上海外国语大学
SHANGHAI INTERNATIONAL STUDIES UNIVERSITY

New Media
Data Analytics and Application

Lecture 11: System Development Case Study

Ting Wang

Outlines

- Systems Thinking for Product Designing
- A Case Study: Film Box Office Prediction
- To Be A Good Data Analyst

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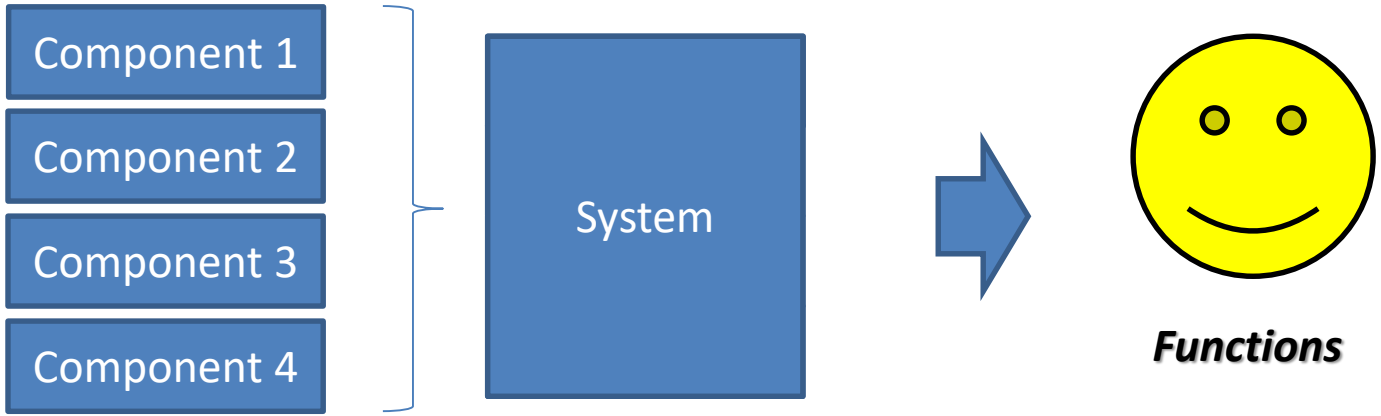
circulating development for your goals

Systems Thinking for Product Designing

Systems Thinking for Product Designing

What is a System?

In computer science and information science, system is a software system which has components as its structure and observable inter-process communications as its behavior.

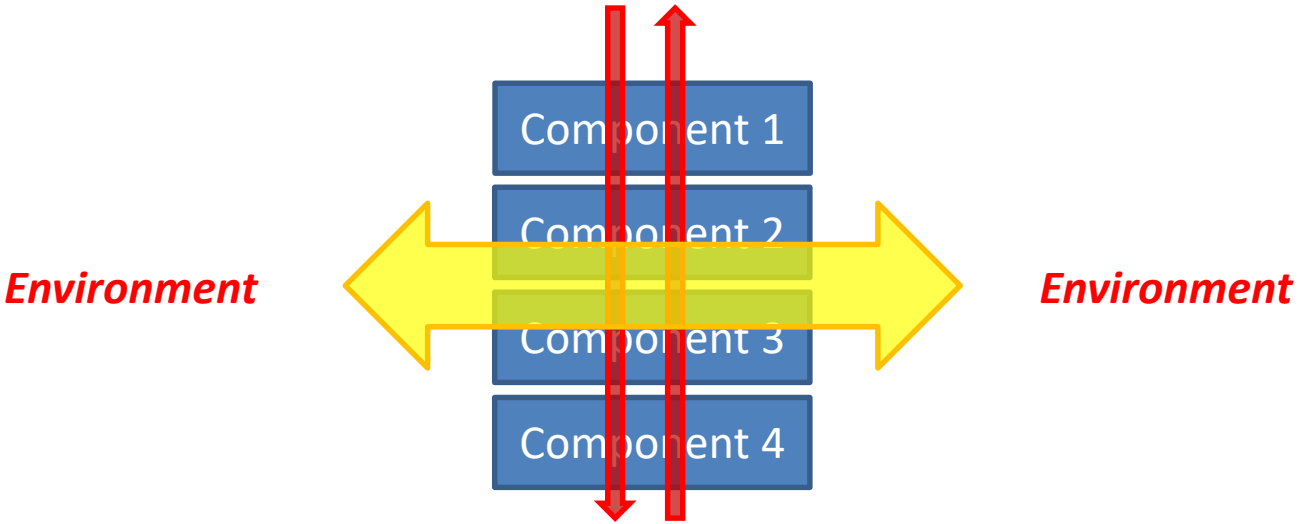


Systems Thinking for Product Designing

What is Systems Thinking?

Global, Optimal, and Integrated thinking methodology for software development and operation.

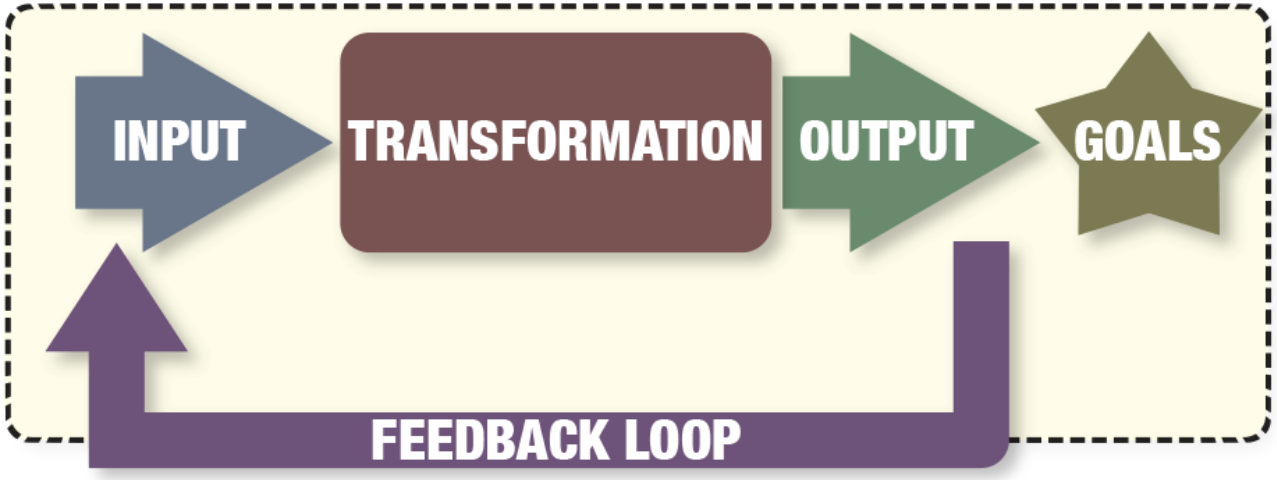
- Interactions between system and its components
- Interactions between system and its environment



Systems Thinking for Product Designing

Two recommended Systems Thinking Approaches

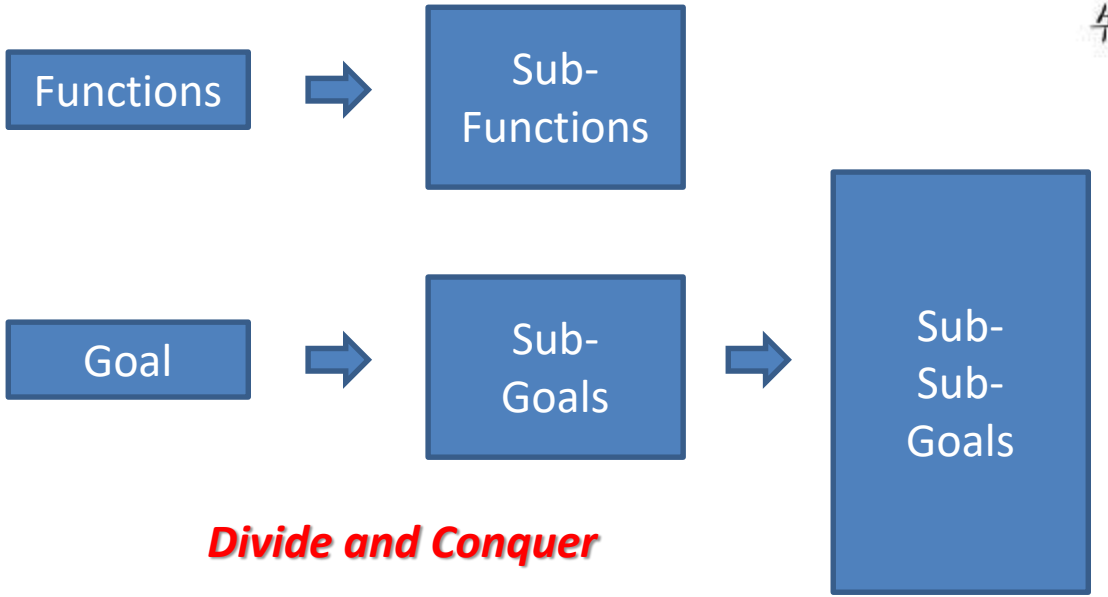
- Goal Seeking
- Input and output



Systems Thinking for Product Designing

Goal Seeking (Global optimization) 全局最优

a global optimization of a function or a set of functions according to some criteria



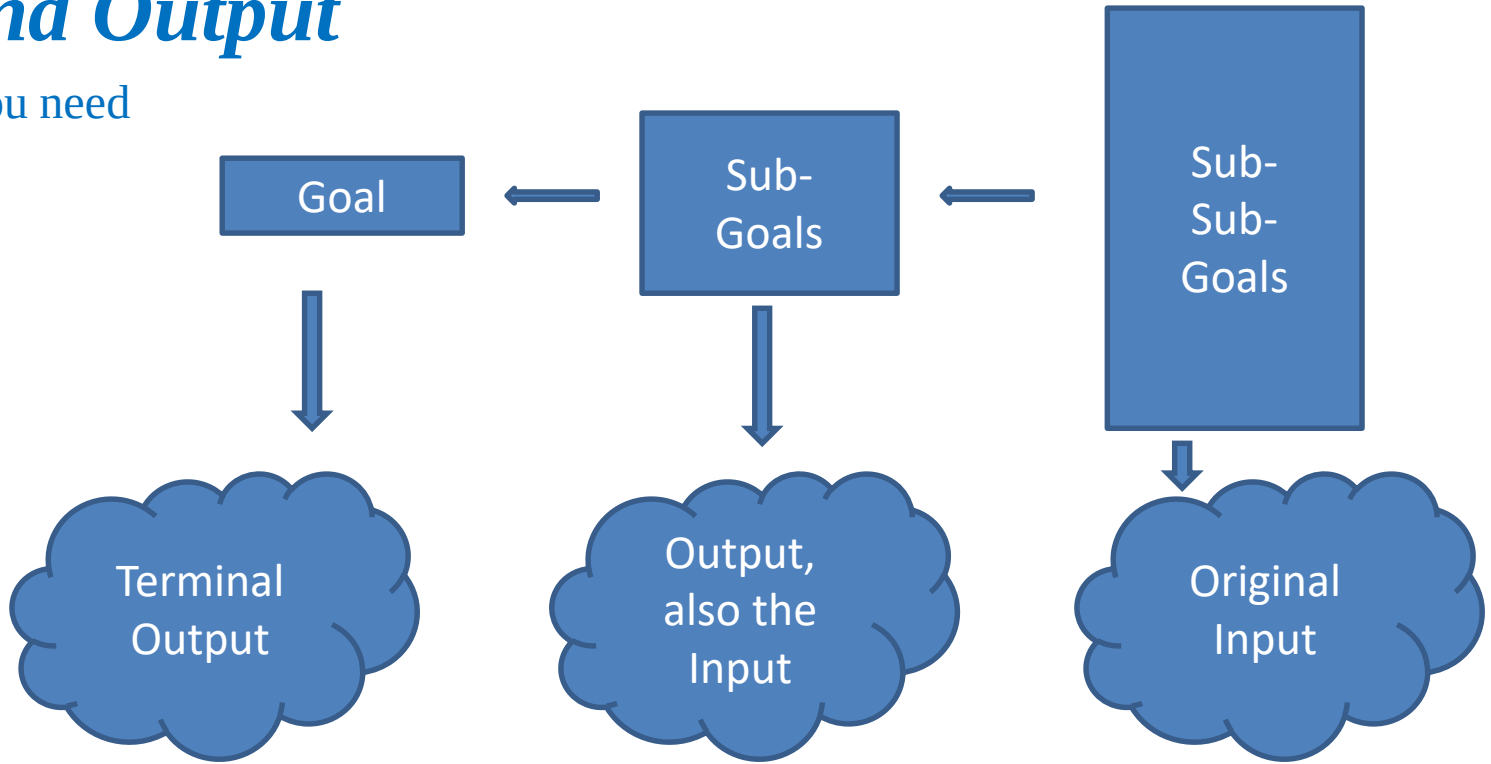
Divide and Conquer

先定一个能达到的小目标

Systems Thinking for Product Designing

Input and Output

all for what you need



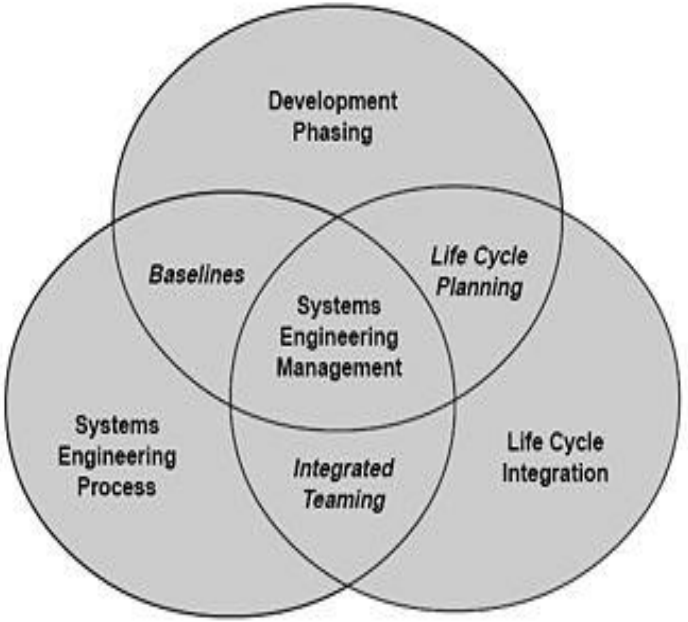
Systems Thinking for Product Designing

System Engineering 系统工程

ensures all likely aspects of system are considered, and integrated into a whole product.

