レシピ92 matplotlibでデータの可視化（P319）

- matplotlibはあらゆるプロットできる
- danielsf/SciPyLectures-fr-ipython/ (2015年) （日本語版/Jupyter/Pythonノートブック）

- このレシピでは、映画製作者の視聴者から可能性である

(1) movie.csvデータセットを読みふみ、年ごとの取引数(medium)を計算し、5年間毎年のデータを平滑化する

- 取引ボリュームに転換

In [1]:
```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np

movie = pd.read_csv('movie.csv')
movie.T
```

Out[1]:

	0	1	2	3	4
color	Color	Color	Color	Color	Color
director_name	James Cameron	Gore Verbinski	Sam Mendes	Christopher Nolan	Doug Walker
num_critic_for_reviews	723.0	302.0	602.0	813.0	NaN
duration	178.0	169.0	148.0	164.0	NaN
director_facebook_likes	0.0	563.0	0.0	22000.0	131.0
actor_3_facebook_likes	855.0	1000.0	161.0	23000.0	NaN
actor_1_name	Joel David Moore	Orlando Bloom	Rory Kinnear	Christian Bale	Rob Walker
actor_3_facebook_likes	1000.0	40000.0	11000.0	27000.0	131.0
gross	760505847.0	309404152.0	200074175.0	448130642.0	NaN
genres	Action|Adventure|Fantasy|Sci-Fi	Action|Adventure|Fantasy	Action|Adventure|Thriller	Action|Thriller	Documentary
actor_1_name	CCH Pounder	Johnny Depp	Christoph Waltz	Tom Hardy	Doug Walker
movie_title	Avatar	Pirates of the Caribbean: At World's End	Spectre	The Dark Knight Rises	Star Wars: Episode VII - The Force Awakens
num_voted_users	886204	471220	275868	1144337	8
cast_total_facebook_likes	4834	48350	11700	106759	143
actor_2_name	Wes Studi	Jack Davenport	Stephanie Sigman	Joseph Gordon-Levitt	Nathan Lee
facenumber_in_poster	0.0	0.0	1.0	0.0	0.0
plot_keywords	avatar|future|marine|native|paraplegic	goldblum|marriage ceremony|marriage proposal|pi...	bomb|spy|spy|spy|spy|terrorist	deception|imprisonment|lies|lies|police offi...	NaN
movie_imdb_link	http://www.imdb.com/title/tt0499549/?ref_=fn_tt_tt_1	http://www.imdb.com/title/tt0449088/?ref_=fn_tt_tt_1	http://www.imdb.com/title/tt2379713/?ref_=fn_tt_tt_1	http://www.imdb.com/title/tt1345836/?ref_=fn_tt_tt_1	http://www.imdb.com/title/tt0818369/?ref_=fn_tt_tt_1
num_user_for_reviews	3054.0	1238.0	994.0	2731.0	NaN
language	English	English	English	English	NaN
country	USA	USA	UK	USA	NaN
content_rating	PG-13	PG-13	PG-13	PG-13	NaN
budget	237000000.0	300000000.0	245000000.0	250000000.0	NaN
title_year	2009.0	2007.0	2015.0	2012.0	NaN
actor_2_facebook_likes	936.0	5000.0	393.0	23000.0	12.0
imdb_score	7.9	7.1	6.8	8.5	7.1
aspect_ratio	1.78	2.35	2.35	2.35	NaN
movie_facebook_likes	33000	0	85000	164000	0

28 rows × 4916 columns

In [2]:
```
med_budget = movie.groupby('title_year')['budget'].median() / 1e6
med_budget
```

Out[2]:
```
title_year
1916.0    0.385907
1920.0    0.100000
1925.0    0.100000
1927.0    4.000000
1929.0    0.376000
          ...
2011.0    7.200000
2012.0   20.000000
2013.0   20.000000
2014.0   10.000000
2015.0   12.000000
2016.0   22.500000
Name: budget, Length: 91, dtype: float64
```

In [3]:
```
med_budget_roll = med_budget.rolling(5, min_periods=1).mean()
med_budget_roll.tail()
```

Out[3]:
```
title_year
2012.0   20.893
2013.0   19.493
2014.0   16.493
2015.0   12.700
2016.0   17.700
Name: budget, dtype: float64
```

(2) データをNumpy配列に戻す（index、情報不可）

In [4]:
```
type(med_budget_roll)
```

Out[4]:
```
pandas.core.series.Series
```

In [5]:
```
years = med_budget_roll.index.values
years
```

Out[5]:
```
array([1916., 1920., 1925., 1927., 1929., 1930., 1932., 1933.,
       1934., 1935., 1936., 1937., 1938., 1939., 1940., 1941.,
       1942., 1943., 1944., 1947., 1948., 1949., 1950., 1952.,
       1953., 1954., 1955., 1956., 1957., 1958., 1959., 1960.,
       1961., 1962., 1963., 1964., 1965., 1966., 1967., 1968.,
       1969., 1970., 1971., 1972., 1973., 1974., 1975., 1976.,
       1977., 1978., 1979., 1980., 1981., 1982., 1983., 1984.,
       1985., 1986., 1987., 1988., 1989., 1990., 1991., 1992.,
       1993., 1994., 1995., 1996., 1997., 1998., 1999., 2000.,
       2001., 2002., 2003., 2004., 2005., 2006., 2007., 2008.,
       2009., 2010., 2011., 2012., 2013., 2014., 2015., 2016.,
       2016.])
```

In [6]:
```
budget = med_budget_roll.values
budget
```

Out[6]:
```
array([0.385907  , 0.2429535 , 0.2429535 , 0.3429535 , 1.4429535 ,
       2.1429535 , 2.1429535 , 2.1429535 , 2.1429535 , 2.1429535 ,
       2.1429535 , 2.1429535 , 2.1429535 , 1.1429535 , 1.1429535 ,
       1.9429535 , 1.9429535 , 1.9429535 , 1.9429535 , 1.9429535 ,
       2.1429535 , 2.1429535 , 2.1429535 , 2.1429535 , 2.1429535 ,
       2.1429535 , 2.1429535 , 2.1429535 , 2.1429535 , 2.1429535 ,
       2.5429535 , 2.5429535 , 2.5429535 , 2.5429535 , 2.5
```