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ENGR 212: Programming Practice

Week 7

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Structuring

&

Visualization

Example

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	"china"	"kids"	"music"	"yahoo"
Gothamist	0	3	3	0
GigaOM	6	0	0	2
Quick Online Tips	0	2	2	22

Preprocessing

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- Almost all blogs can be read online or via their RSS feeds.
- An RSS feed is a simple XML document that contains information about the blog and all the entries.
- The first step in generating word counts for each blog is to parse these feeds. Universal Feed Parser is an excellent module. Install via:
- sudo pip install feedparser

Install feedparser

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- PyCharm (like any other module installation)

or

- pip install feedparser

Sample Data Set

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- Highly referenced blogs with clean data (mostly text)
  - feedlist.txt
  - Available on LMS (/Lectures/Week 06/Code)

RSS Feed or Atom Feed

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- RSS and Atom feeds always have a title and a list of entries.
- Each entry usually has either a summary or description tag that contains the actual text of the entries.

Get word counts

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```
# Returns title and dictionary of word counts for an RSS feed
def getwordcounts(url):
    # Parse the feed
    d =feedparser.parse(url)
    wc ={}

    # Loopover  all the entries
    for e in d.entries:
        if 'summary' in e:
            summary = e.summary
        else:
            summary = e.description

        # Extract a list of words
        words = getwords(e.title+' '+summary)
        for wordin  words:
            wc.setdefault(word,0)
            wc[word] += 1
    return d.feed.title, wc
```

Tokenize: Get Words

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```
import re

# Strips out all of the HTML and splits the words by
# nonalphabetical characters and returns them as a list.

def getwords(html):
    # Remove all the HTML tags
    txt=re.compile(r'<[^>]+>').sub('',html)

    # Split words by all non-alpha characters
    words=re.compile(r'[^A-Z^a-z]+').split(txt)

    # Convert to lowercase
    return [word.lower() for word in words if word!='']
```

Generate word counts

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```
apcount={}
wordcounts={}

feedlist=[line for line in file('feedlist.txt')]

for feedurl in feedlist:
    title,wc=getwordcounts(feedurl)
    wordcounts[title]=wc
    for word,count in wc.items():
      apcount.setdefault(word,0)
      if count>1:
        apcount[word]+=1

wordlist=[]
for w,bc in apcount.items():
  frac=float(bc)/len(feedlist)
  if frac>0.1 and frac<0.5:
    wordlist.append(w)
```

Compute word appearance counts

Eliminate common & rare words

Create word matrix

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	"china"	"kids"	"music"	"yahoo"
Gothamist	0	3	3	0
GigaOM	6	0	0	2
Quick Online Tips	0	2	2	22

```
out=file('blogdata.txt','w')
out.write('Blog')
for word in wordlist:
  out.write('\t%s' % word)
out.write('\n')

