빅데이터 연구회 : KU-BIG

MyAnimeList Dataset

Recommendation

송 민 우경민 이강현
윤재경 정재원 이소담

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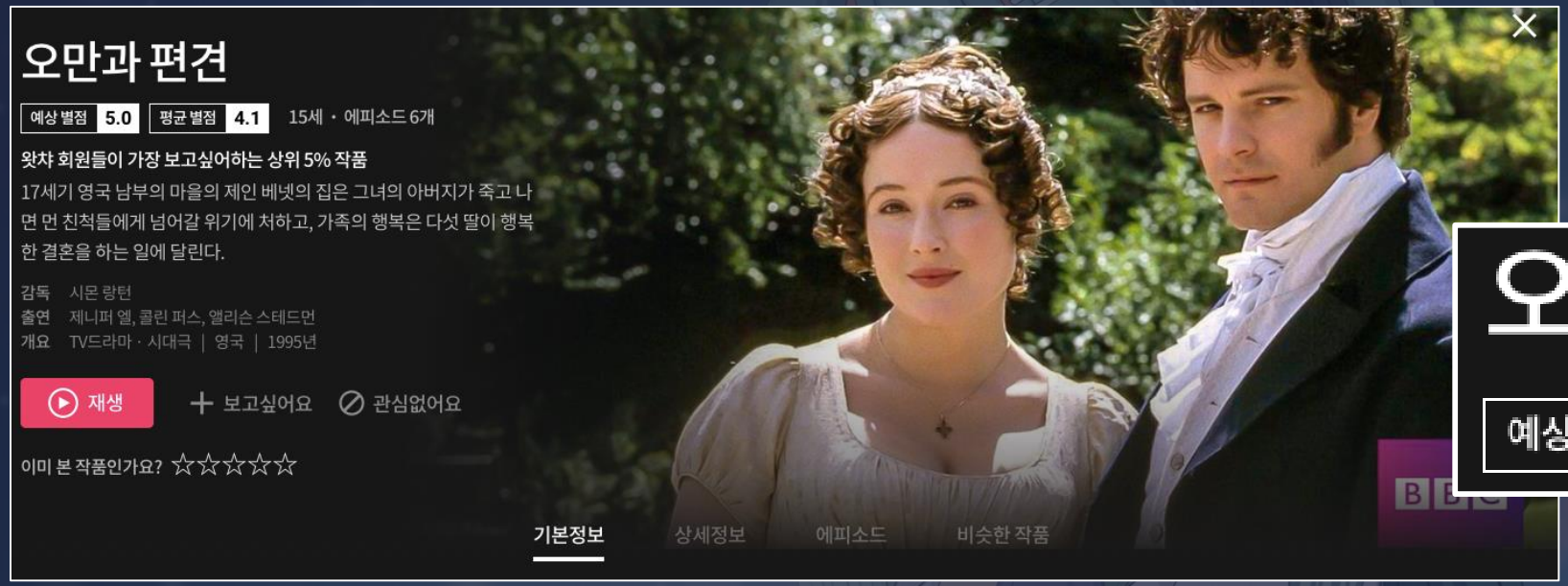
프로젝트