Software Engineering

(in software and information industry)



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a case study

Film Box Office Prediction

EXAMPLE 1:
Films

Case Description

Film Box Office Prediction

- is crucial to film investment
- is significant to the market without Completion Bond
- can be done by a number of approaches

In this case, film box office prediction will be computed based on the information collected by online film news reports.

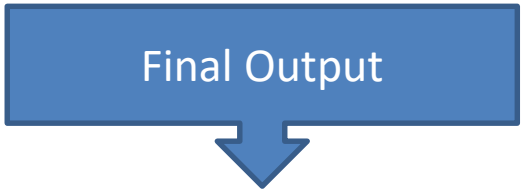
Software Analysis

Film Box Office Prediction

Terminal Goal

To make a decision:

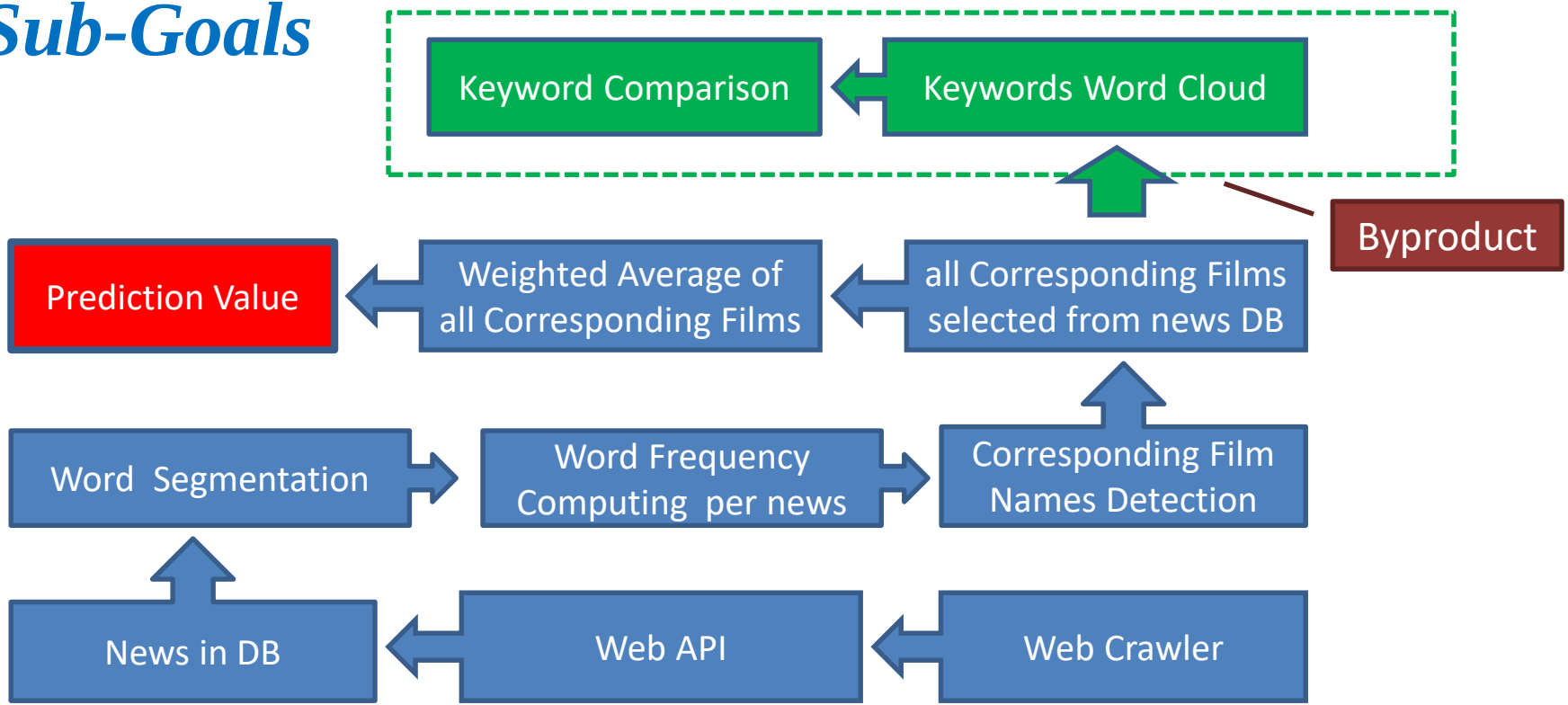
whether a film is worth of being invested or not.



This depends on the **prediction value** of the box office of the potential film project.

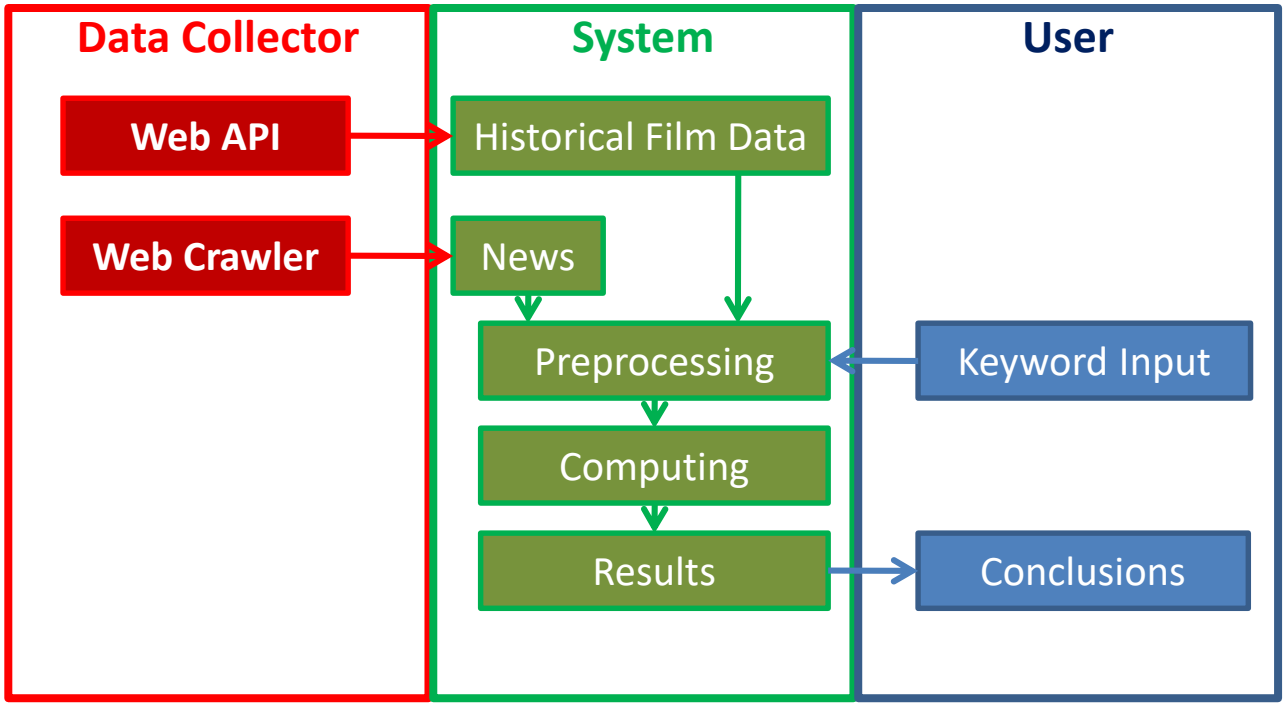
Film Box Office Prediction

Sub-Goals



Film Box Office Prediction

Activity Diagram



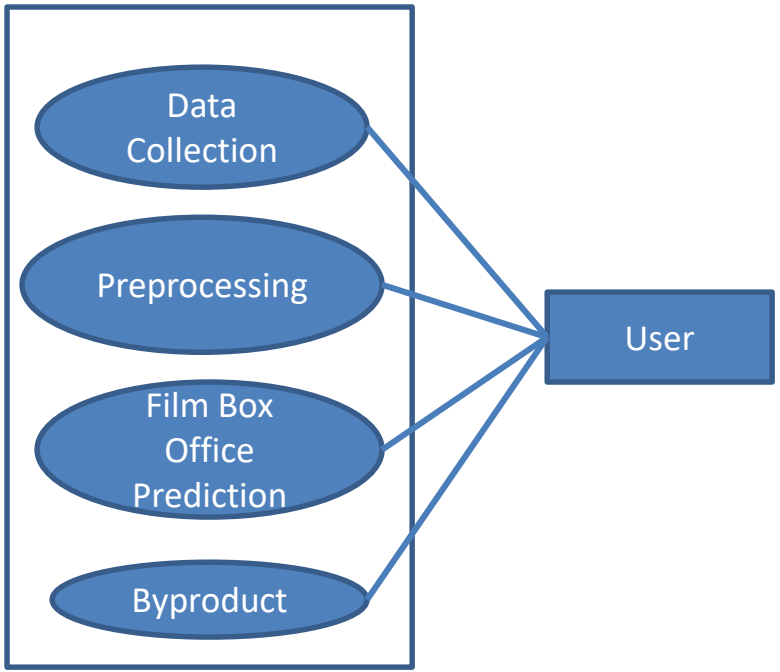
Film Box Office Prediction

Functions

1. Film Box Office Prediction
2. Byproduct: Keyword Comparison
   - Word Cloud
   - Media Attention
   - Feature Comparisons

Film Box Office Prediction

Use Case Diagram



Film Box Office Prediction

Input and Output

Input: Keywords of film name

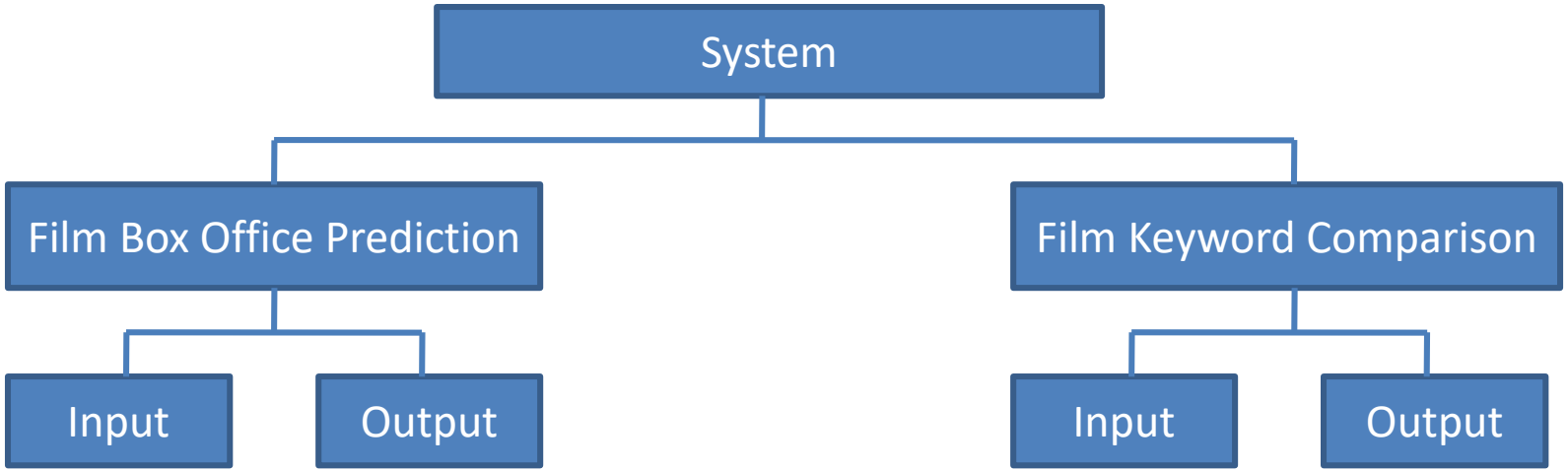
- Byproduct: Keywords
- Other conditions: Word Frequency, Periods,…