for blog,wc in wordcounts.items():
  print blog
  out.write(blog)
  for word in wordlist:
    if word in wc: out.write('\t%d' % wc[word])
    else: out.write('\t0')
  out.write('\n')
```

Hierarchical Clustering

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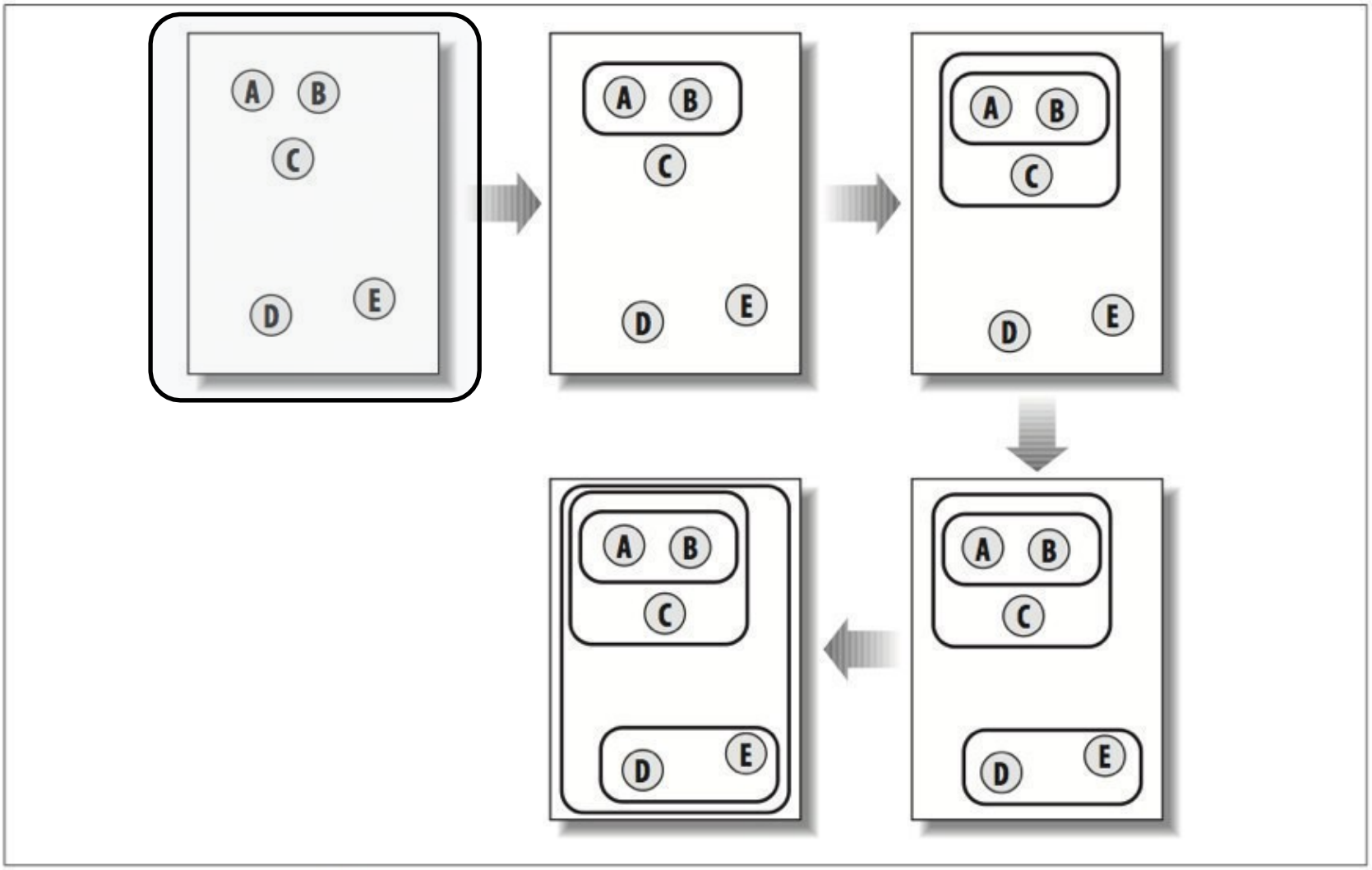

Hierarchical Clustering

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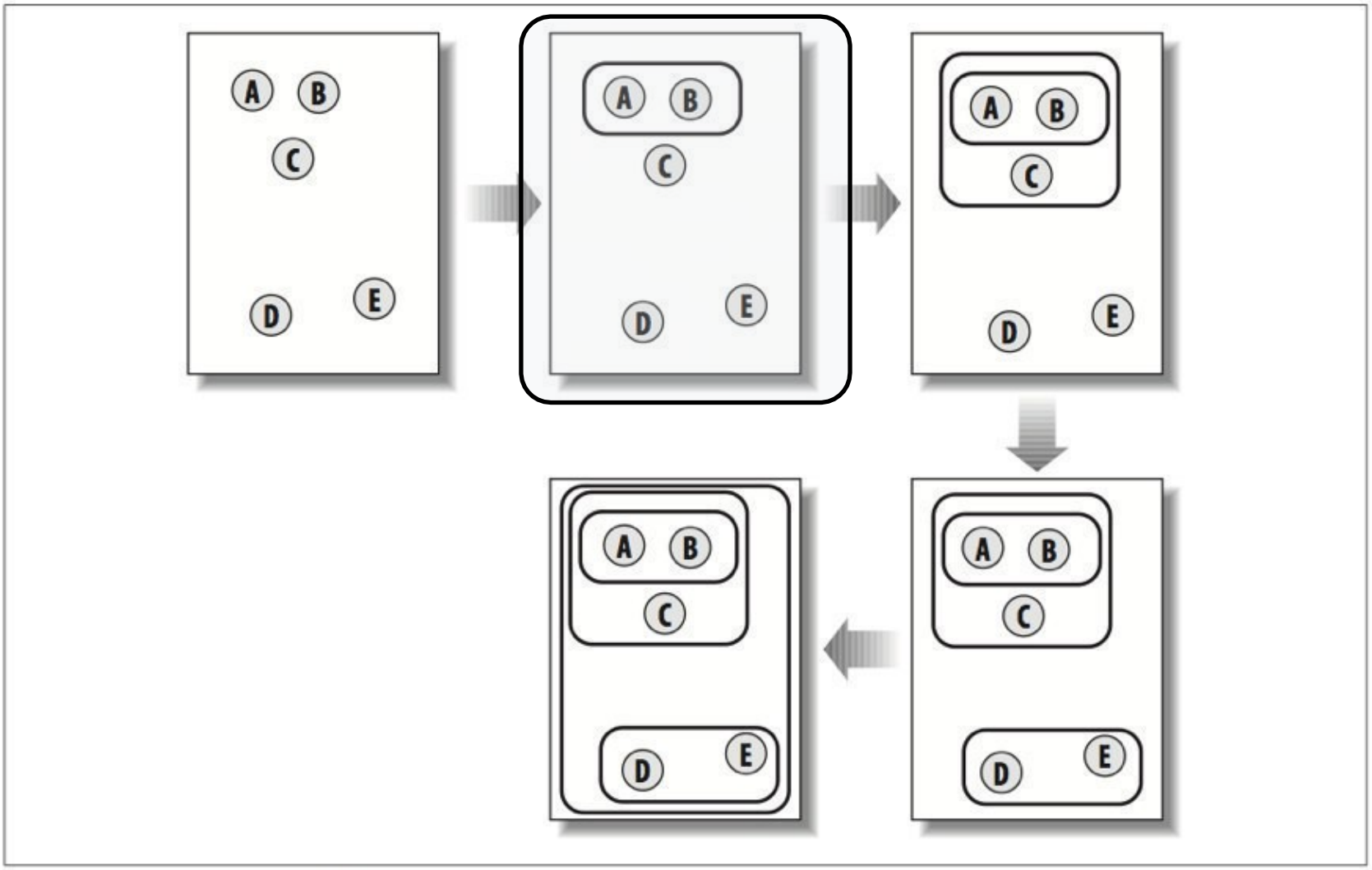

Hierarchical Clustering