추천시스템



WATCHA PLAY

오만과 편견

예상 별점 5.0 평균 별점 4.1

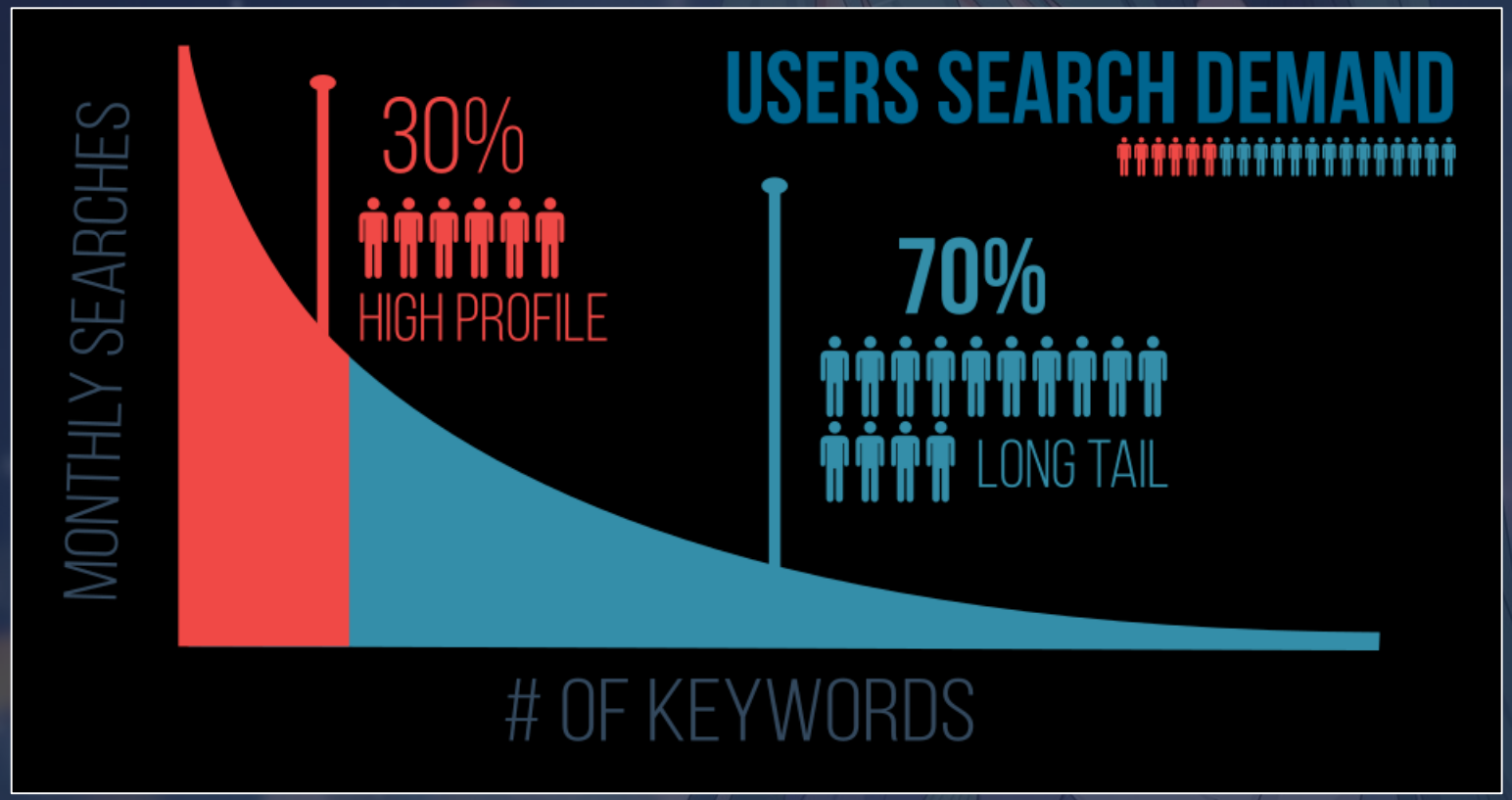
NETFLIX

NETFLIX 영화

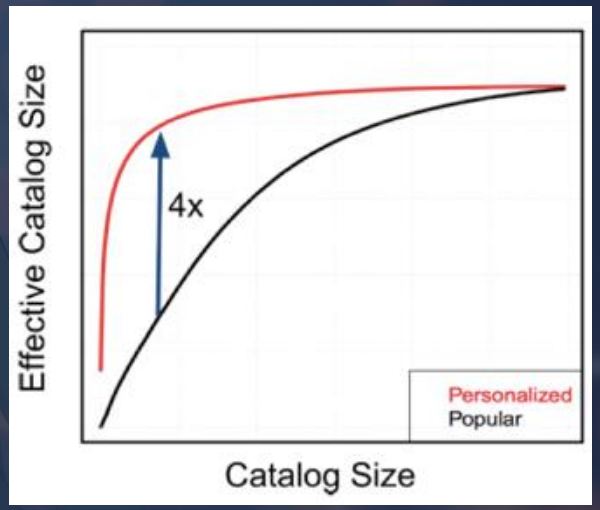
우리의 계절은

80% 일치 2018 12 1시간 14분

프로젝트 주제 선정 이유



추천 시스템은 1년에 1.2조원의 가치



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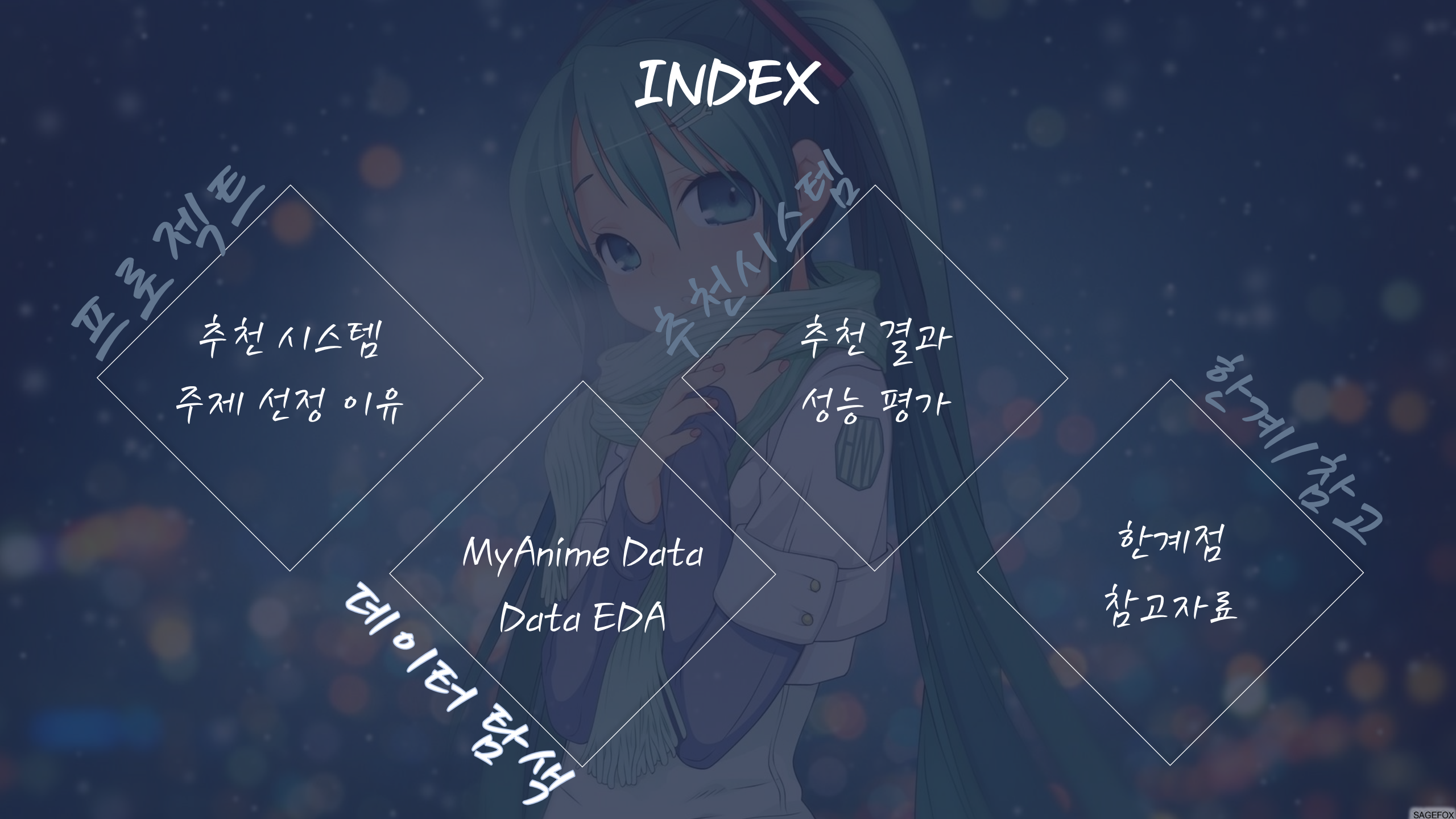

프로젝트
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데이터 탐색

MyAnime data

MyAnimeList

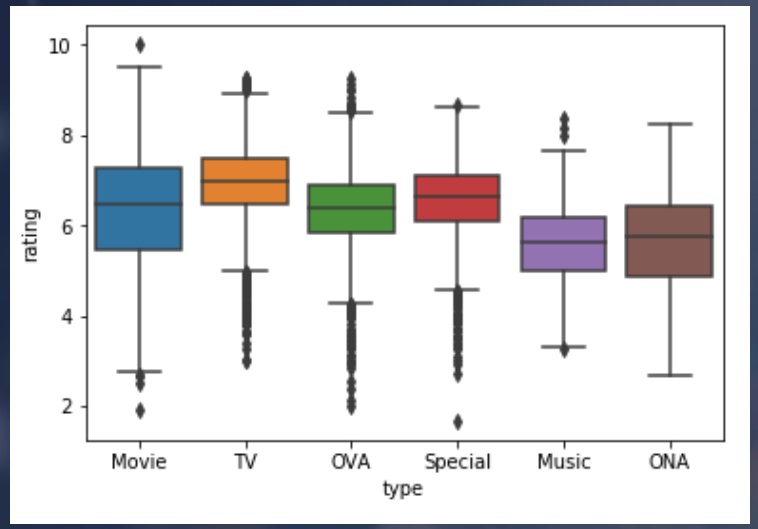
: an anime andmanga social networking and social cataloging application website. The site provides its users with a list-like system to organize and score anime and manga.