Output: Prediction value of film box office

- Word Cloud,
- Media Attention,
- Word Frequency Comparison

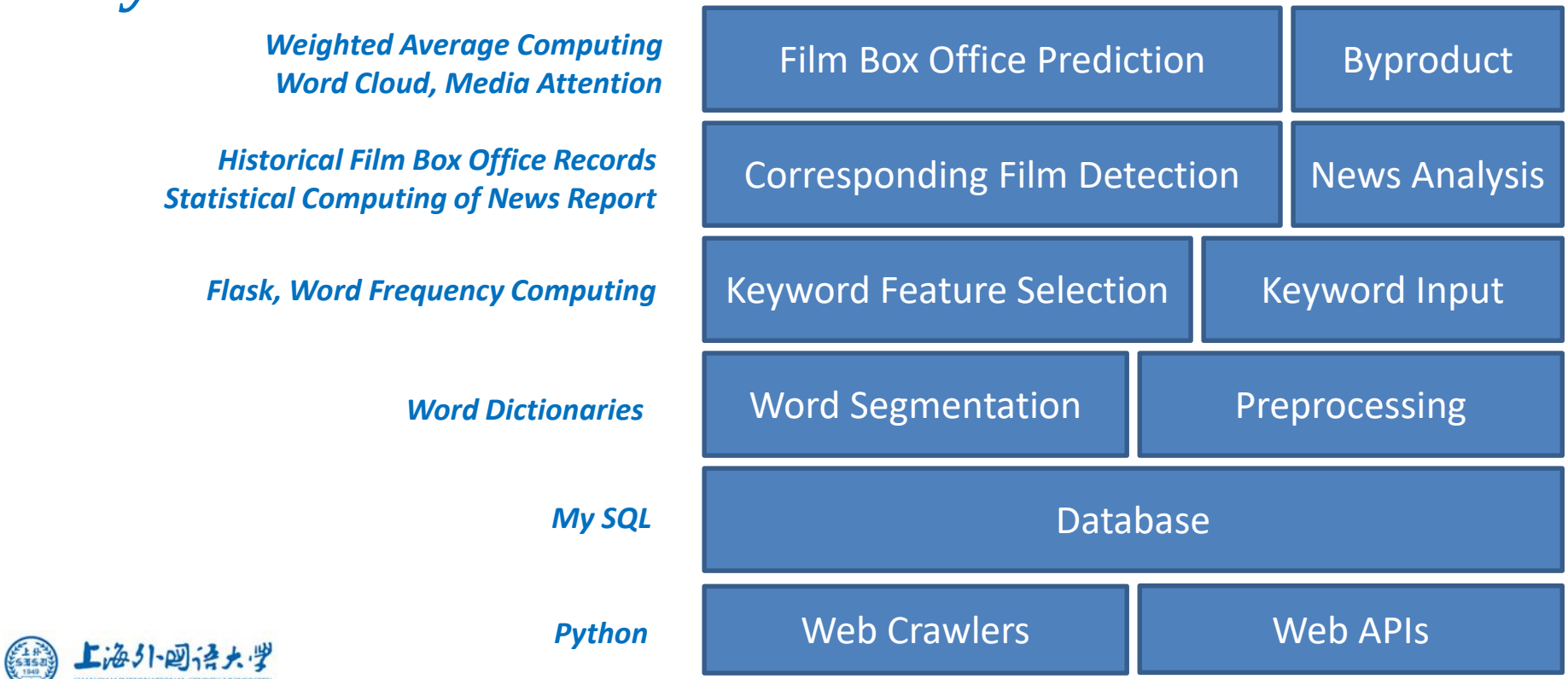
Film Box Office Prediction

System Design



Film Box Office Prediction

System Architecture



Film Box Office Prediction

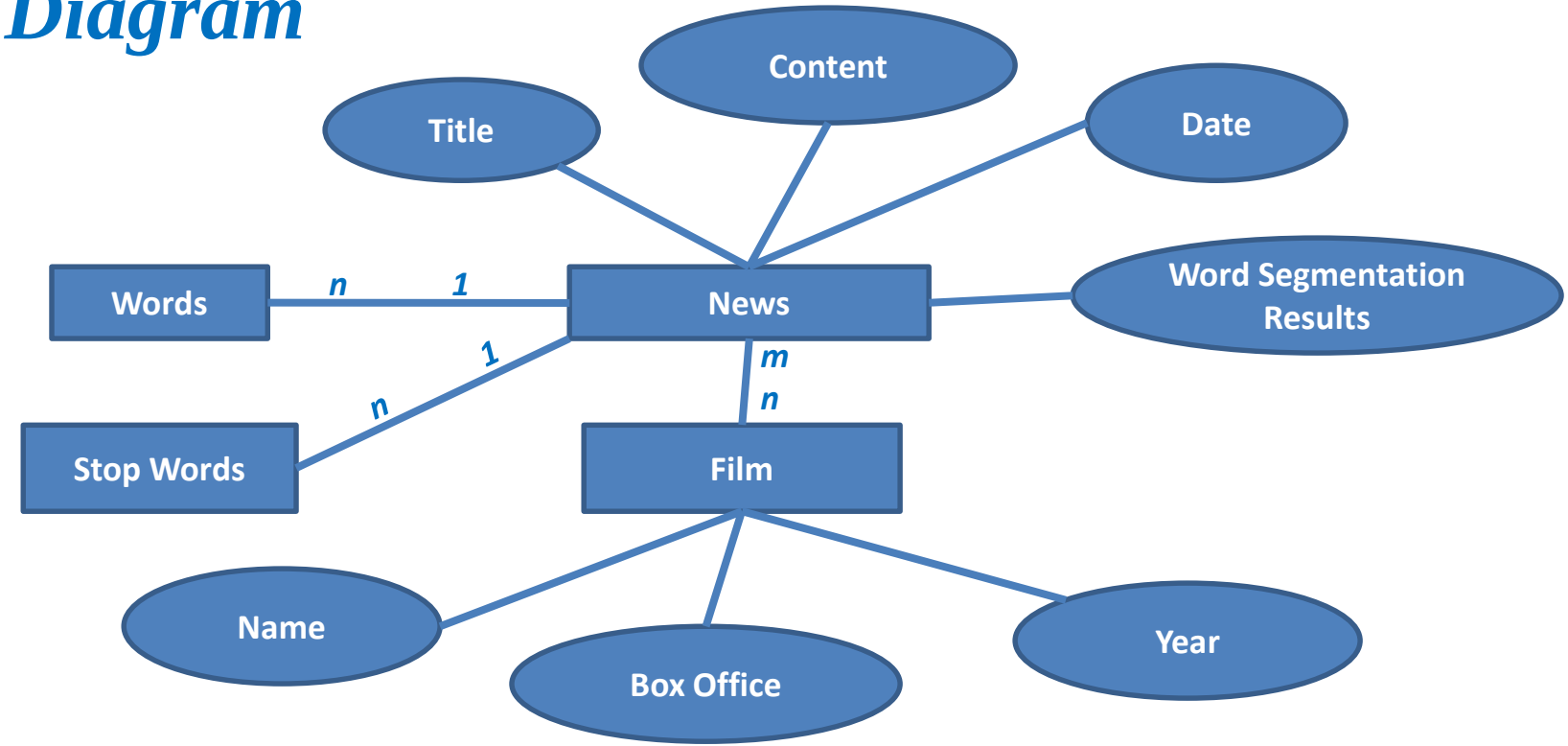
Databases

- Word_Dictionary
- News
- Stop_Word
- Historical_Film_Box_Office

Tips: Film names also can be used for word segmentation.

Film Box Office Prediction

ER Diagram



Computing Steps

Film Box Office Prediction

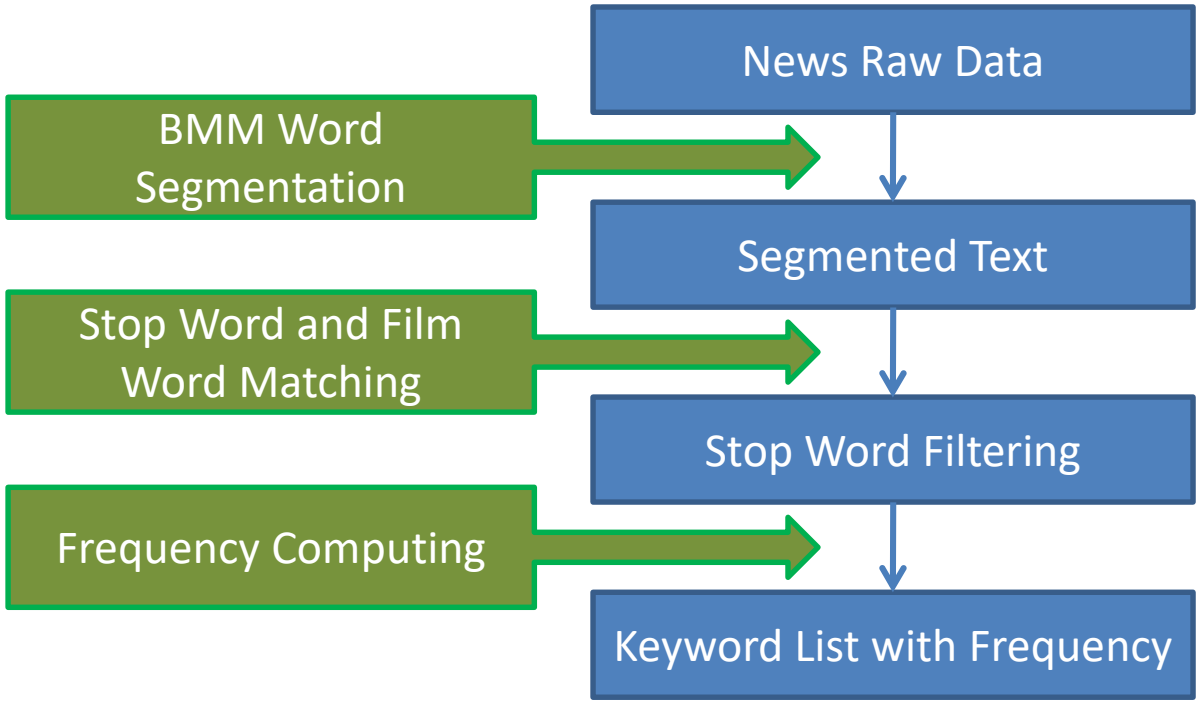
Data Collection

Web API → ***Historical Data of Film Box Office***

Web Crawler → ***News Reports*** → News Raw Data

Film Box Office Prediction

Data Transformation



Database: text

Database: text
Python: string

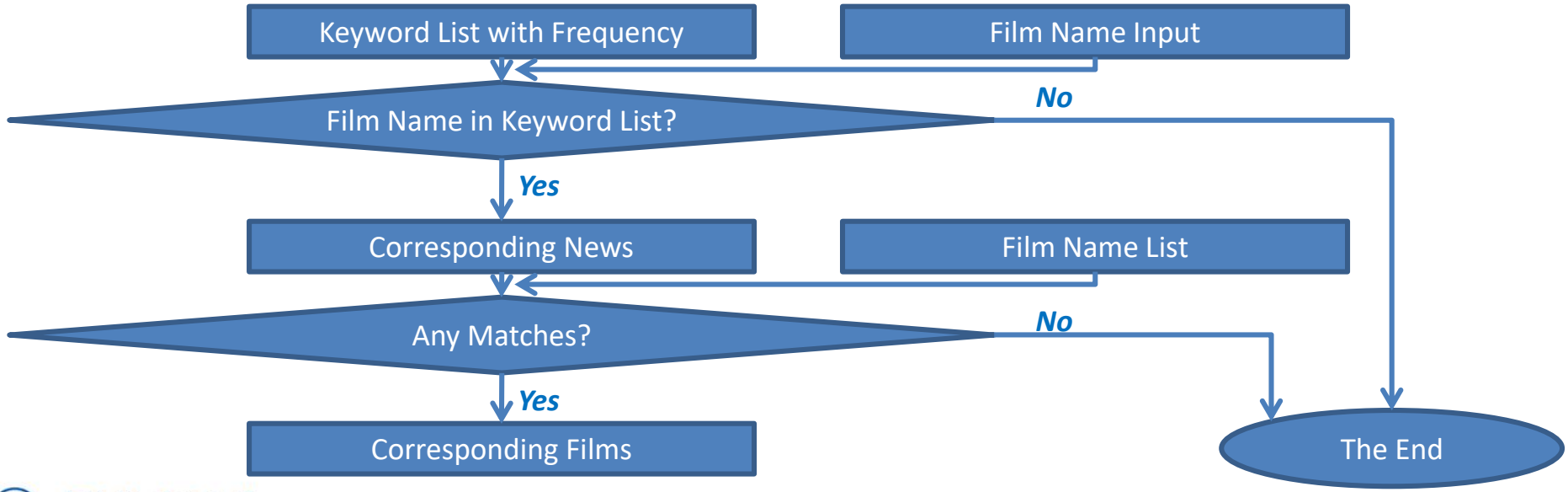
Python: string

Python: dict

Film Box Office Prediction

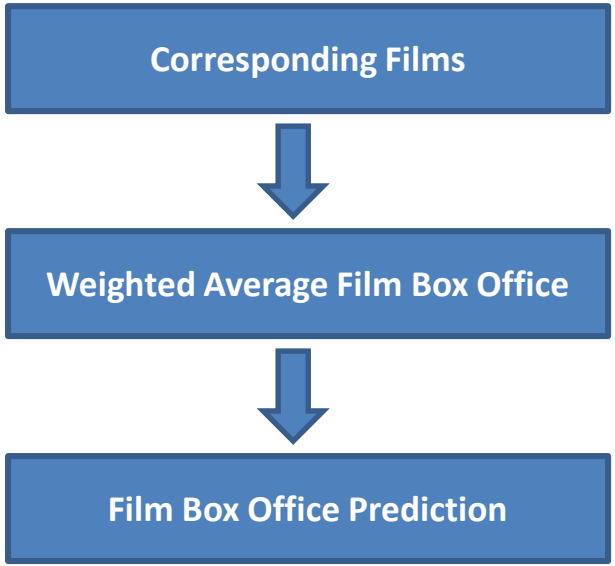
Information Acquisition (From Data to Info.)