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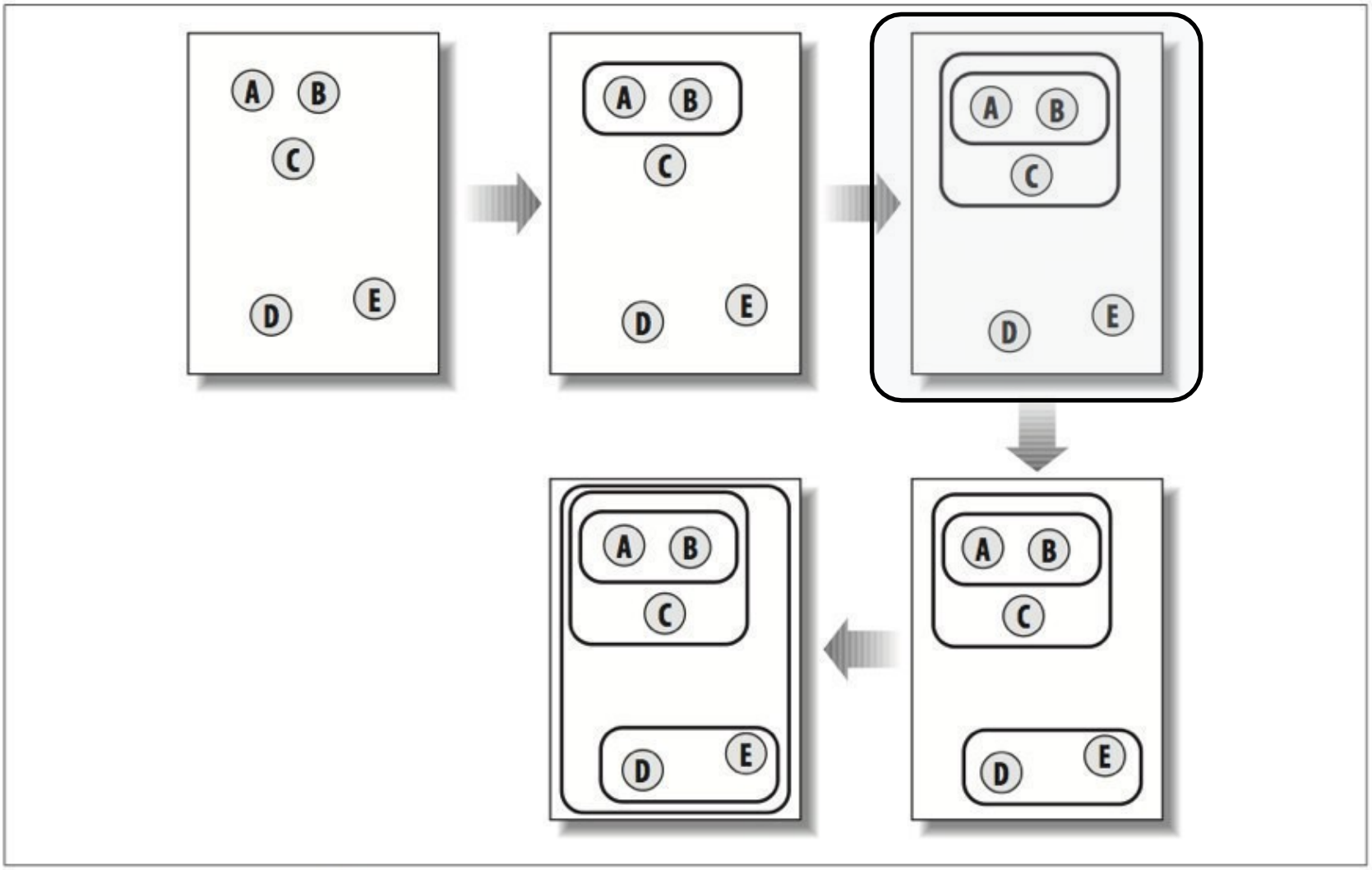

Hierarchical Clustering

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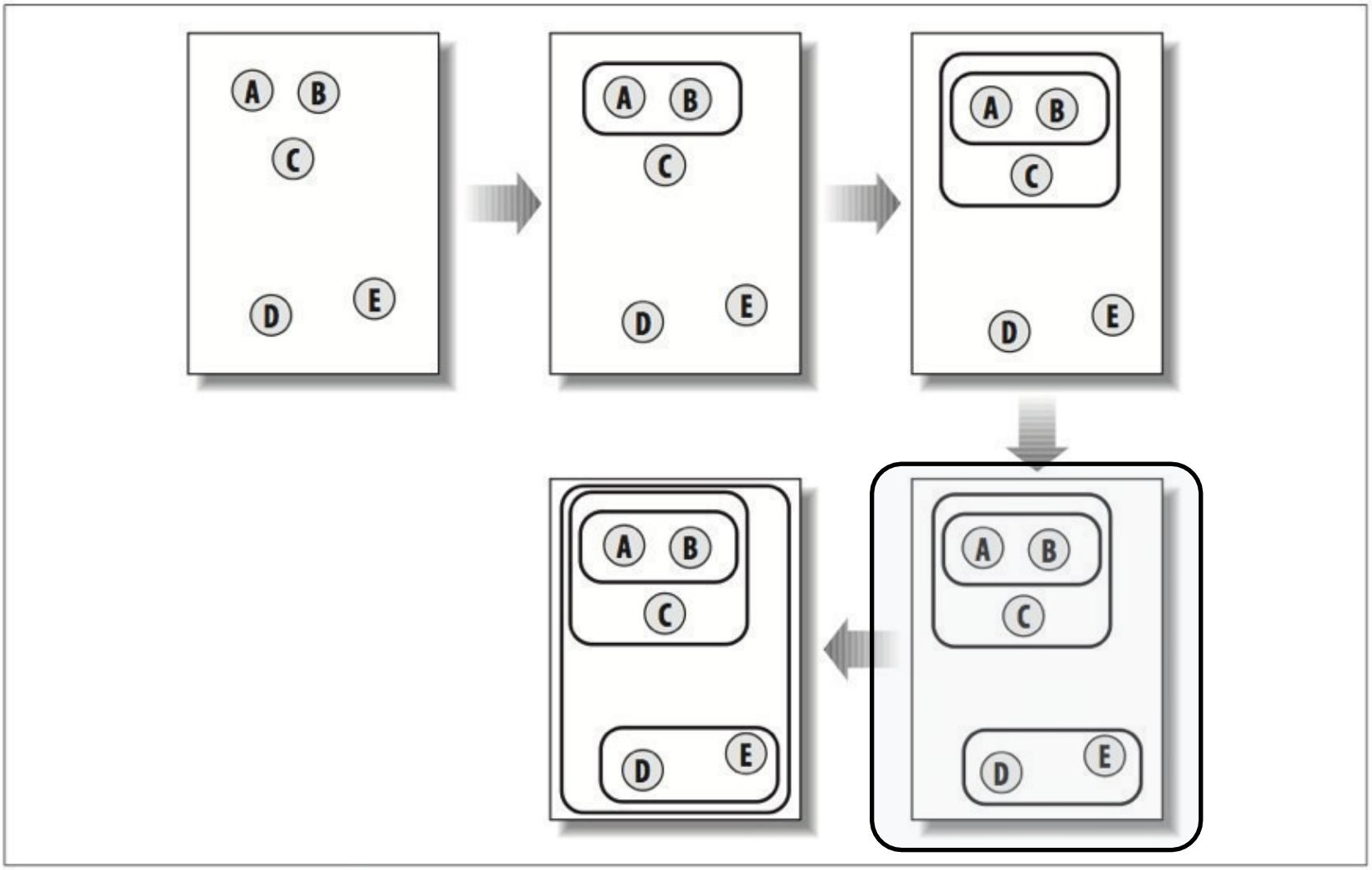