Rating.csv

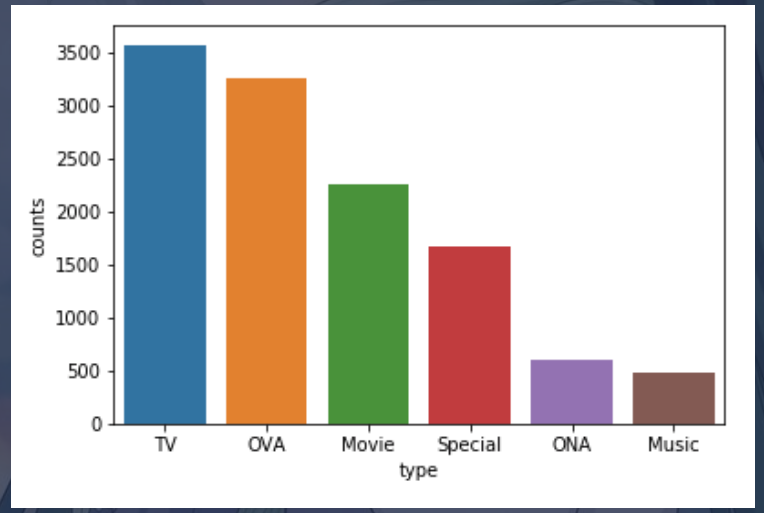
- user_id
- anime_id
- rating

데이터 탐색
Data EDA

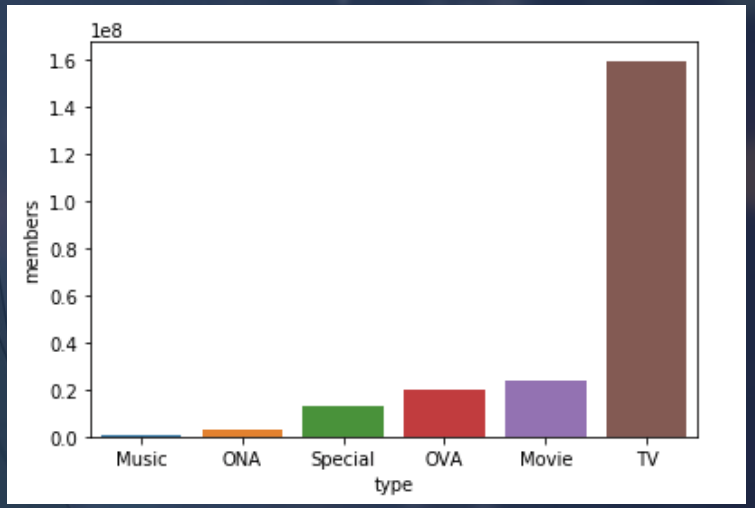
Rating - Type



Count - Type

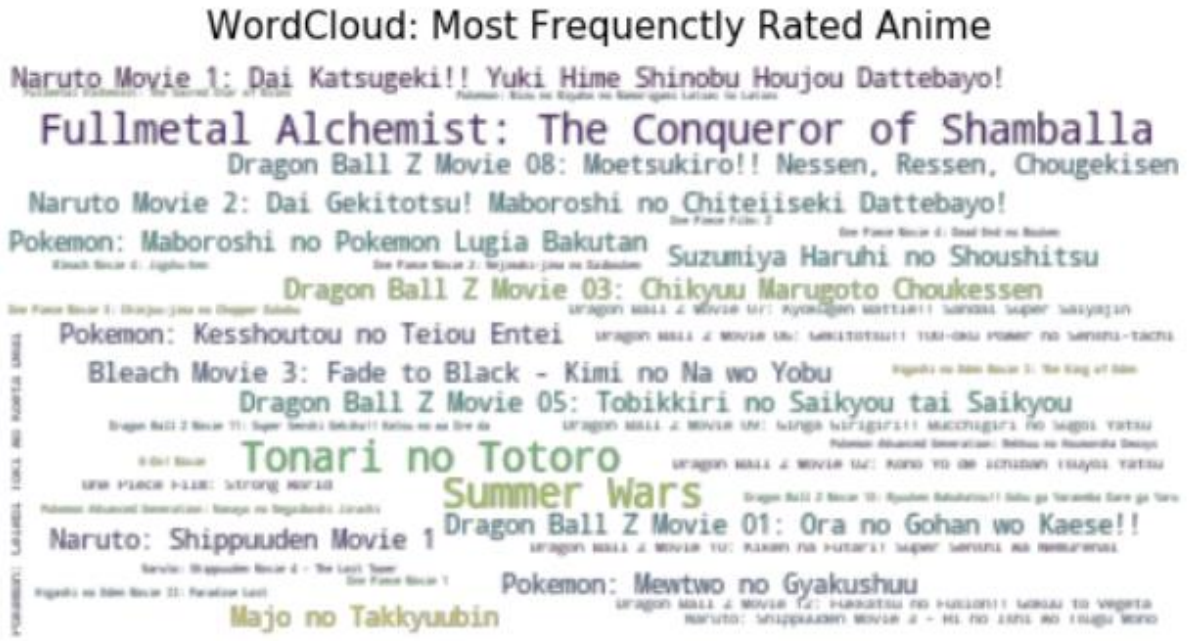


Members - Type



데이터 탐색

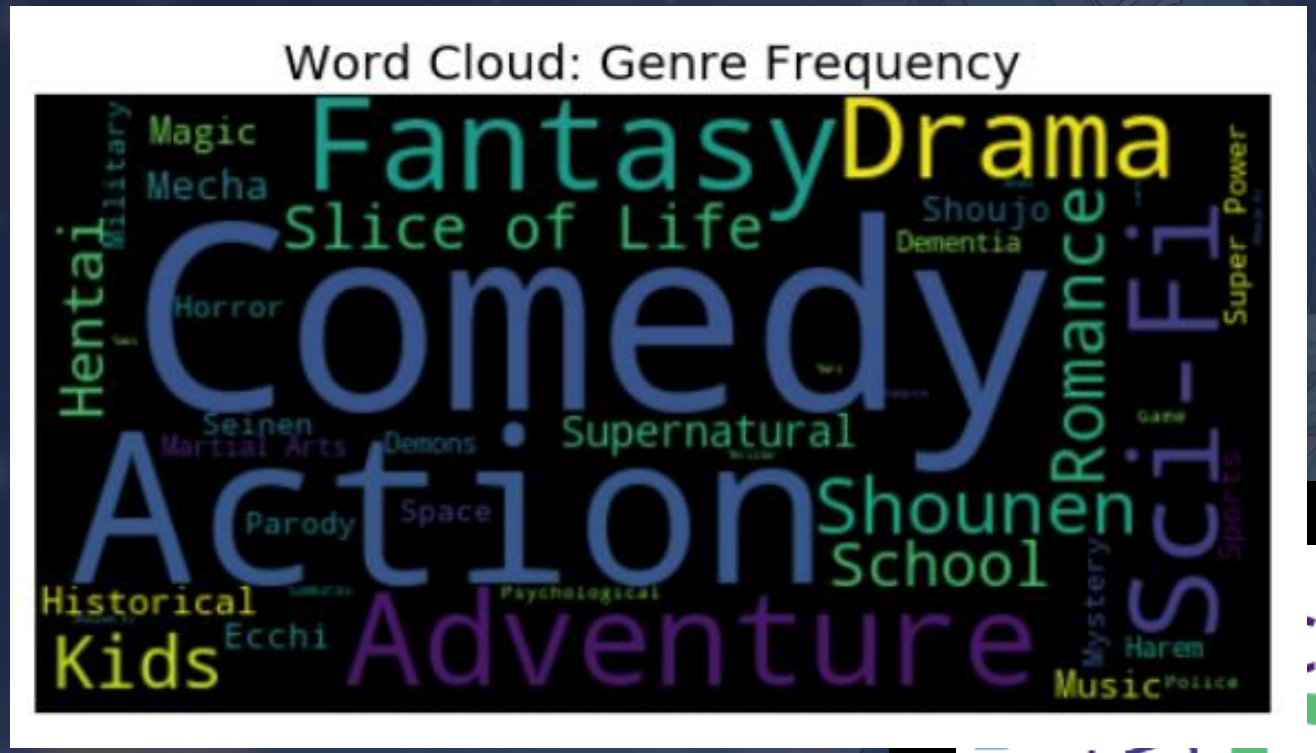
Data EDA



	name	count
493	Fullmetal Alchemist: The Conqueror of Shamballa	3816
523	Tonari no Totoro	3572
5651	Summer Wars	3566
402	Naruto Movie 1: Dai Katsugeki!! Yuki Hime Shinobu Houjou Dattebayo!	3542
528	Pokemon: Mewtwo no Gyakushuu	3503
7511	Suzumiya Haruhi no Shoushitsu	2879
2472	Naruto: Shippuuden Movie 1	2865
1117	Pokemon: Maboroshi no Pokemon Lugia Bakutan	2842
936	Naruto Movie 2: Dai Gekitotsu! Maboroshi no Chiteiiseki Dattebayo!	2817
4835	Bleach Movie 3: Fade to Black - Kimi no Na wo Yobu	2758

데이터 탐색

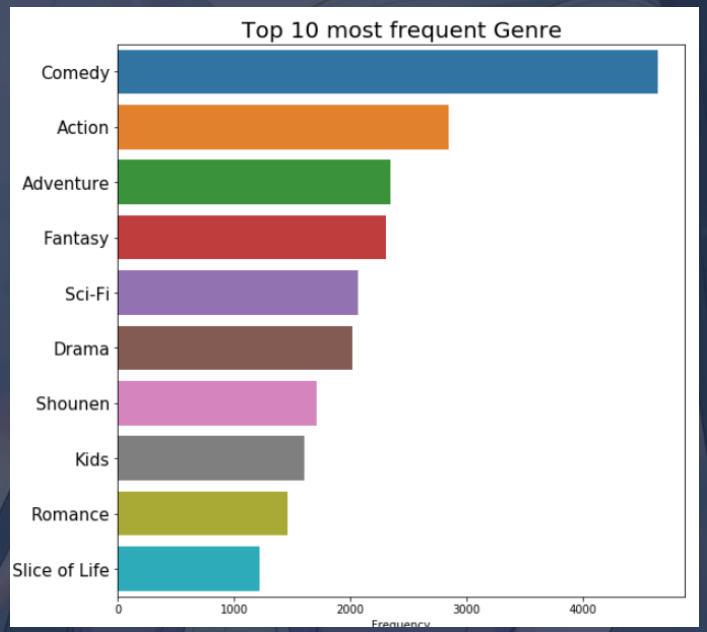
Data EDA



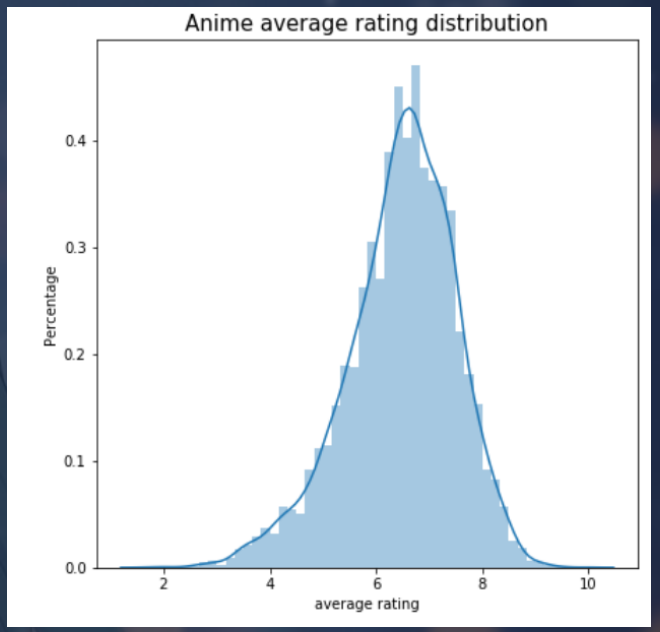
clustering

데이터 탐색
Data EDA

Frequent Genre



Anime average rating



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추천시스템

사용 알고리즘

- 협업 필터링
  - Collaborative filtering
    : Matrix Factorization

추천시스템

Python Coding

GitHub

enfow Update README.md — Latest commit f722

.gitignore	initial commint- implementing basic recommendation system for movie.
MF.py	initial commint- implementing basic recommendation system for movie.
README.md	Update README.md
data.py	initial commint- implementing basic recommendation system for movie.
sim.py	initial commint- implementing basic recommendation system for movie.

→ https://github.com/KU-BIG/recommendation_system

```python
