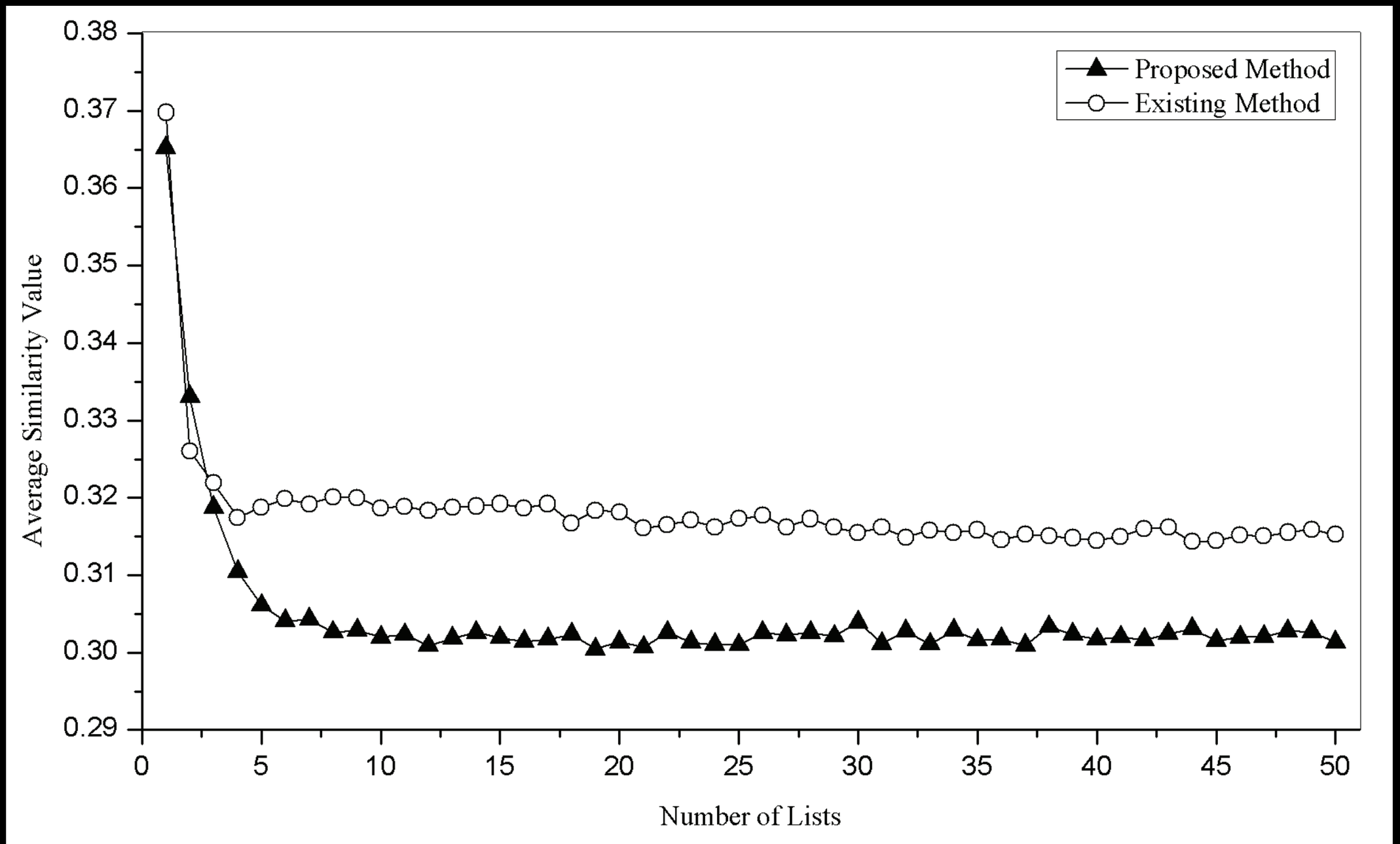
- variable size of music tracks
- A list contains 10 items (i.e., music tracks)
- Run 100 times and 50 lists
- Num. of cluster : 2

Criteria

- Average Similarity Value (compare to existing method, CF method)

Experiment

Result - Similarity Value



Experiment

Test Case #3

The experimental condition

- variable size of music tracks
- A list contains 10 items (i.e., music tracks)
- Run 100 times and 150 lists
- Num. of cluster : 3

No. of Lists	Size
0 (Initial)	200
50	300 (+100)
100	400 (+100)

