keyword_analysis

November 9, 2017

In [15]:
```
import pickle
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

In [16]:
```
dat = pickle.load(open("extracted_files/extracted_raw.p", "rb"))
dat = list(filter(None, dat))
df = pd.DataFrame(dat)
```

In [17]:
```
df.columns
```

Out[17]:
```
Index(['abstract', 'authors', 'cite_count', 'cover_date', 'doi', 'keywords',
       'publication_name', 'reference_count', 'subject_area', 'title', 'type',
       'volume'],
      dtype='object')
```

In [18]:
```
abstracts = " ".join(list(df.abstract))
```

In [19]:
```
abstracts = abstracts.lower()
```

In [20]:
```
from nltk.tokenize import sent_tokenize, word_tokenize
```

In [21]:
```
words = word_tokenize(abstracts)
```

In [22]:
```
words
```

Out[22]:
```
['ï',
 '2017',
 'elsevier',
 'ltd',
 'a',
 'comprehensive',
 'public',
 'health',
 'strategy',
 'for',
 'adolescent',
```

```
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',',
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'for',
'risk',
'recognition',
',',
'and',
'services',
'for',
'those',
'at',
'risk',
'.',
'interpersonal',
'trauma',
'and',
'substance',
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'with',
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'target',
'these',
'factors',
';',
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',',
'the',
```

```
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 ...]
```

```
In [23]: keywords = pickle.load(open("keywords.p", "rb"))
```

```
In [24]: also_keywords = []
         for key in keywords:
             also_keywords.append(key.split())

         keywords = []
         for sublist in also_keywords:
             for item in sublist:
                 keywords.append(item.lower())
         keywords
```

```
Out[24]: ['abductive',
          'logic',
          'programming',
          'abductive',
          'reasoning',
```

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'ai',
'world',
'wide',
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```
          'web',
          'consortium']

In [25]: key_dict = {}
         for key in keywords:
             for word in words:
                 if word.lower() == key.lower():
                     if key in key_dict.keys():
                         key_dict[key] += 1
                     else:
                         key_dict[key] = 1

In [26]: key_dict

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 'weak': 10,
 'web': 34,
 'wide': 26,
 'world': 51}
```

In [27]:
```
import operator
# x = {1: 2, 3: 4, 4: 3, 2: 1, 0: 0}
sorted_x = sorted(key_dict.items(), key=operator.itemgetter(1))
```

In [28]:
```
for_plotting = sorted_x[-15:]
```

In [29]:
```
for_plotting
```

Out[29]:
```
[('problem', 1668),
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 ('learning', 6258),
 ('system', 8138),
 ('data', 8352),
 ('and', 11298),
 ('the', 12384),
 ('of', 38465)]
```
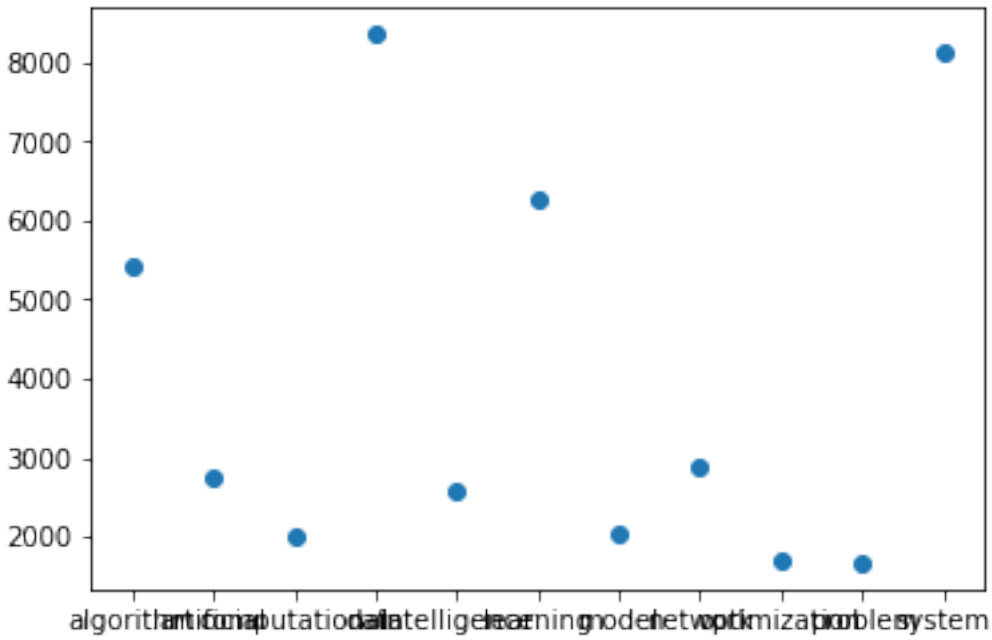