Hierarchical Clustering

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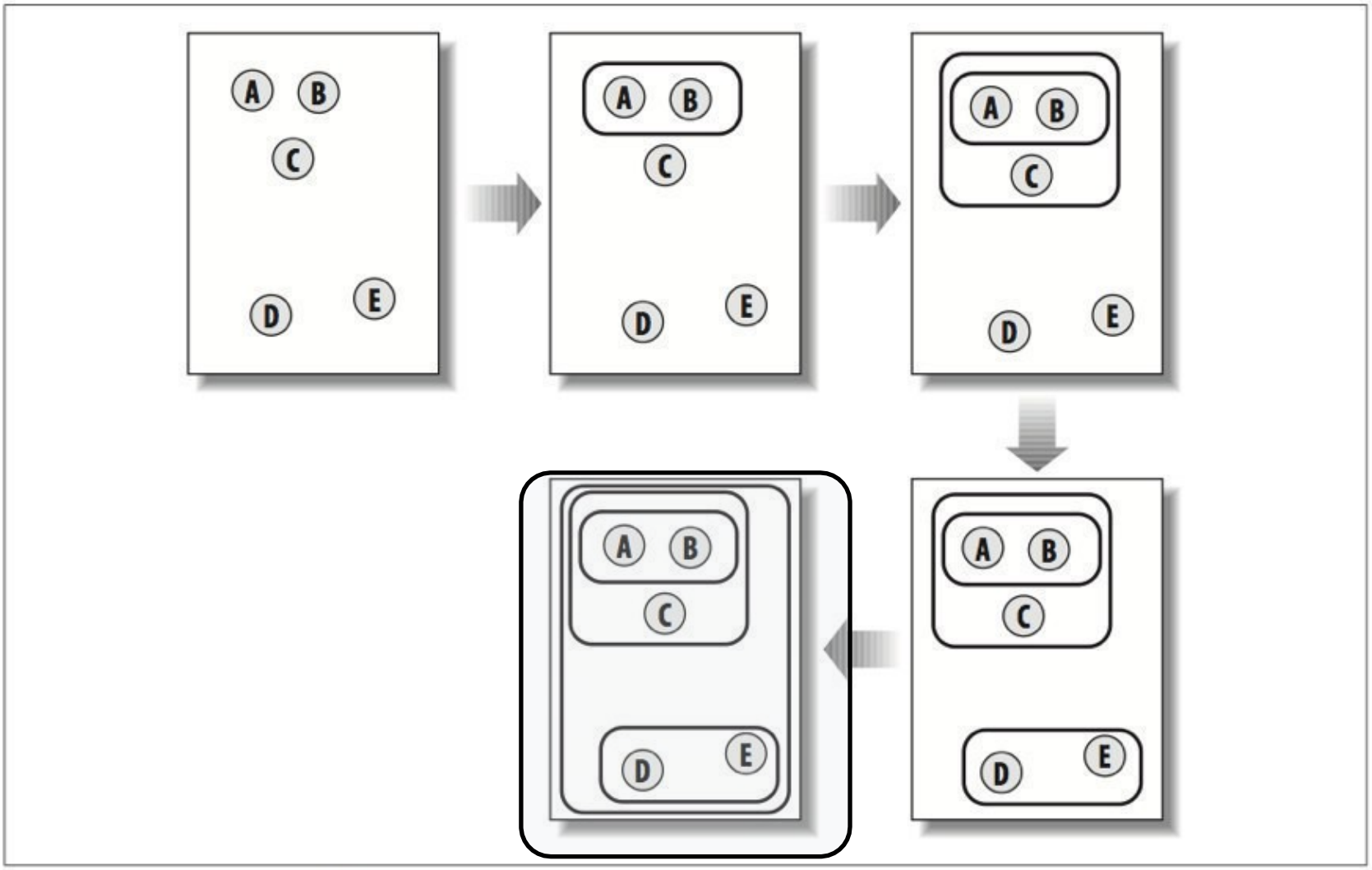

Similarity (closeness)

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- Pearson correlation coefficient.
- Others can be used as well.
  - e.g., Tanimoto (same as Jaccard)

Play with

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- /Week 07/Code folder on LMS contains all the code. Dow
  them into a directory.