For Film Box Office Prediction



Film Box Office Prediction

Prediction and Data Visualization

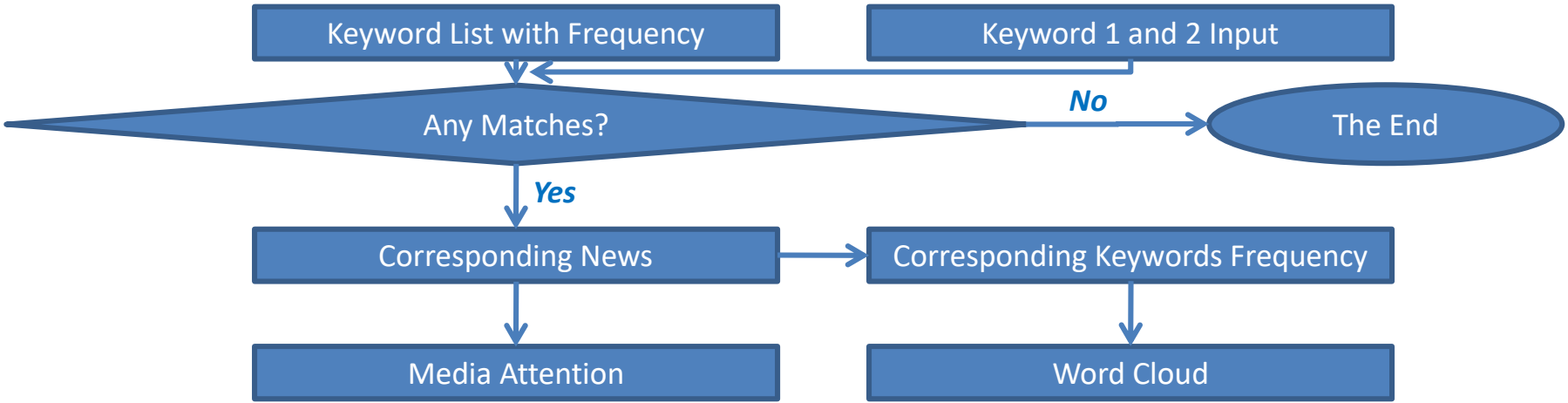


$$\bar{x} = \frac{x_1 f_1 + x_2 f_2 + \cdots + x_k f_k}{n}$$

Film Box Office Prediction

Text Mining

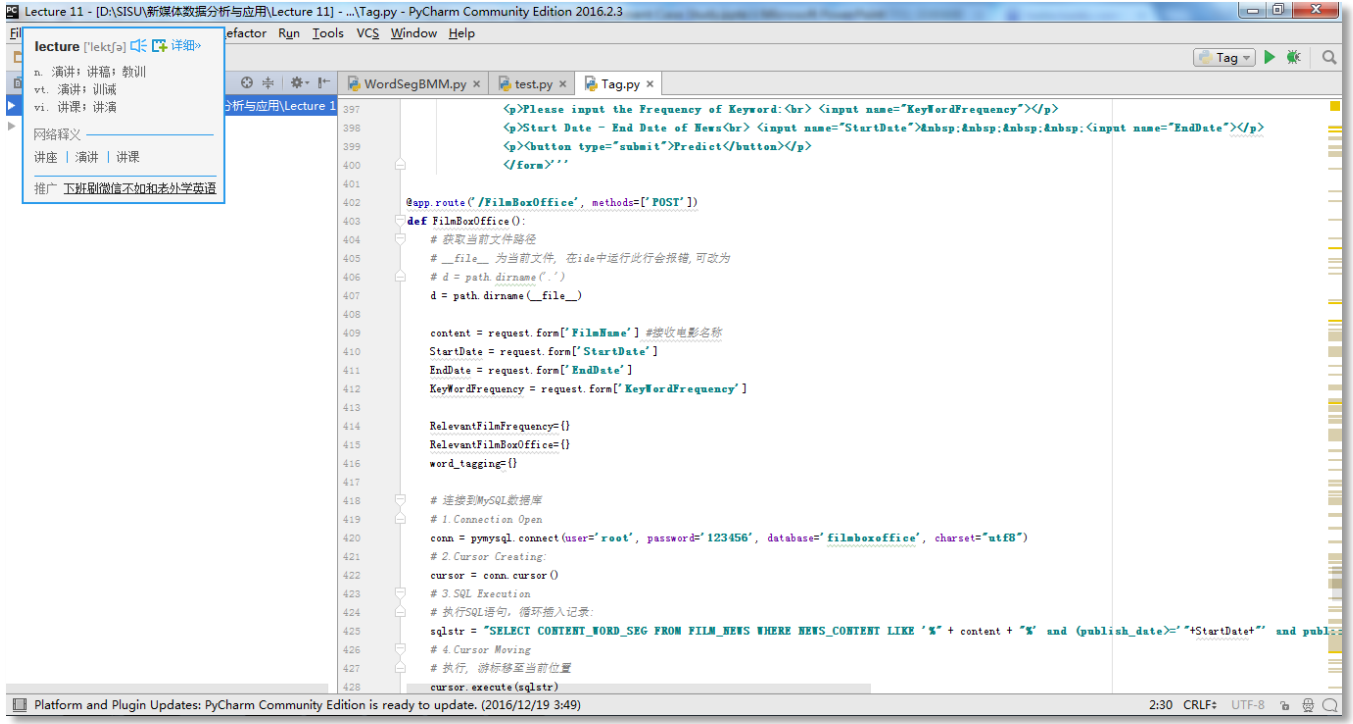
For Byproduct, Keyword Comparison



Film Box Office Prediction

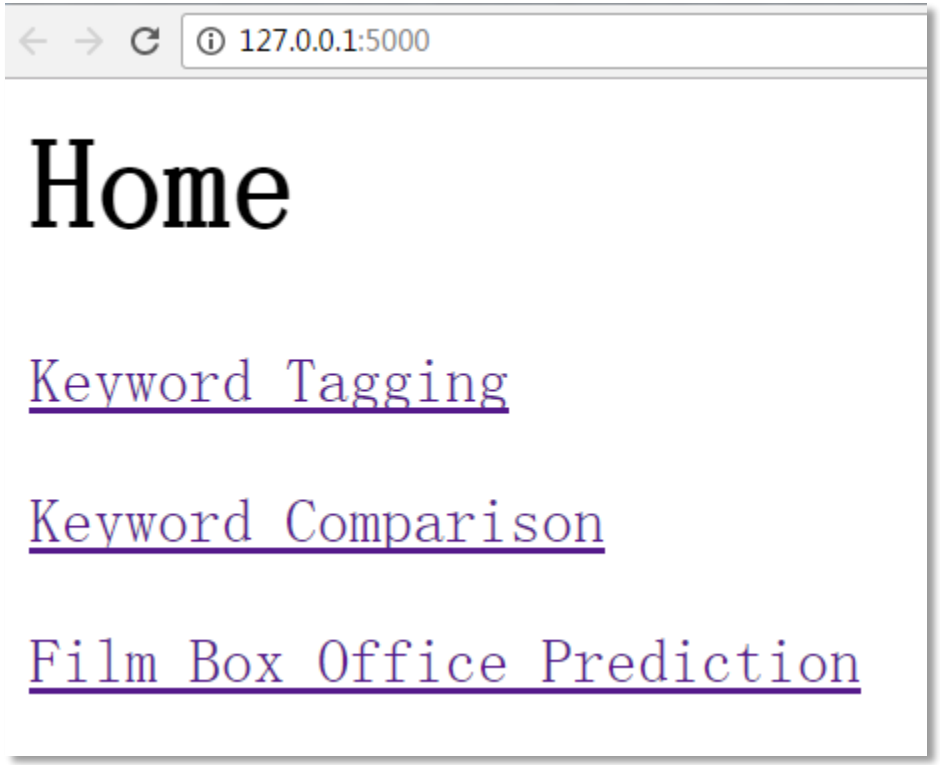
Software Development

Python
PyCharm
Flask
MySql



Film Box Office Prediction

Testing



Film Box Office Prediction

Input for Keyword Comparison

Please input the Keywords:

捉妖记　　西游降魔篇

Please input the Frequency of Keyword:

10

Start Date - End Date

2013-1-1　　2016-12-1

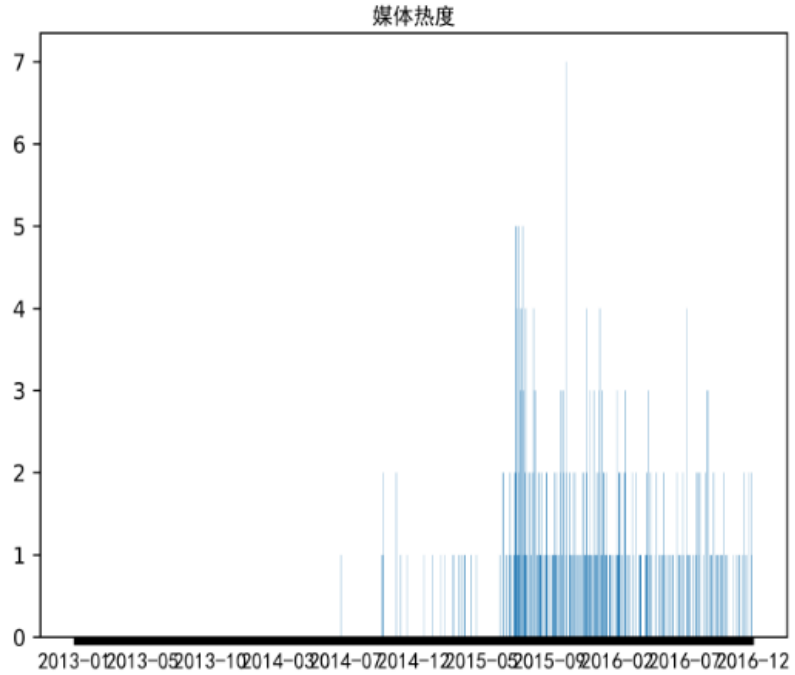
Comparison

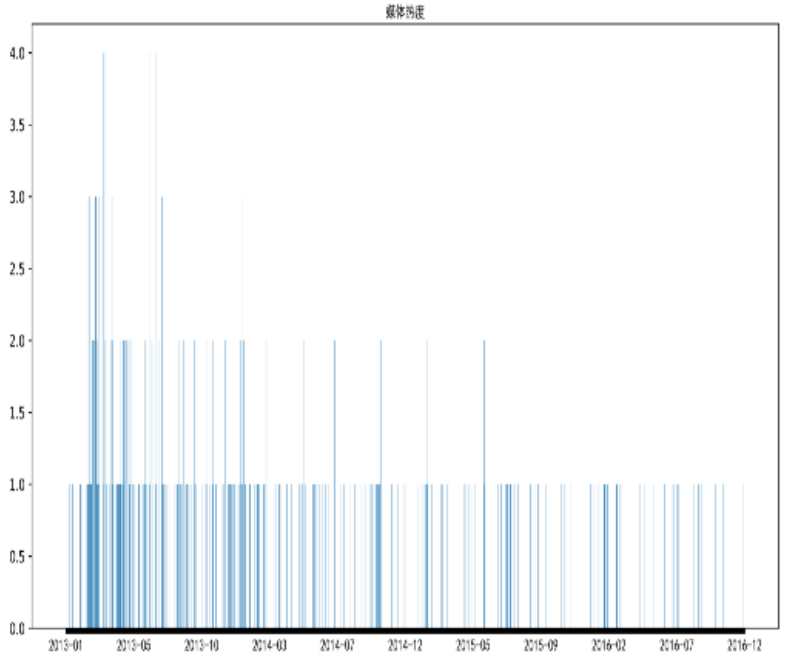
Similarity: 59.74025974025974%

Key Word 1:芈月传

Key Word 2:甄嬛传

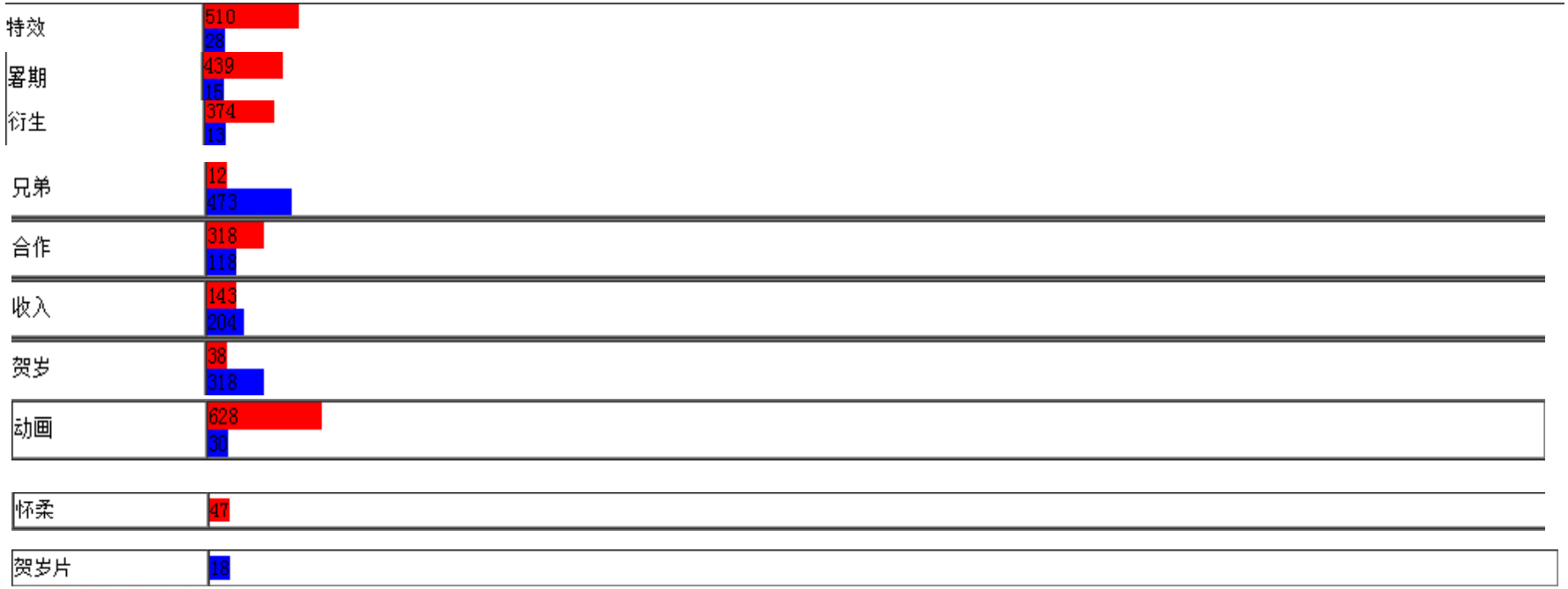
Film Box Office Prediction



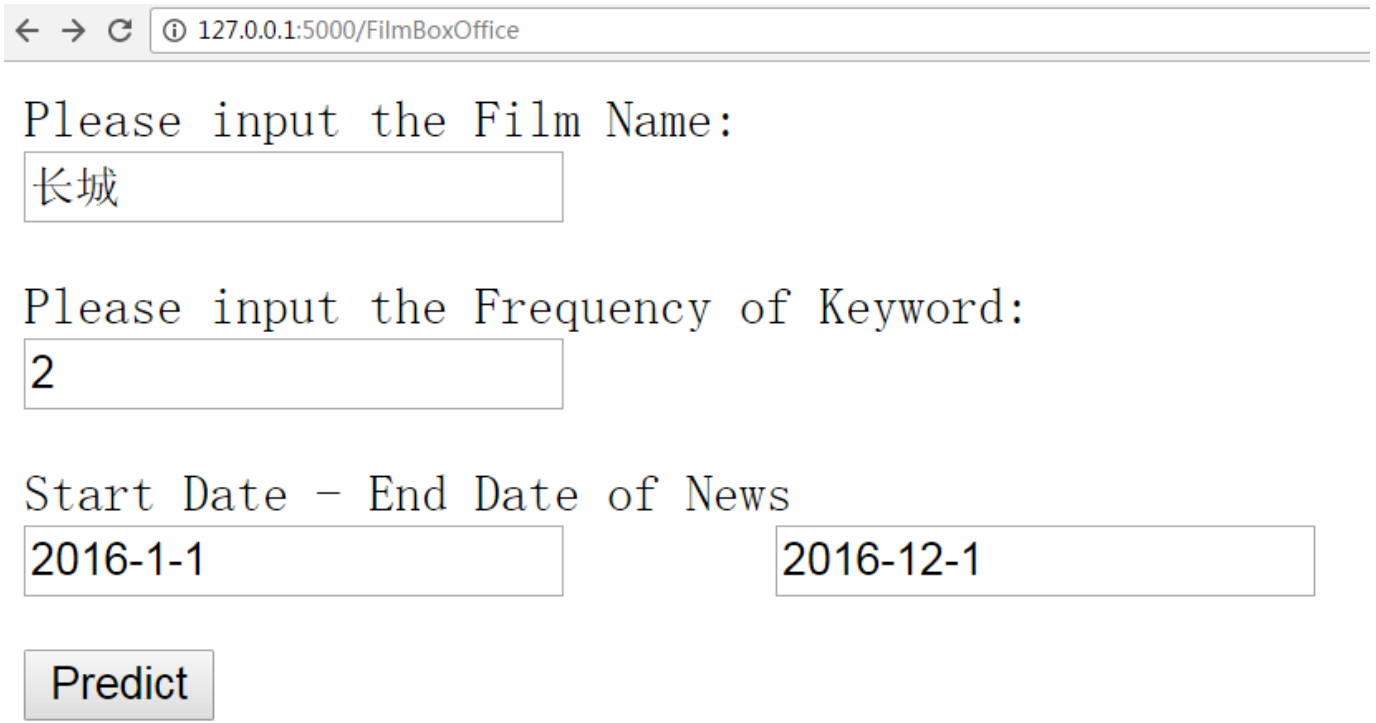


Film Box Office Prediction

- Keyword Comparison

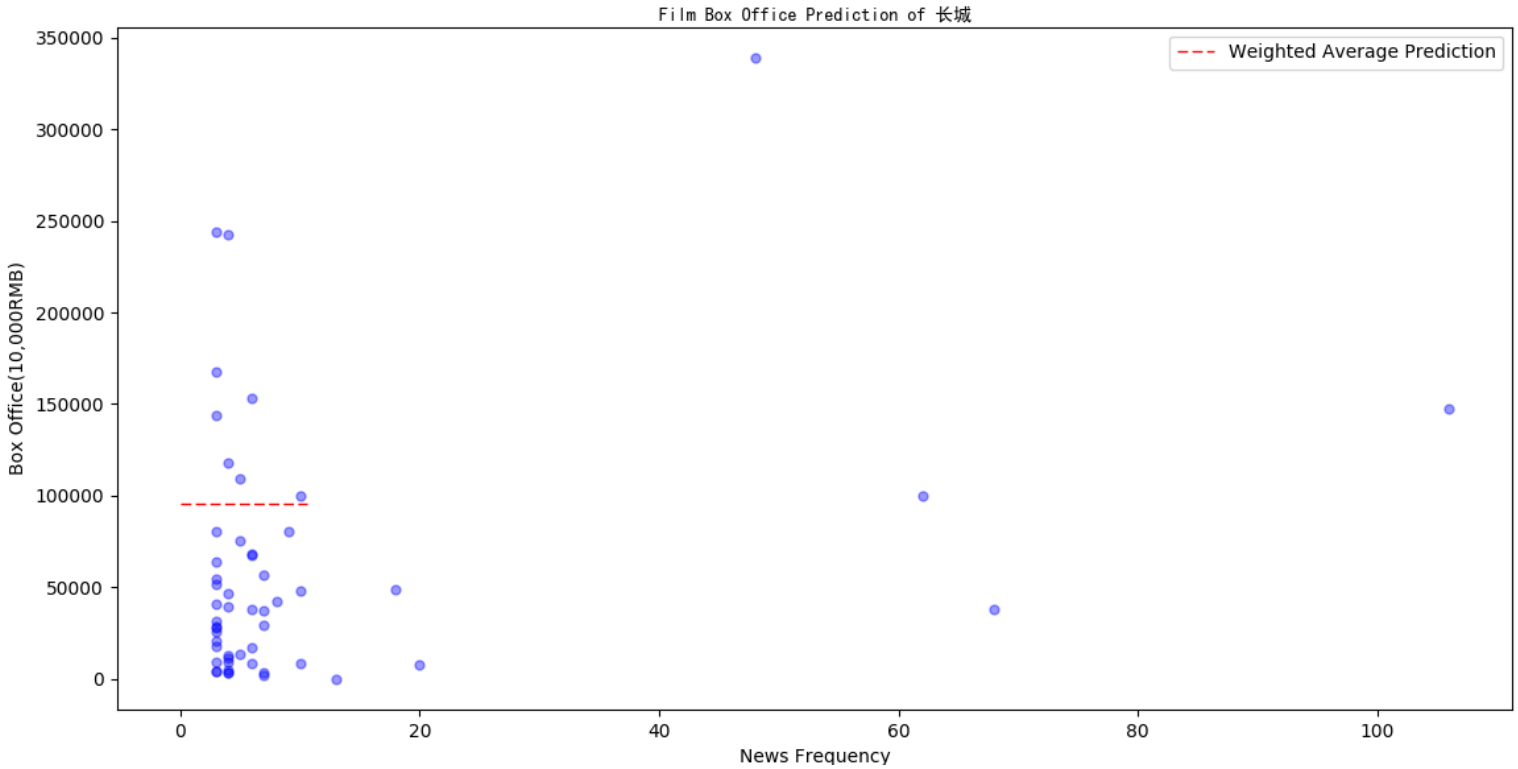


Film Box Office Prediction



Film Box Office Prediction

Film Box Office Prediction



Film Box Office Prediction

- 《芳华》

Home

Film Box Office of 芳华 : 151097.2136392405(x10,000) RMB

Please input the Film Name:

芳华

Please input the Frequency of Keyword:

2

Start Date - End Date of News

2015-03-01 2017-12-01

Predict

芳华 (2017)

Youth

累计票房
142241.5万

类型：战争/剧情/爱情

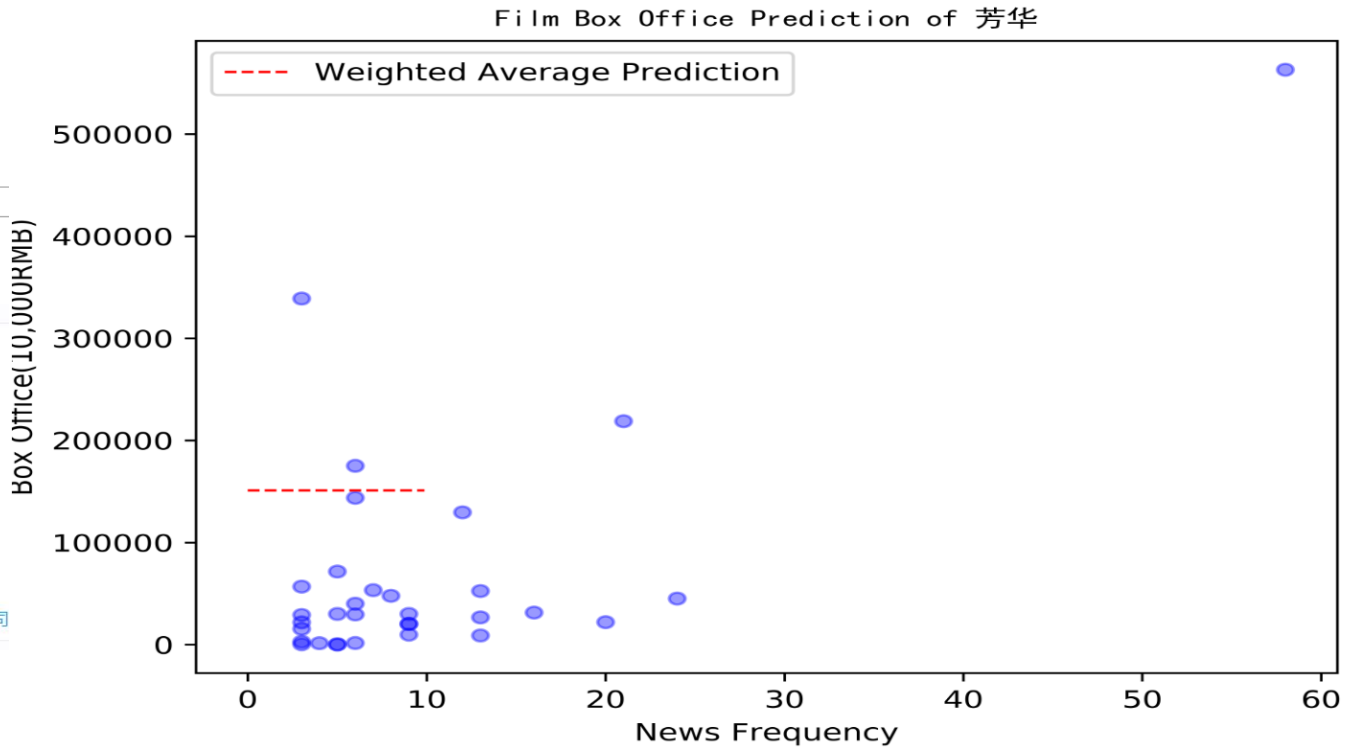
片长：136min

上映时间：2017-12-15（中国）

制式：2D/IMAX

国家及地区：中国

发行公司：华谊兄弟电影有限公司



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Film Box Office Prediction

- 《芳华》

Home

Film Box Office of 芳华 : 146639.15003030302(x10,000) RMB

Please input the Film Name:

芳华

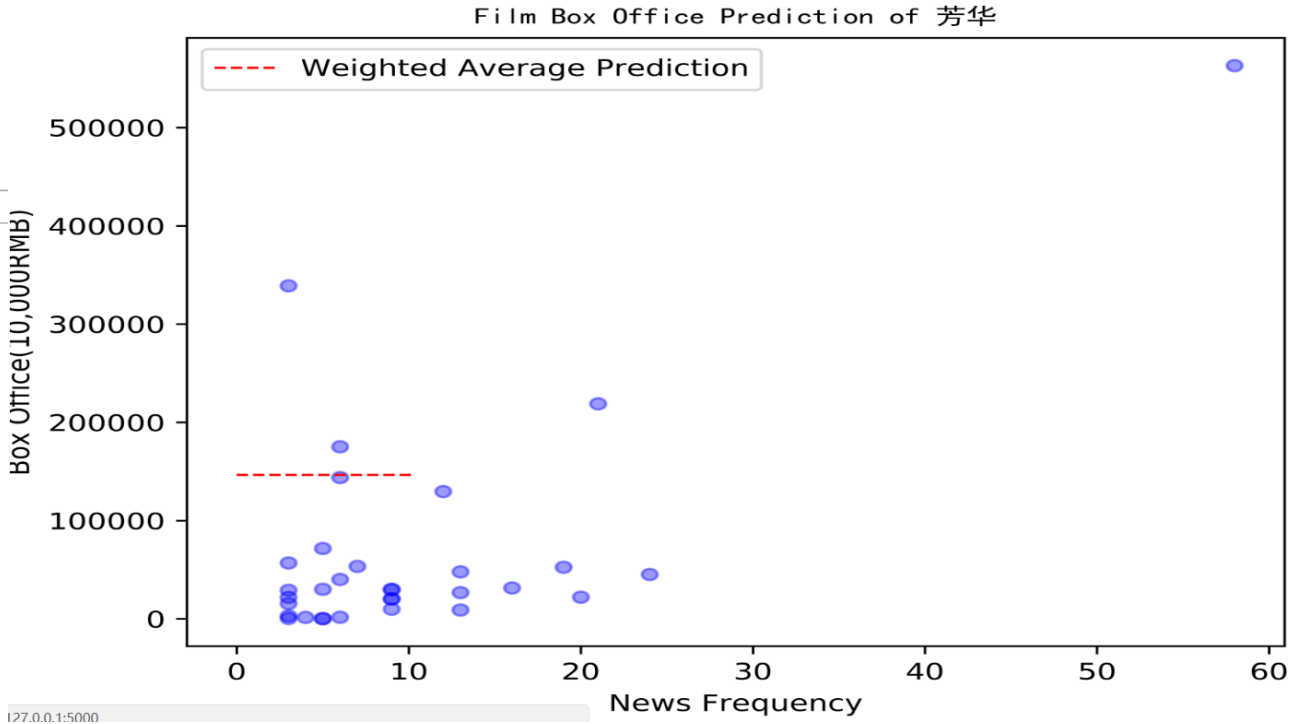
Please input the Frequency of Keyword:

2

Start Date - End Date of News

2015-03-01 2017-12-14

Predict



127.0.0.1:5000

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Conclusions

Film Box Office Prediction

What are the shortages of this system?

Do you have any ideas about developing a better one?

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tips for your career

To Be A Good Data Analyst

To Be A Good Data Analyst

Tip 1

- You have opinions, so do data
- How to read and interpret these data is very important, it depends on your opinions
- Sometimes, GUESS is important, a hypothesis is crucial to the problem

Guess for Hypothesis

Guess for Hypothesis

哪种关系更稳定？What kind of relationship is more steady between Male and Female?

- 不是东风压倒西风，就是西风压倒东风 One Strong, One Weak
- 两种风差不多强劲 Equal

Take Films Stars as an example:

Hypothesis

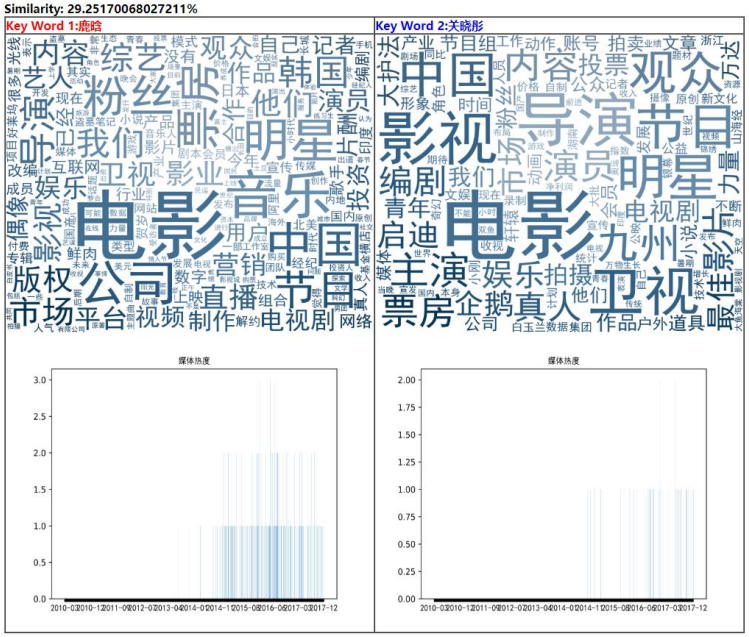
男女之间，不是东风压倒西风，就是西风压倒东风，你待她太好，她未必会投桃报李。

——司溟 《鸩之媚》

Guess for Hypothesis

- 鹿晗 关晓彤；
- 孙俪 邓超；
- 佟丽娅 陈思诚；
- 李小璐 贾乃亮

- 鹿晗 关晓彤（2018）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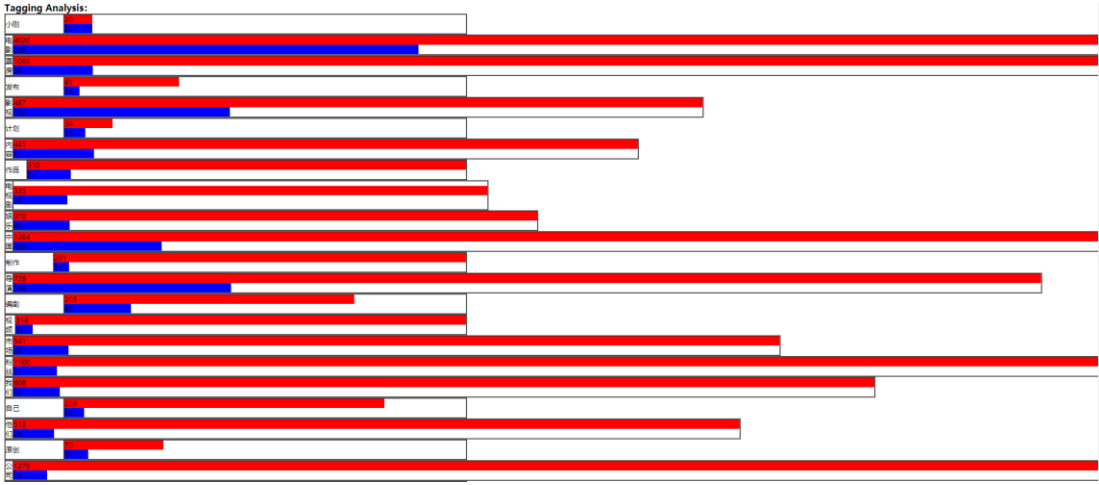
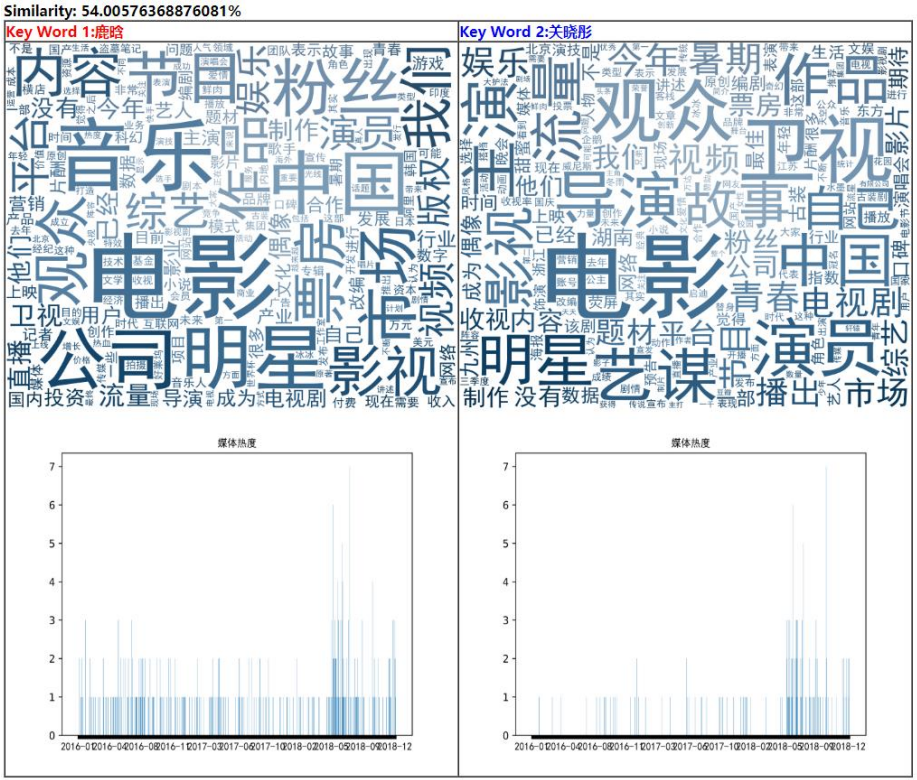
Key Word 2:关晓彤
媒体热度
媒体热度


Tagging Analysis:

- 鹿晗 关晓彤（2019）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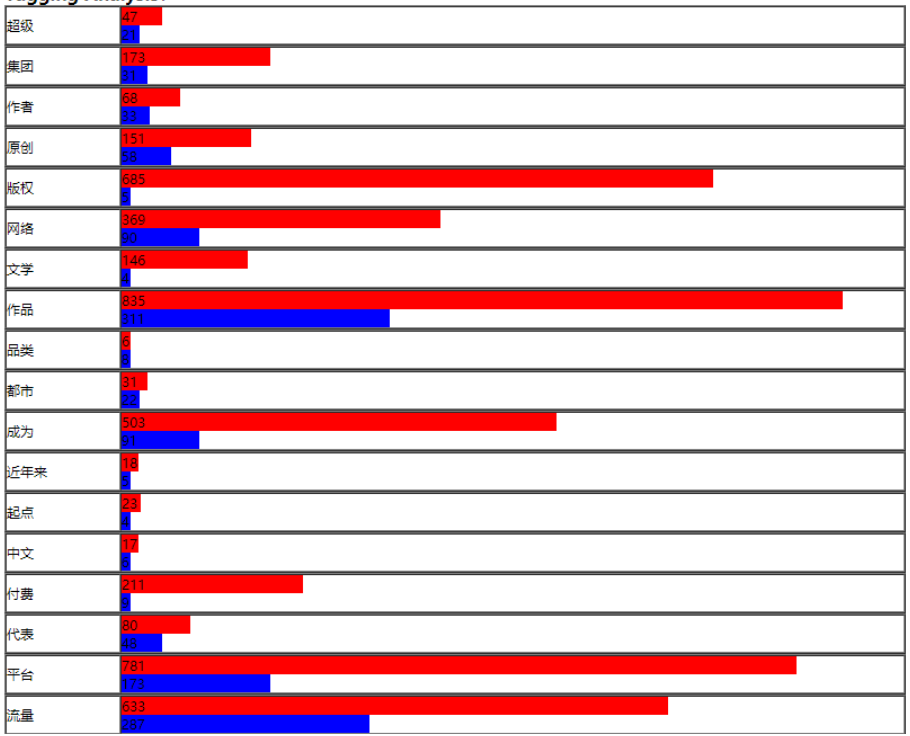
Key Word 2:关晓彤
媒体热度
媒体热度


Tagging Analysis:
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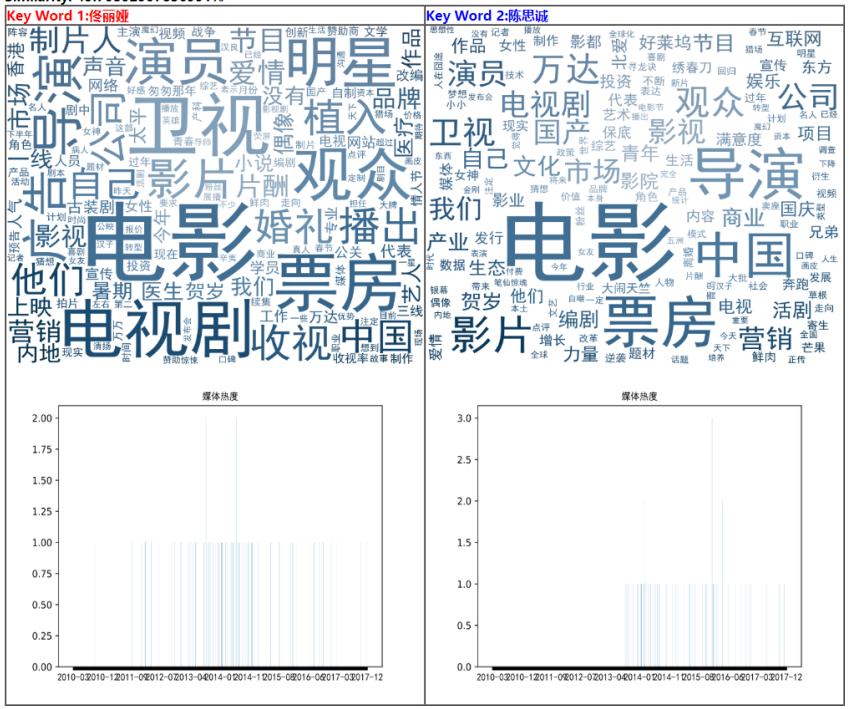
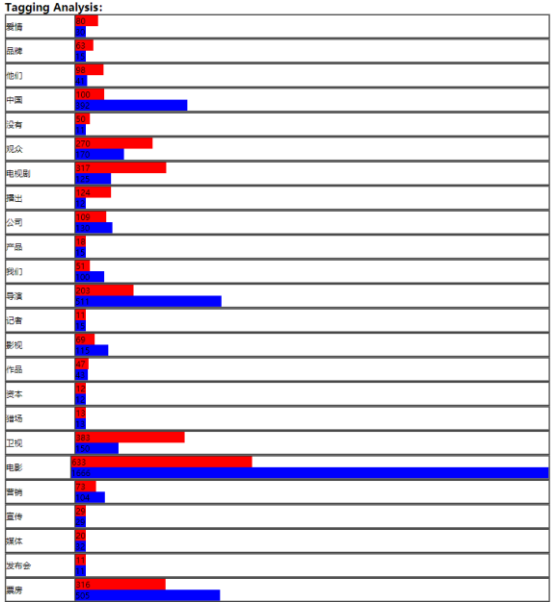
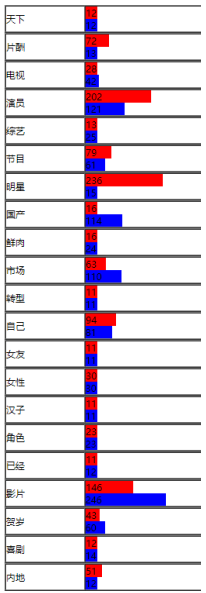
集团 173 21
作者 68 33
原创 151 56
版权 685 5
网络 369 90
文学 146 4
作品 835 311
品类 6 2
都市 31 22
成为 503 91
近年来 18 8
起点 23 4
中文 17 8
付费 211 4
代表 80 48
平台 781 173
流量 633 257