class MatrixFactorization():

    def __init__(self, matrix, lr, reg_param, epochs):

        self._matrix = matrix
        self._row, self._column = matrix.shape
        self._k = 5
        self._lr = lr
        self._reg_param = reg_param
        self._epochs = epochs


    def fit(self):

        # initialize latent features
        self._P = np.random.normal(size=(self._row, self._k))
        self._Q = np.random.normal(size=(self._column, self._k))

        # initialize biases
        self._b_P = np.zeros(self._row)
        self._b_Q = np.zeros(self._column)
        self._b = np.mean(self._matrix[np.where(self._matrix != 0)])

        #training
        for epoch in range(self._epochs):
            for i in range(self._row):
                for j in range(self._column):
                    if self._matrix[i, j] > 0:
                        self.gradient_descent(i, j, self._matrix[i, j])


    def gradient_descent(self, i, j, rating):

        # get error
        prediction = self.get_prediction(i, j)
        error = rating - prediction
```

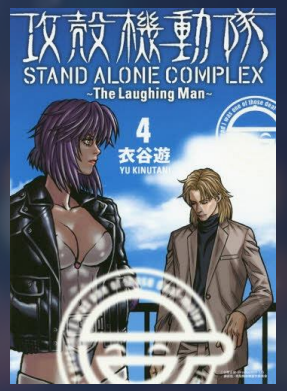
추천시스템 추천 결과

```
#get anime name
get_name(top10_rec_exmp)
```

```
## Recommendation for User 3 ##

 ['Gintama Movie: Kanketsu-hen - Yorozuya yo Eien Nare', 'Gintama: Yorinuki Gintama-san on Theater 2D', 'Tonari no Totoro', 'Gintama Movie: Shinyaku Benizaku
ra-hen', 'Tengen Toppa Gurren Lagann Movie: Gurren-hen', 'Suzumiya Haruhi no Shoushitsu', 'Trigun: Badlands Rumble', 'One Piece Movie 4: Dead End no Bouken',
'One Piece Film: Strong World', 'Majo no Takkyuubin']
```