```
>>> import clusters
>>> blognames, words, data = clusters.readfile('blogdata.txt')
>>> clust=clusters.hcluster(data)
>>> clusters.printclust(clust, labels = blognames)
```

Visualizing Clusters - Dendograms

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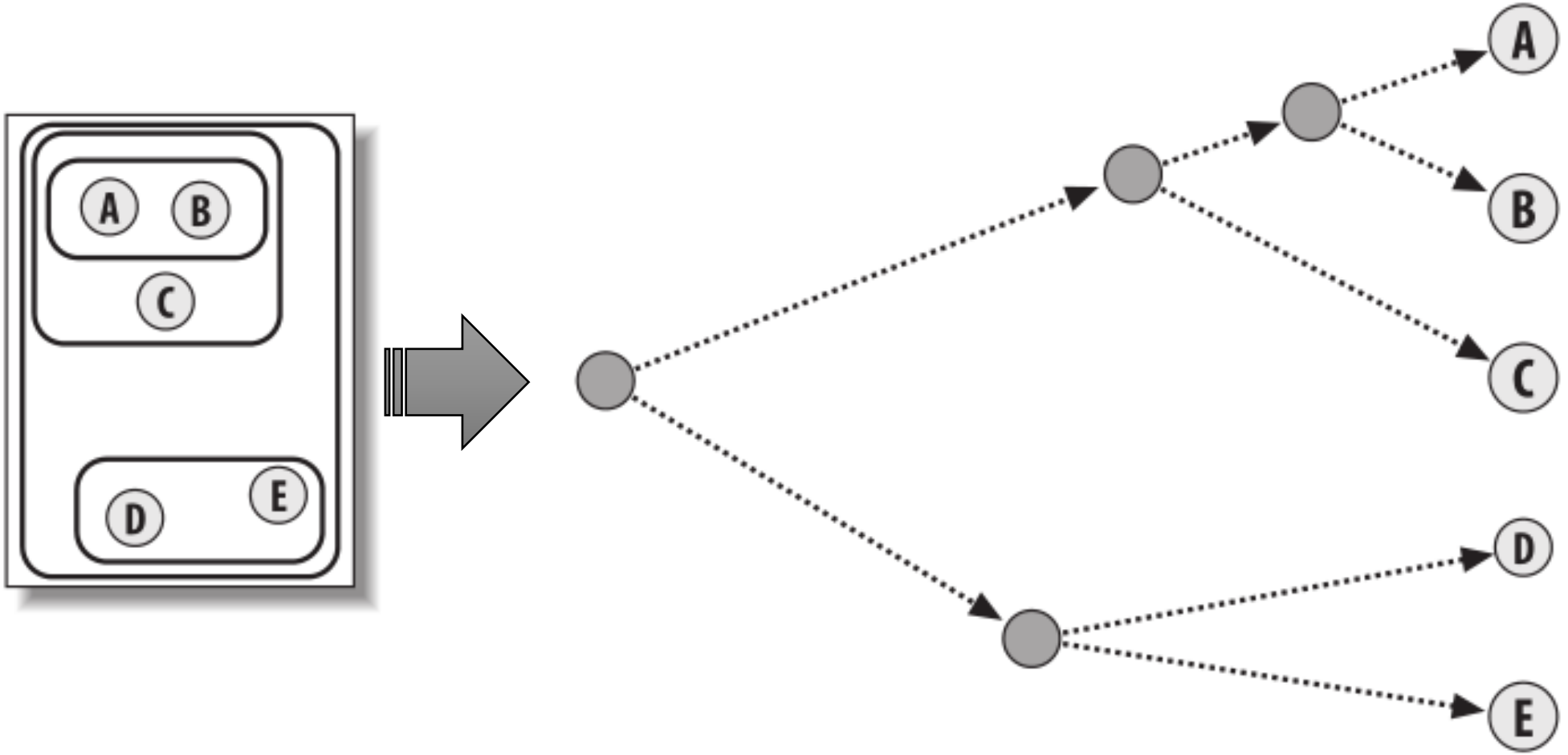

Viewing Clusters - printclust

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```
John Battelle's Searchblog
-
  Search Engine Watch Blog
  -
    Read/WriteWeb
    -
      Official Google Blog
      -
        Search Engine Roundtable
        -
          Google Operating System
          Google Blogoscoped
```