- 佟丽娅 陈思诚(2018)

Similarity: 45.768025078369 6%

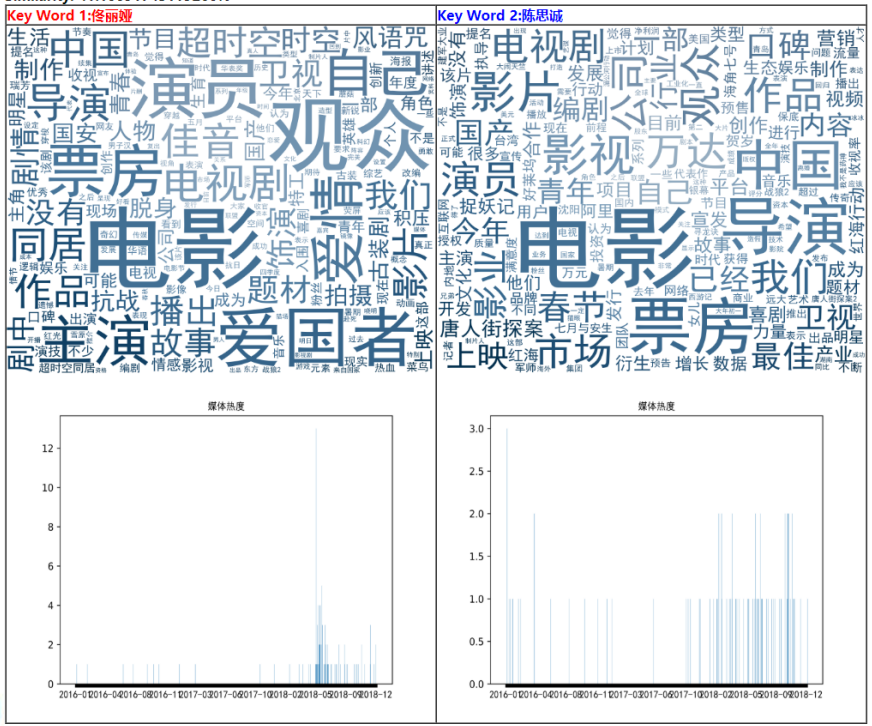






- 佟丽娅 陈思诚(2019)

Similarity: 41.100917431192660%



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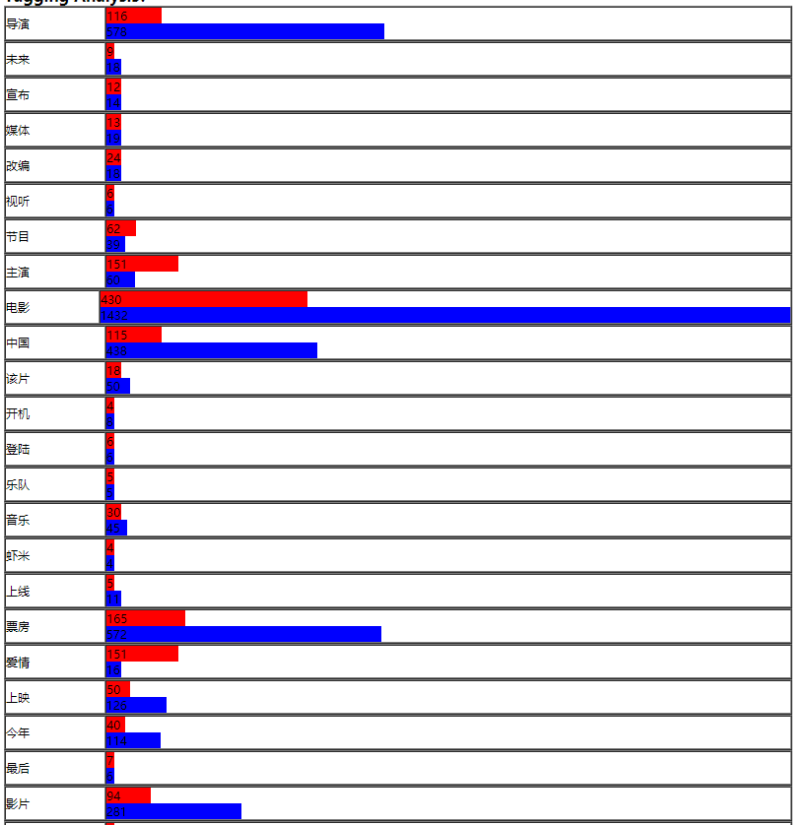
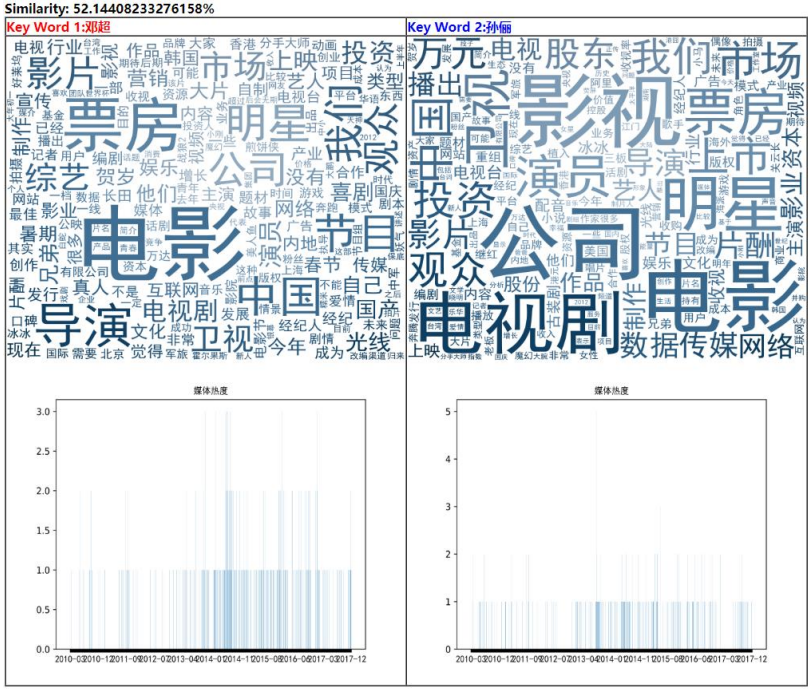


- 邓超 孙俪(2018)


Similarity: 52.144082332761 58%
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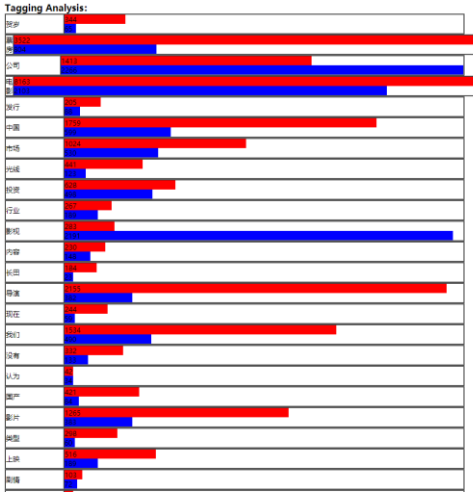
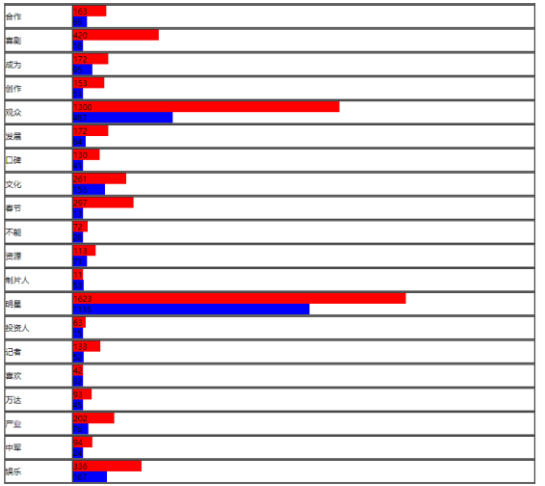
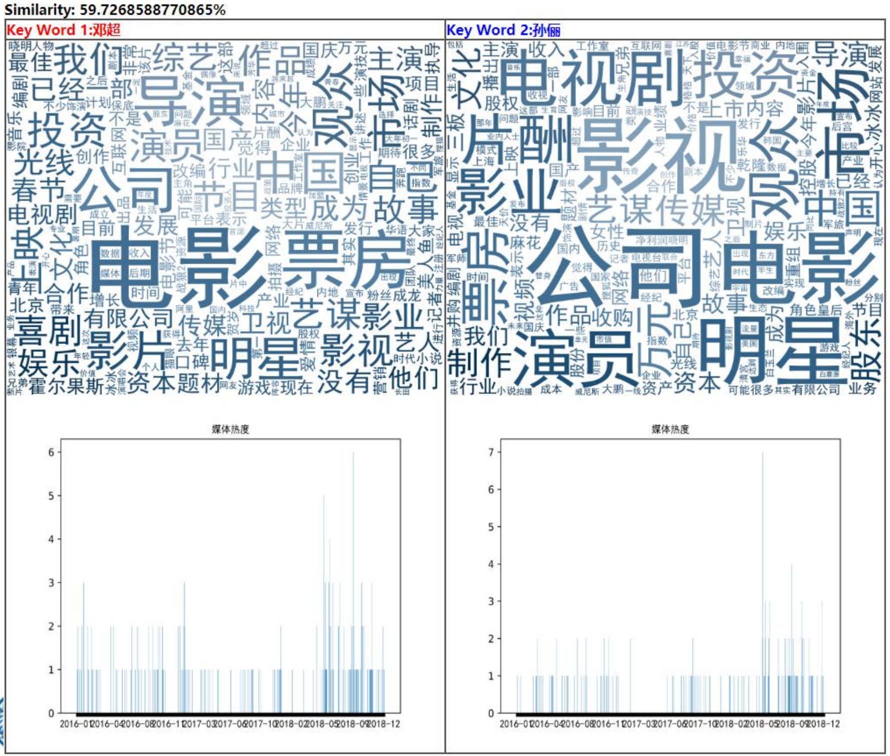
Key Word 2:孙俪
媒体热度
媒体热度


Tagging Analysis:



- 邓超 孙俪(2019)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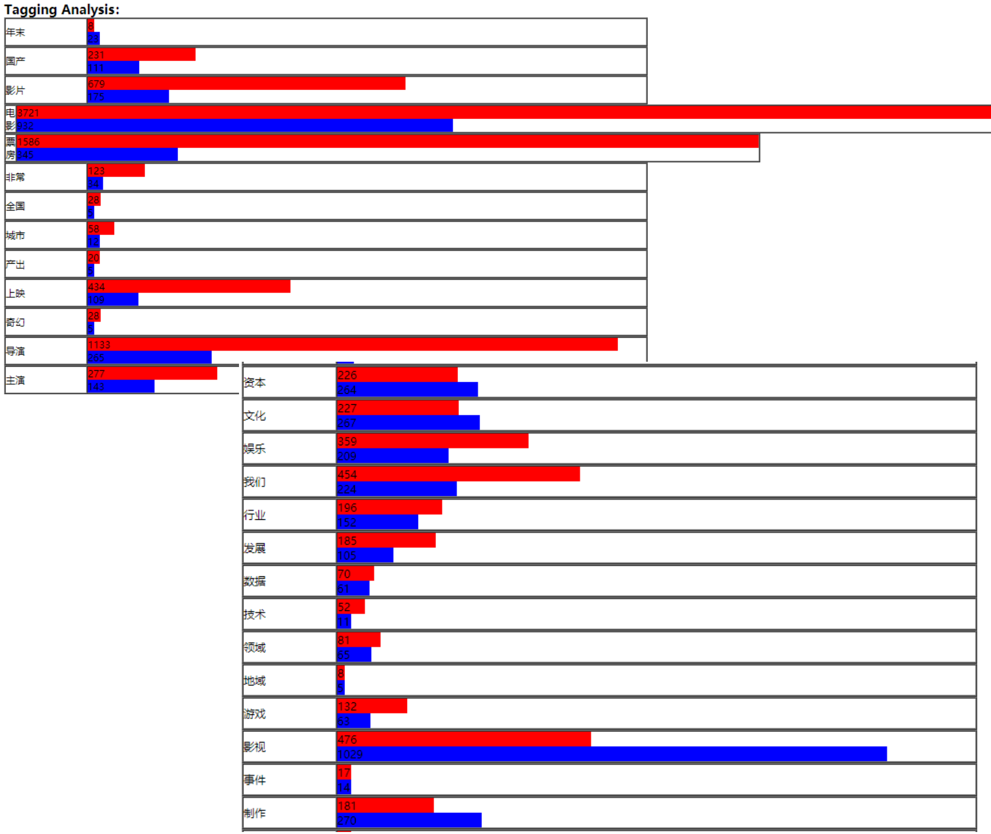
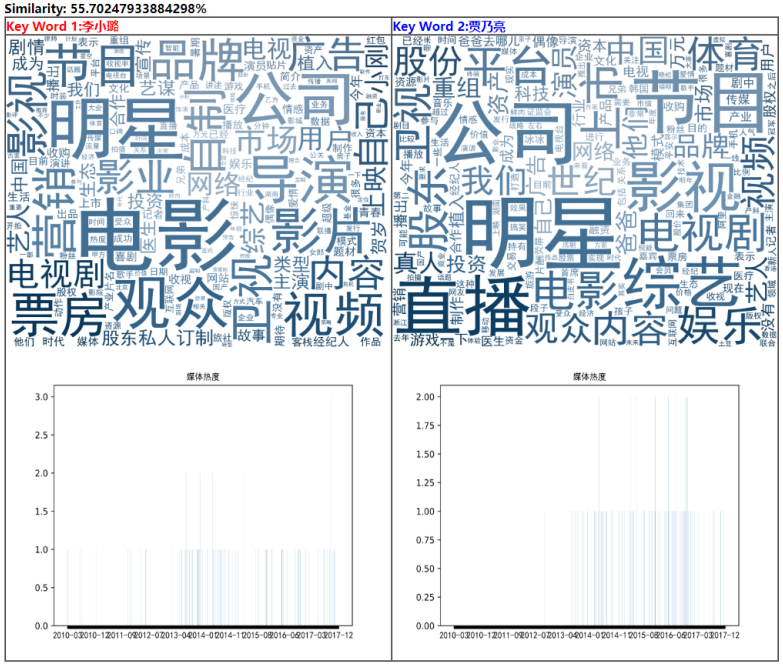
Key Word 2:孙俪
媒体热度
媒体热度


Tagging Analysis:
年末 8 23
国产 231 111
影片 679 175
电影 3721 932
票房 1586 345
非常 123 34
全国 28 5
城市 58 12
产出 20 5
上映 434 109
奇幻 28 5
导演 1133 265
主演 277 143
资本 226 264
文化 227 267
娱乐 359 209
我们 454 224
行业 196 152
发展 185 105
数据 70 61
技术 52 11
领域 81 65
地域 8 5
游戏 132 63
影视 476 1029
事件 17 14
制作 181 270

- 李小璐 贾乃亮（2018）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Key Word 1:李小璐
Key Word 2:贾乃亮
媒体热度
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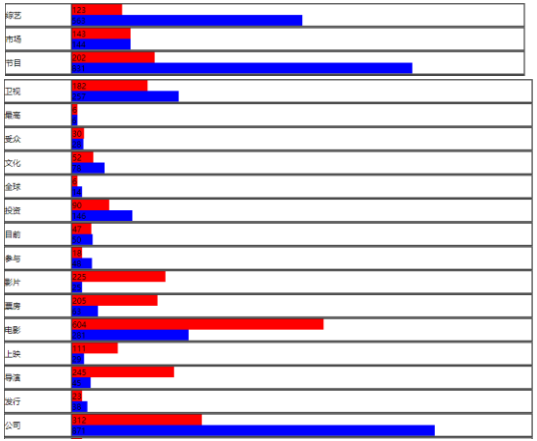

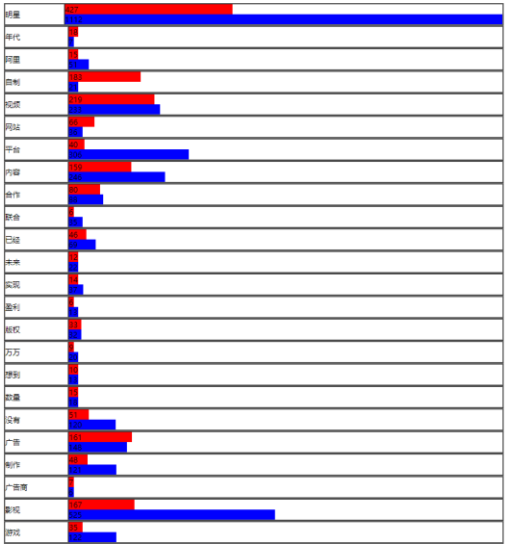

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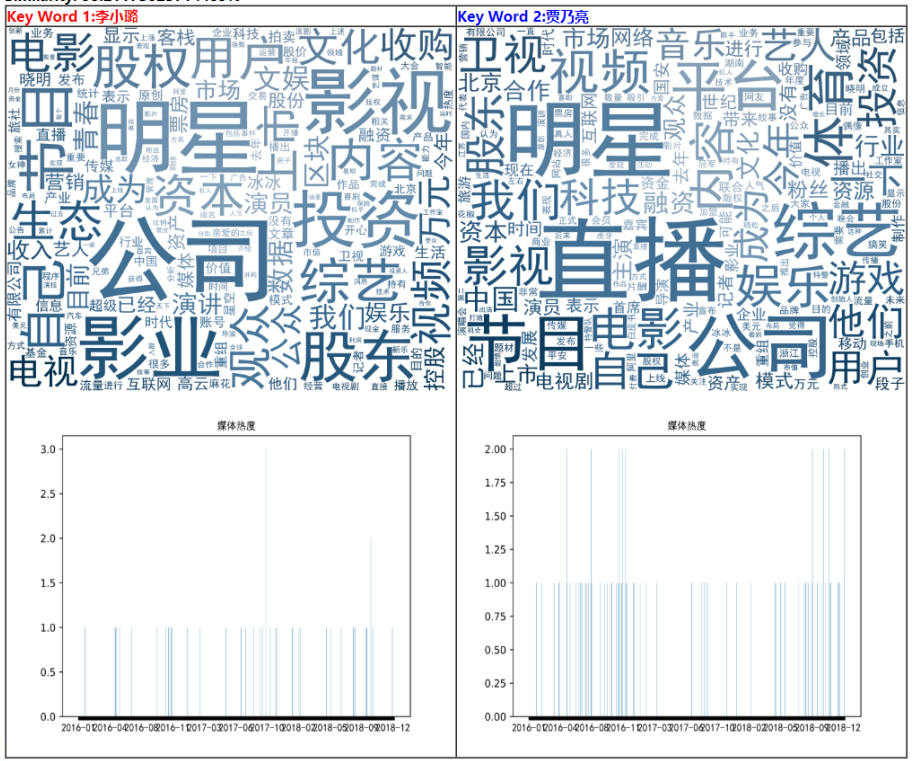

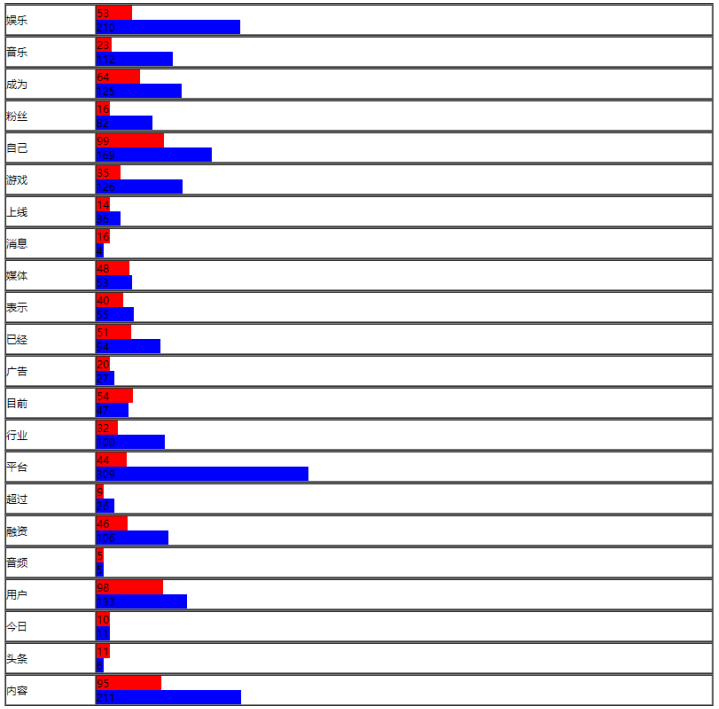

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Now, what is your conclusion?

To Be A Good Data Analyst

Tip 2

- Data Quality is always the most important
- Precise Prediction needs good data quality

To Be A Good Data Analyst

Tip 3

- Data Analysis is not the end, but a new start. Decision Support is more important.

To Be A Good Data Analyst

Tip 4

- To know more about your business, which is more important than to know more algorithms and mathematic models.

To Be A Good Data Analyst

Tips 5

- Conclusions that are not correct, feasible or applicable are useless
- Conclusions will change, if some elements, such as hypothesis, time, and place are changed

Reference

Reference

Books and Chapters (1)

https://item.jd.com/11983227.html

Chapter 1-2

Machine Learning Package Installation

Machine Learning Theory Foundations

Reference

Books and Chapters (2)

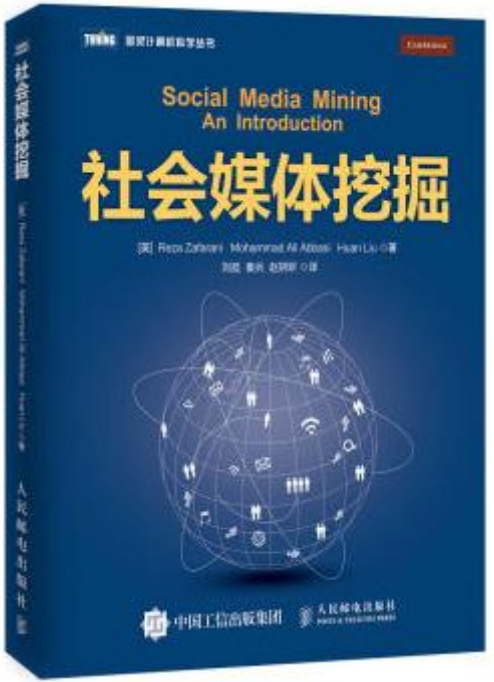
https://item.jd.com/11803260.html

Chapter 5

Data Mining Essentials

Online Reference:

http://www.public.asu.edu/~huanliu/



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Books and Chapters (3)

https://item.jd.com/11676691.html

Python Data Visualization

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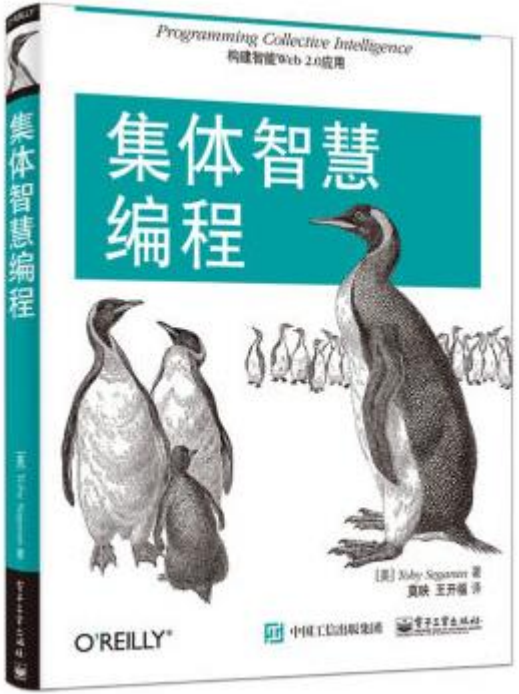
https://item.jd.com/11667512.html

Programming Collective Intelligence



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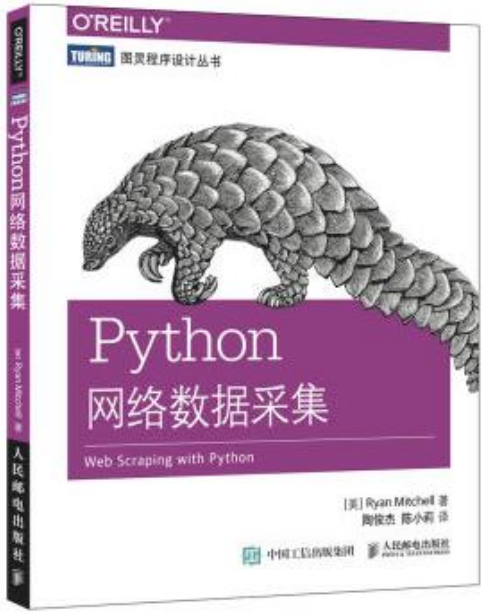

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The End of the Lectures

Thank You

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