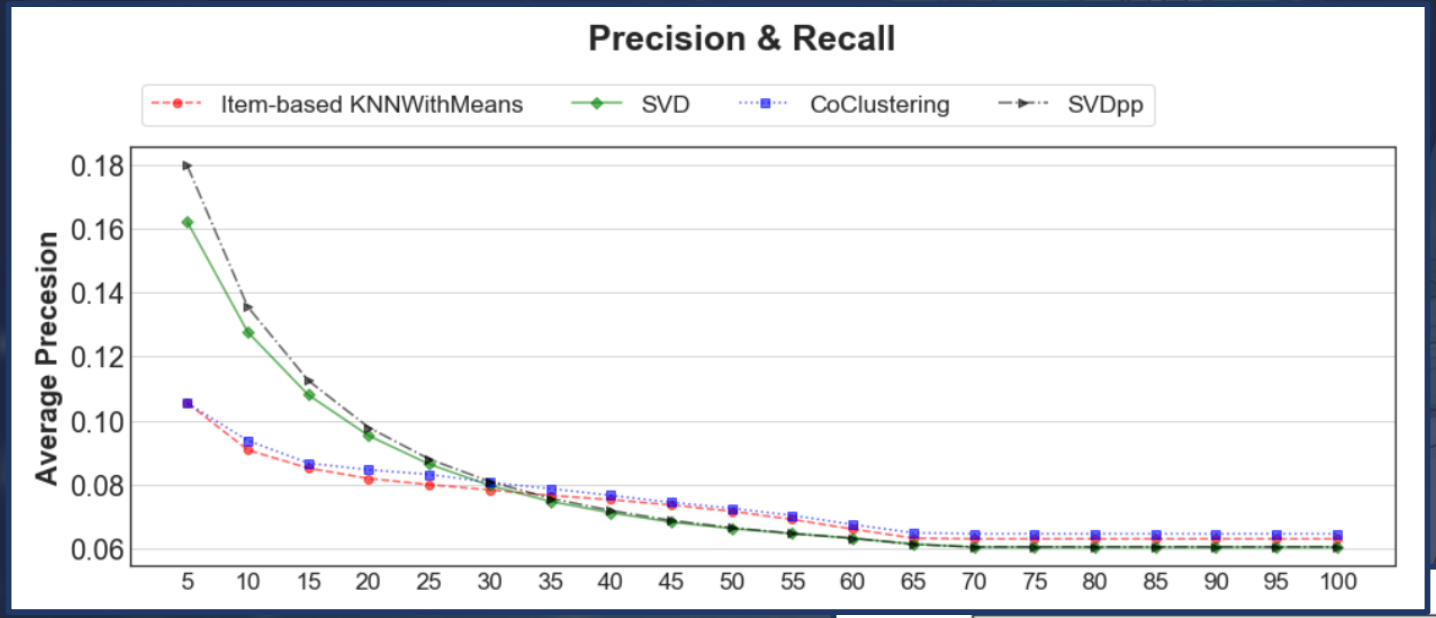
```
## Recommendation for User 19418 ##

 ['Gintama Movie: Kanketsu-hen - Yorozuya yo Eien Nare', 'Detective Conan Movie 08: Magician of the Silver Sky', 'Bo
ruto: Naruto the Movie', 'Detective Conan Movie 07: Crossroad in the Ancient Capital', 'Gintama Movie: Shinyaku Beni
zakura-hen', 'Detective Conan Movie 03: The Last Wizard of the Century', 'Lupin III: Cagliostro no Shiro', 'Crayon S
hin-chan Movie 09: Arashi wo Yobu Mouretsu! Otona Teikoku no Gyakushuu', 'Mind Game', 'Detective Conan Movie 15: Qua
rter of Silence']
```

10개의 Anime 추천 (Top 10)



추천시스템

성능 평가

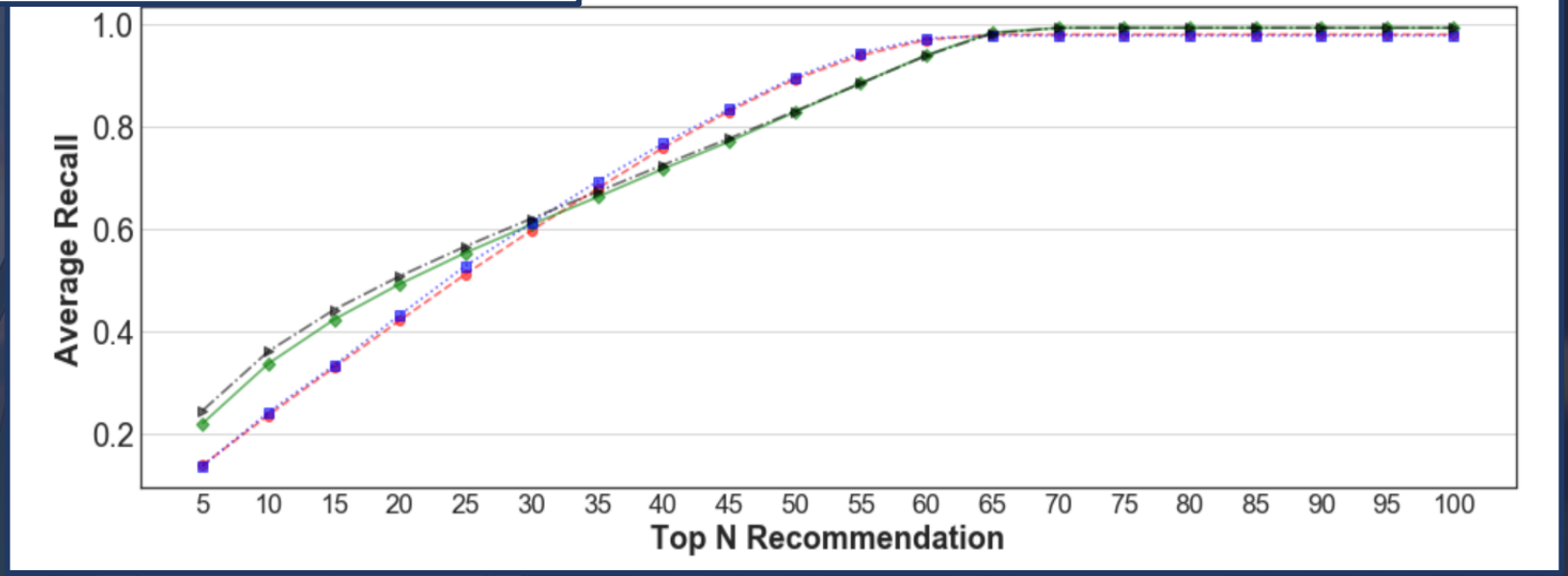


Precision :

a measure of exactness, determines the fraction of relevant items retrieved out of all items retrieved