In [30]:
```
to_remove = "of,the,and,for,a,i,in,an"
to_remove = to_remove.split(",")
to_remove
```

```
Out[30]: ['of', 'the', 'and', 'for', 'a', 'i', 'in', 'an']

In [31]: # for i, val in enumerate(for_plotting):
         #     print(i,val)
         #     if key in to_remove:
         i = 0
         while 1:
             if for_plotting[i][0] in to_remove:
                 del for_plotting[i]
             else:
                 i += 1
             if i >= len(for_plotting):
                 break

In [32]: for_plotting

Out[32]: [('problem', 1668),
          ('optimization', 1692),
          ('computational', 1988),
          ('model', 2052),
          ('intelligence', 2590),
          ('artificial', 2754),
          ('network', 2888),
          ('algorithm', 5418),
          ('learning', 6258),
          ('system', 8138),
          ('data', 8352)]

In [33]: x = []
         y = []
         for val in for_plotting:
             x.append(val[0])
             y.append(val[1])
         # pickle.dump([x,y], open("for_plotting.p", "wb"))

In [34]: # x, y = pickle.load(open("for_plotting.p", "rb"))

In [35]: plt.scatter(x,y)
         plt.show()
```




```
In [37]: li = list(df.subject_area)

In [38]: flat_li = []
         for sublist in li:
             for item in sublist:
                 flat_li.append(item)

In [39]: flat_li

Out[39]: ['Psychology (all)',
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'Software',
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 'Computer Science Applications',
 ...]
```

```
In [41]: from collections import Counter
```

```
In [42]: count = Counter(flat_li)
```

```
In [43]: count
```

```
Out[43]: Counter({'Acoustics and Ultrasonics': 4,
                  'Aerospace Engineering': 18,
                  'Agricultural and Biological Sciences (all)': 1,
                  'Agronomy and Crop Science': 2,
                  'Algebra and Number Theory': 6,
                  'Analysis': 4,
                  'Analytical Chemistry': 6,
                  'Applied Mathematics': 65,
                  'Applied Microbiology and Biotechnology': 1,
                  'Artificial Intelligence': 205,
                  'Arts and Humanities (miscellaneous)': 5,
                  'Atomic and Molecular Physics, and Optics': 13,
                  'Automotive Engineering': 14,
                  'Behavioral Neuroscience': 1,
                  'Biochemistry, Genetics and Molecular Biology (all)': 1,
                  'Bioengineering': 4,
                  'Biomaterials': 1,
                  'Biomedical Engineering': 12,
```

```
'Biophysics': 2,
'Biotechnology': 1,
'Building and Construction': 7,
'Business and International Management': 7,
'Business, Management and Accounting (all)': 1,
'Chemical Engineering (all)': 7,
'Chemical Engineering (miscellaneous)': 2,
'Chemistry (all)': 6,
'Civil and Structural Engineering': 27,
'Cognitive Neuroscience': 13,
'Colloid and Surface Chemistry': 1,
'Communication': 3,
'Computational Mathematics': 65,
'Computational Mechanics': 1,
'Computational Theory and Mathematics': 24,
'Computer Graphics and Computer-Aided Design': 2,
'Computer Networks and Communications': 25,
'Computer Science (all)': 429,
'Computer Science (miscellaneous)': 18,
'Computer Science Applications': 175,
'Computer Vision and Pattern Recognition': 72,
'Condensed Matter Physics': 33,
'Control and Optimization': 30,
'Control and Systems Engineering': 403,
'Decision Sciences (all)': 63,
'Decision Sciences (miscellaneous)': 14,
'Development': 1,
'Developmental and Educational Psychology': 1,
'Discrete Mathematics and Combinatorics': 2,
'Drug Discovery': 1,
'Earth and Planetary Sciences (all)': 2,
'Earth and Planetary Sciences (miscellaneous)': 1,