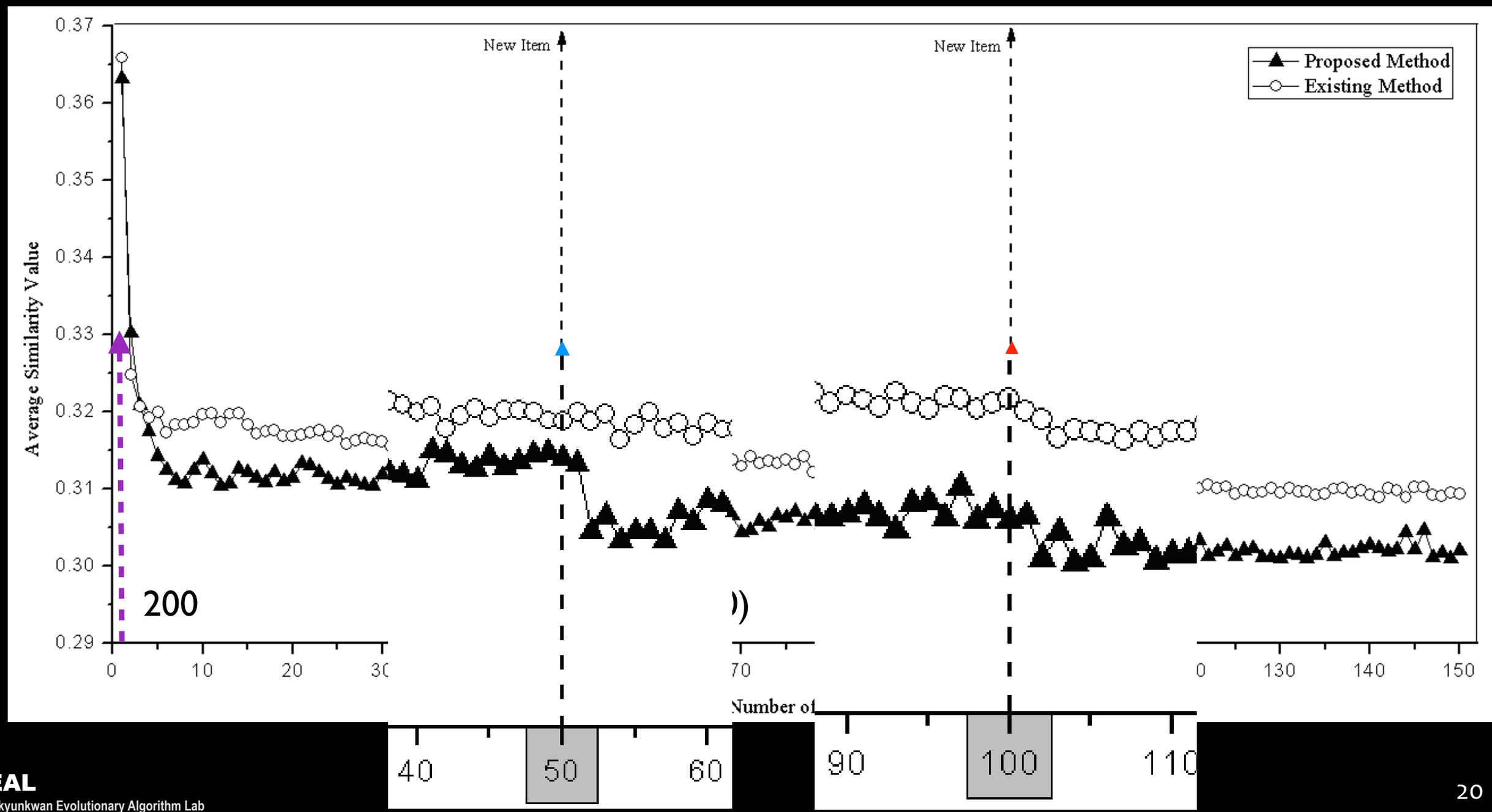
Criteria

- Average Similarity Value (compare to existing method)
- Maintain the trend of previous results

  (on the specific point which *new items are added*)

Experiment

Result - Similarity Value



Discussion

Discussion

Recommender system

In this research,
we introduce a new type of recommender system.

- interactive evolutionary computation
  with the content-based filtering method

From experimental result,
proposed system can recommend new items which are tailored
with *user's preference* and response quickly (i.e., time efficiency).

This system can be an alternative way to improve recommender system.
(i.e., overcome limitations of existing methods)