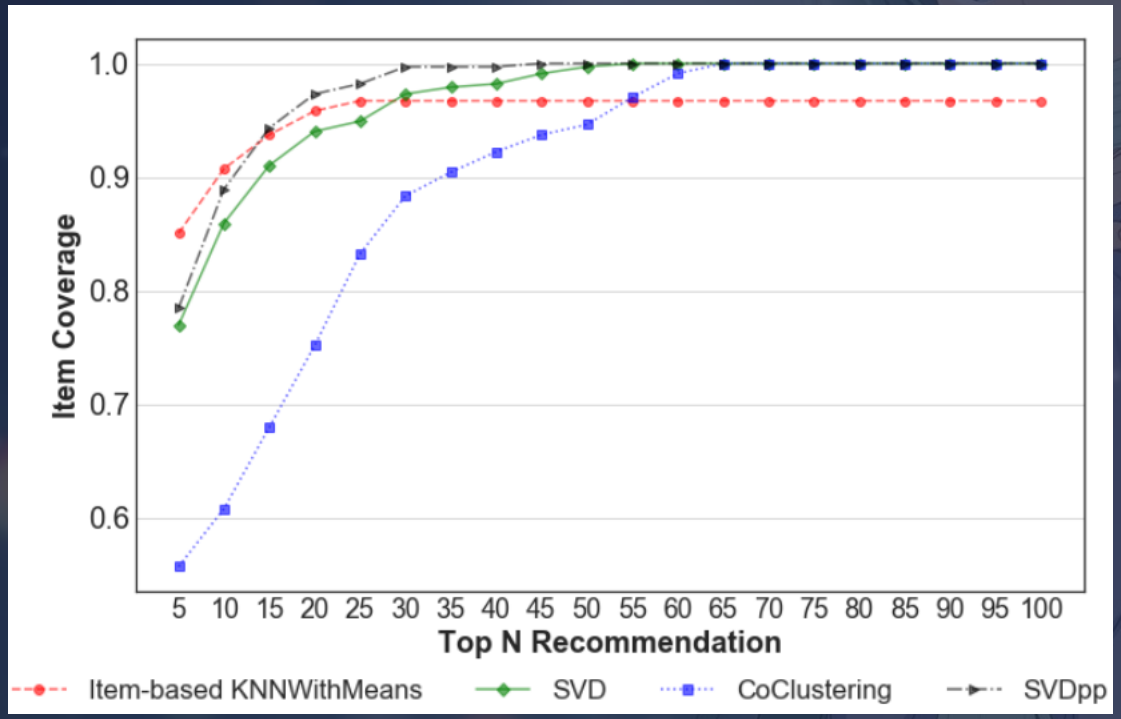
Recall :

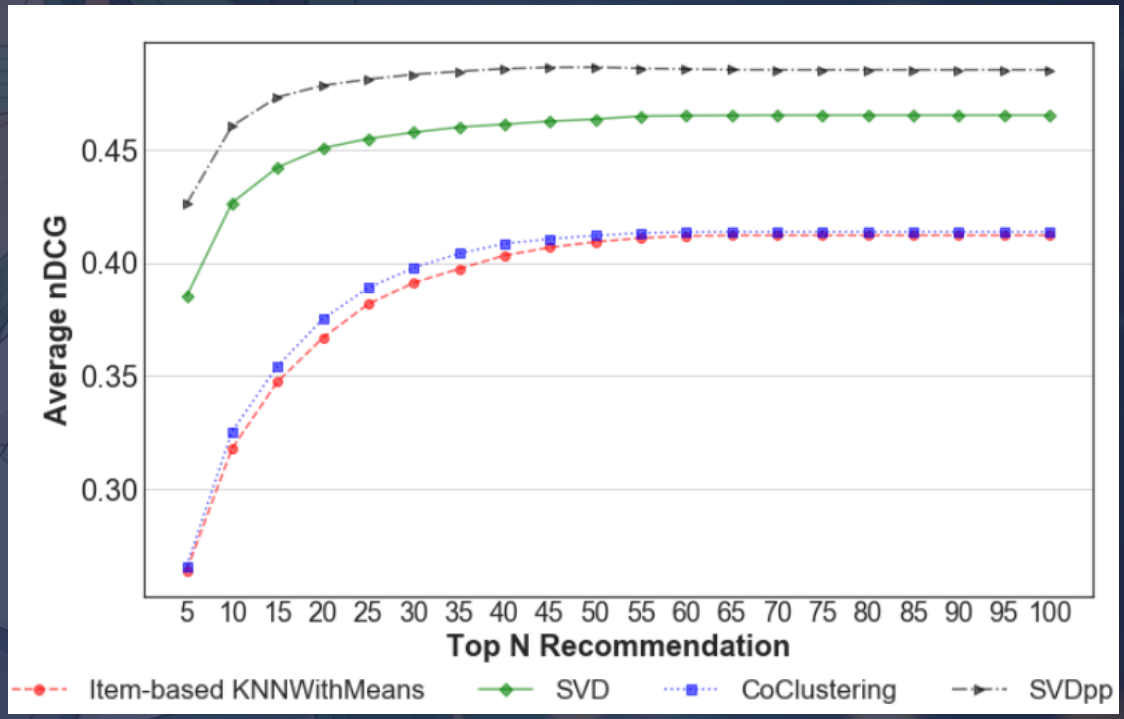
a measure of completeness, determines the fraction of relevant items retrieved out of all relevant items