'Earth-Surface Processes': 1,
'Ecology': 1,
'Ecology, Evolution, Behavior and Systematics': 1,
'Economics and Econometrics': 1,
'Economics, Econometrics and Finance (miscellaneous)': 14,
'Education': 6,
'Electrical and Electronic Engineering': 60,
'Electrochemistry': 1,
'Electronic, Optical and Magnetic Materials': 14,
'Energy Engineering and Power Technology': 22,
'Engineering (all)': 79,
'Engineering (miscellaneous)': 4,
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'Experimental and Cognitive Psychology': 2,
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```
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'Fuel Technology': 2,
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'Hardware and Architecture': 49,
'Health Informatics': 16,
'Health, Toxicology and Mutagenesis': 1,
'Horticulture': 1,
'Human Factors and Ergonomics': 10,
'Human-Computer Interaction': 13,
'Immunology': 1,
'Immunology and Microbiology (all)': 1,
'Industrial and Manufacturing Engineering': 51,
'Infectious Diseases': 1,
'Information Systems': 41,
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'Instrumentation': 8,
'Language and Linguistics': 2,
'Law': 1,
'Library and Information Sciences': 26,
'Linguistics and Language': 2,
'Management Information Systems': 1,
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'Management of Technology and Innovation': 6,
'Marketing': 1,
'Materials Chemistry': 4,
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'Mechanics of Materials': 14,
'Media Technology': 1,
'Medicine (all)': 1,
'Metals and Alloys': 3,
'Microbiology': 1,
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'Numerical Analysis': 5,
'Ocean Engineering': 1,
'Pharmacology': 1,
'Physical Therapy, Sports Therapy and Rehabilitation': 6,
'Physical and Theoretical Chemistry': 4,
'Physics and Astronomy (all)': 4,
'Pollution': 6,
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```
                  'Psychology (all)': 6,
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                  'Sociology and Political Science': 1,
                  'Software': 155,
                  'Soil Science': 6,
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                  'Statistics and Probability': 29,
                  'Strategy and Management': 7,
                  'Surfaces and Interfaces': 1,
                  'Surfaces, Coatings and Films': 6,
                  'Theoretical Computer Science': 51,
                  'Tourism, Leisure and Hospitality Management': 1,
                  'Toxicology': 1,
                  'Urban Studies': 1,
                  'Waste Management and Disposal': 5})

In [44]: sorted_count = sorted(count.items(), key=operator.itemgetter(1))

In [45]: sorted_count

Out[45]: [('Biotechnology', 1),
          ('Electrochemistry', 1),
          ('Behavioral Neuroscience', 1),
          ('Pharmacology', 1),
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 ('Computer Science (all)', 429)]
```
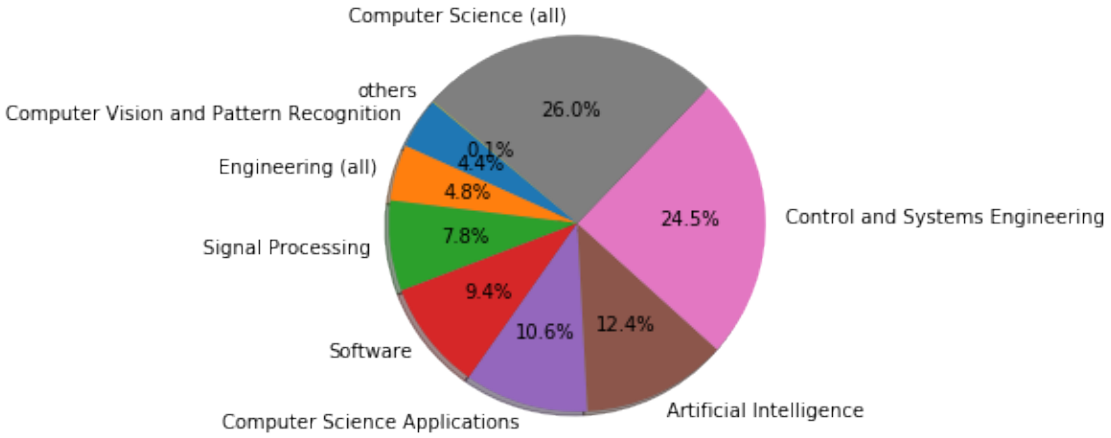

In [52]:
```
temp = sorted_count[-8:]

labels = []
sizes = []

for item in temp:
    labels.append(item[0])
    sizes.append(item[1])

labels.append("others")
sizes.append(1)
```

In [54]:
```
# Data to plot
# colors = ['gold', 'yellowgreen', 'lightcoral', 'lightskyblue']
# explode = (0.1, 0, 0, 0)  # explode 1st slice

# Plot
plt.pie(sizes, labels=labels,
        autopct='%1.1f%%', shadow=True, startangle=140)

plt.axis('equal')
plt.show()
```


Computer Science (all)
26.0%
others
Computer Vision and Pattern Recognition
0.1%
Engineering (all)
4.4%
4.8%
Signal Processing
7.8%
9.4%
Software
10.6%
Computer Science Applications
12.4%
Artificial Intelligence
24.5%
Control and Systems Engineering