추천시스템 성능 평가

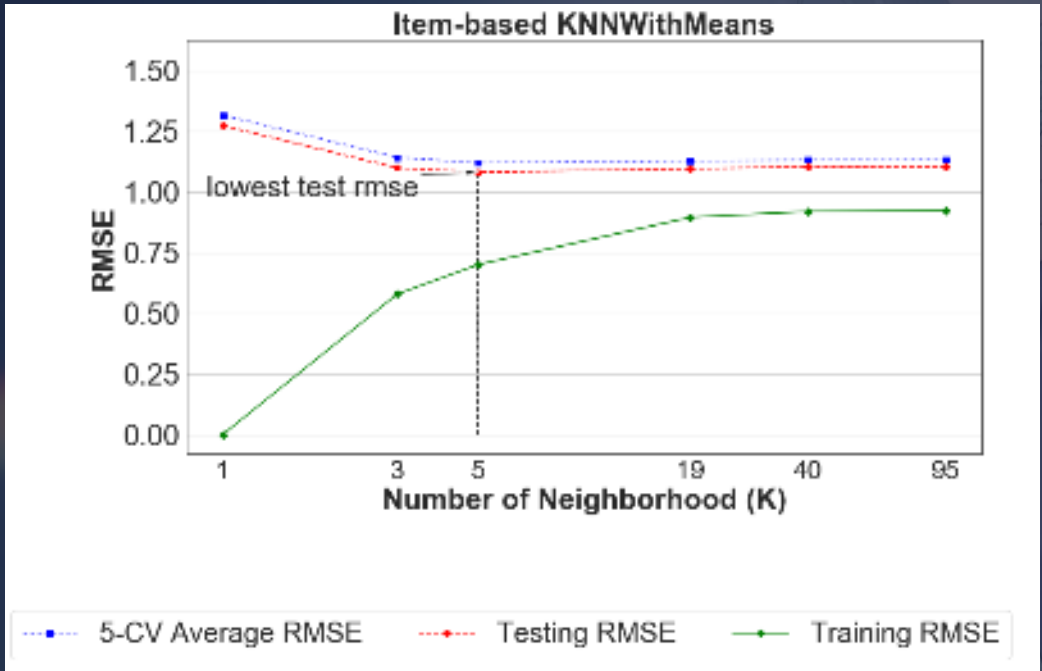
Recommendation Quality Evaluation



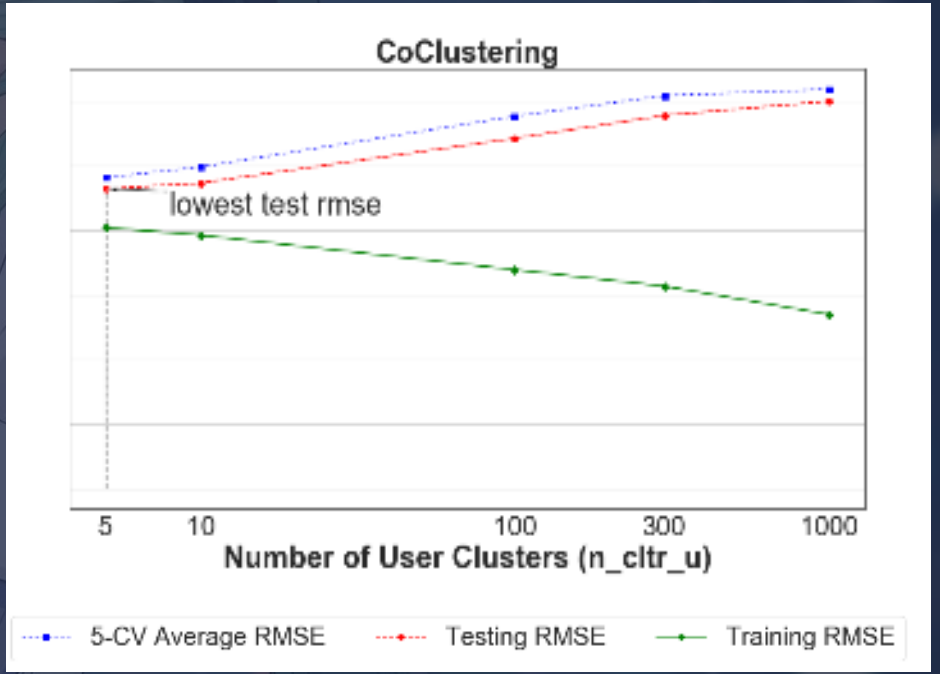


추천시스템 성능 평가

Knn



Co-clustering



추천시스템

Using R

Code

```r
install.packages("recommenderlab")
library(tidyverse)
library(recommenderlab)
library(stringr)
library(devtools)
data <- read.csv("rating.csv", header=T)
data_rating <- data[data$rating != -1,]
index <- sample(1:nrow(data_rating), 10000, replace=F)
data_rating <- data_rating[index,]

rating_df <- data_rating
rating_df <- rating_df %>%
  mutate(user_id = str_c("u", user_id),
         anime_id = str_c("m", anime_id))

rating_mat <- spread(rating_df, anime_id, rating) %>%
  remove_rownames() %>%
  column_to_rownames(var = "user_id")

rating_rrm <- as(as(rating_mat, "matrix"), "realRatingMatrix")

rating_rrm <- rating_rrm[rowCounts(rating_rrm) > 1,
                         colCounts(rating_rrm) > 0]

> print(object.size(rating_mat), units = "auto")
84.9 Mb
> print(object.size(rating_rrm), units = "auto")
302.4 Kb

rating_eval <- evaluationScheme(rating_rrm, method="split", train=0.7, given=1)

ubcf_rmse <- Recommender(getData(rating_eval, "train"), method = "UBCF",
                         param=list(normalize = "center", method="Cosine", nn=5))

ubcf_pred <- predict(ubcf_rmse, getData(rating_eval, "known"), type="ratings")
calcPredictionAccuracy(ubcf_pred, getData(rating_eval, "unknown"))

ubcf_pred <- predict(object = ubcf_rmse, newdata = rating_rrm,  n = 5)

recc_matrix <- sapply(ubcf_pred@items, function(x){
  colnames(rating_rrm)[x]
})
```

Output

```
> recc_matrix[c(3,13,333)]
$`u10419`
[1] "m9253"  "m29803" "m1"     "m100"   "m10012"

$u10903
[1] "m1943"  "m26055" "m969"   "m2449"  "m1"

$u26192
[1] "m4985"  "m10119" "m9260"  "m1"     "m100"
```

- Steins;Gate /Carnival Phantasm/ Overload/ Cowboy Bebob/ Shin Shirayuki-hime Densetsu Prtear

- Paprika / JoJo no Kimyou na Bouken: Stardust Crusaders 2nd Season/ Tsubasa Chronicle 2nd Season/Ghost in the Shell: Stand Alone Complex - The Laughing Man/Overload

- Mahou Shoujo Lyrical Nanoha: The Movie 1st/Seitokai Yakuindomo OVA/Kizumonogatari I: Tekketsu-hen/ Overload/ Cowboy Bebob

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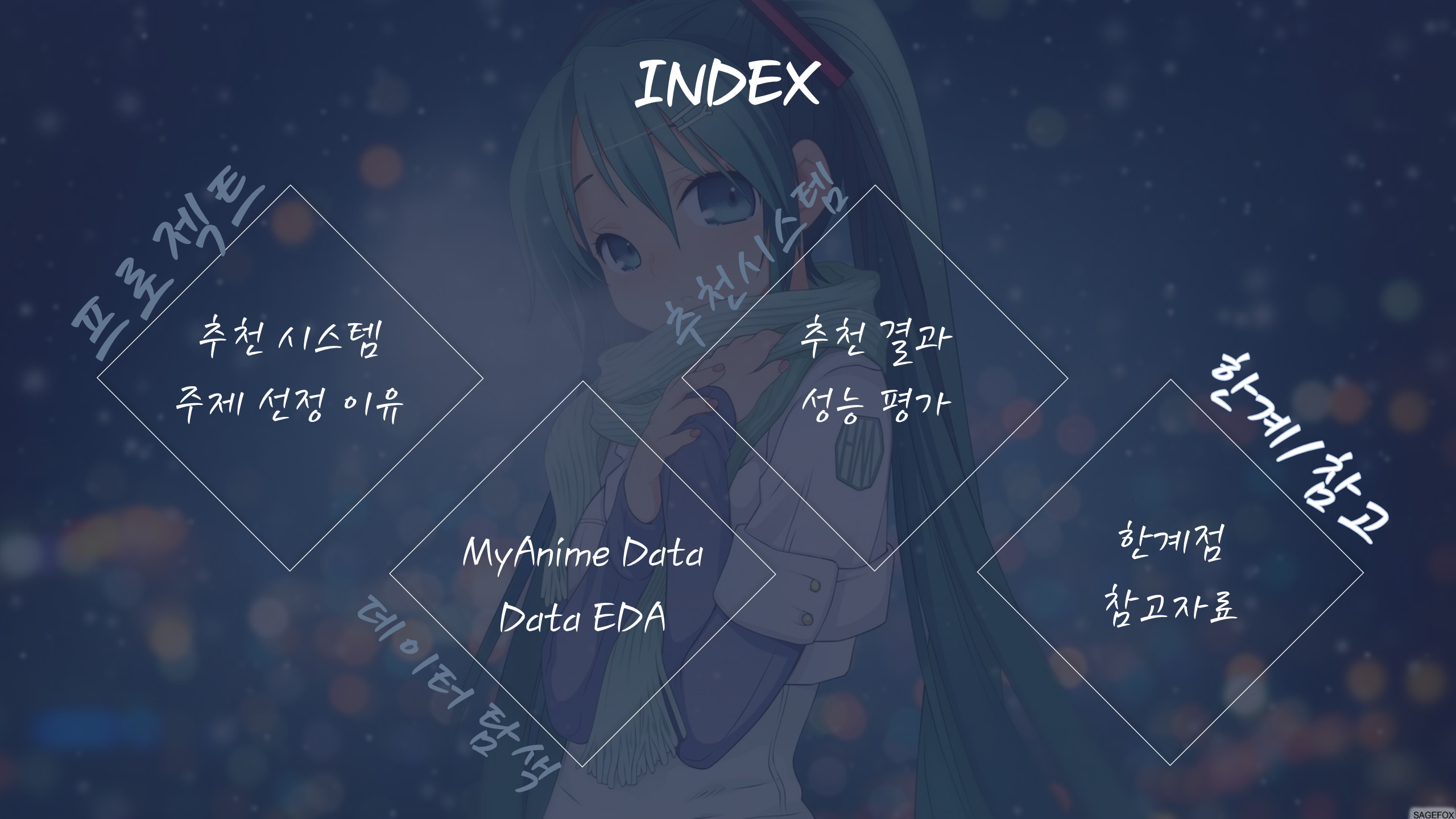

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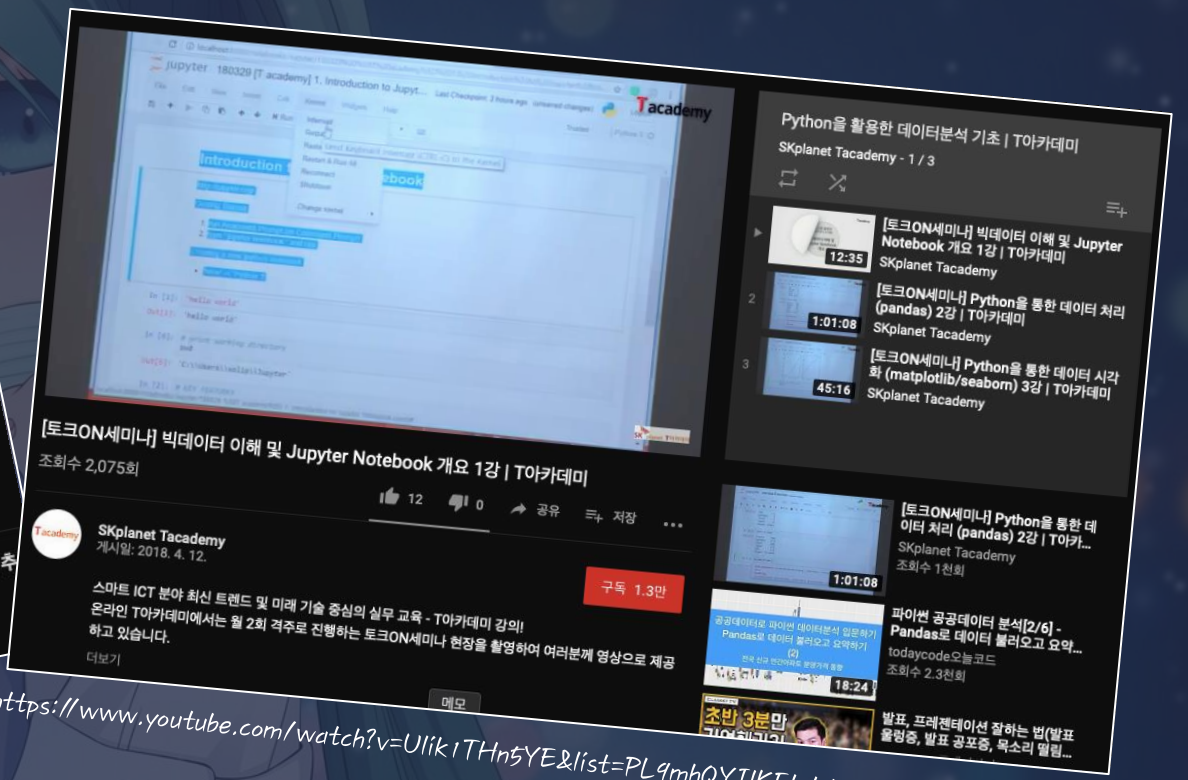
참고자료

참고

https://www.youtube.com/playlist?list=PLwQdCtnouPk6rOKwGFs-KOzS8P4qIdJzY

https://www.youtube.com/watch?v=Ulik1THn5YE&list=PL9mhQYIlKEhdnNrVs9MlVLramrRQ8jqis



도움을 주신 많은 논문과,,
블로거/엔지니어 분들 감사합니다^^,,

https://github.com/KU-BIG/recommendation_system

한계점

통컴실,, 열일,,

정재원

아직 * 떠있네 오후 1:24

강현

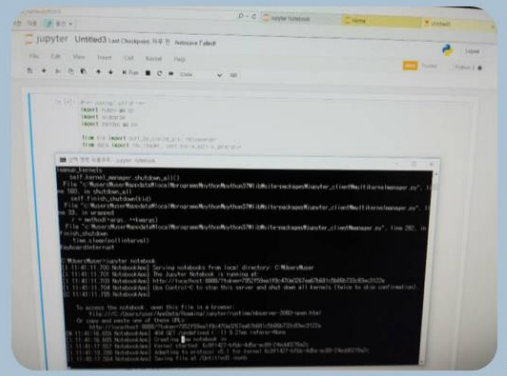
6. 04. 화

한평생 돌려야되나보다 ㅎ 오후 1:26

시간이 너무 오래 걸려요.ㅠ

2019년 6월 5일 수요일

정재원



오전 10:16

송민

아아 오전 10:16

송민

! 오전 10:17

윤 재경

아직도 돌아가고 있어?ㅋㅋㅋ

컴퓨터 열일하네.. 오전 11:44

안녕하살법!

첫 모임

=

마지막 모임

KU-BIG

한학기 동안 모두 수고 많으셨습니다!