Visualizing Clusters – Drawing Dendograms

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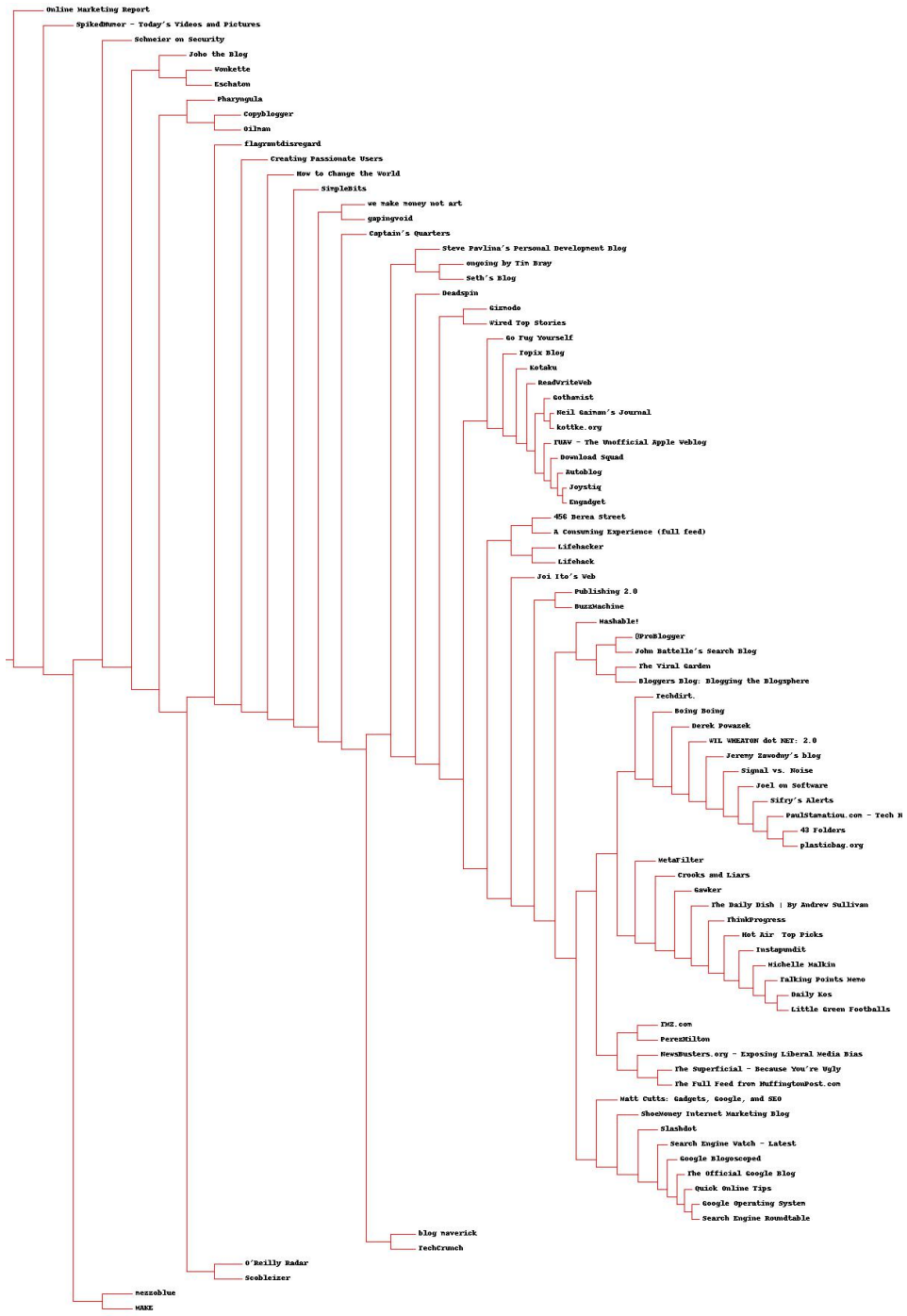
- Install PIL module
  - Follow the instructions posted on LMS
    - /Lectures/Week 07/PIL.Installation.txt

Play with

- /Week 07/Code folder on LMS contains all the code.
- Download them into a directory.

```
>>> import clusters
>>> blognames, words, data = clusters.readfile('blogdata.txt')
>>> clust=clusters.hcluster(data)
>>> clusters.drawdendrogram(clust, blognames, jpeg = ‘cl.jpg')
```


Online Marketing Report
SpikedHumor - Today's Videos and Pictures
Schneier on Security
Joho the Blog
Wonkette
Eschaton
Pharyngula
Copyblogger
Oilman
flagrantdisregard
Creating Passionate Users
How to Change the World
SimpleBits
we make money not art
gapingvoid
Captain's Quarters
Steve Pavlina's Personal Development Blog
ongoing by Tim Bray
Seth's Blog
Deadspin
Gizmodo
Wired Top Stories
Go Fug Yourself
Topix Blog
Kotaku
ReadWriteWeb
Gothamist
Neil Gaiman's Journal
Kottke.org
TUAW - The Unofficial Apple Weblog
Download Squad
Autoblog
Joystiq
Engadget
456 Berea Street
A Consuming Experience (full feed)
Lifehacker
Lifehack
Joi Ito's Web
Publishing 2.0
BuzzMachine
Mashable!
ProBlogger
John Battelle's Search Blog
The Viral Garden
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Boing Boing
Derek Powazek
WIL WHEATON dot NET: 2.0
Jeremy Zawodny's blog
Signal vs. Noise
Joel on Software
Sifry's Alerts
Paulstamatiou.com - Tech N
43 Folders
plasticbag.org
MetaFilter
Crooks and Liars
Gawker
The Daily Dish | By Andrew Sullivan
ThinkProgress
Hot Air Top Picks
Instapundit
Michelle Malkin
Talking Points Memo
Daily Kos
Little Green Footballs
TMZ.com
PerezHilton
NewsBusters.org - Exposing Liberal Media Bias
The Superficial - Because You're Ugly
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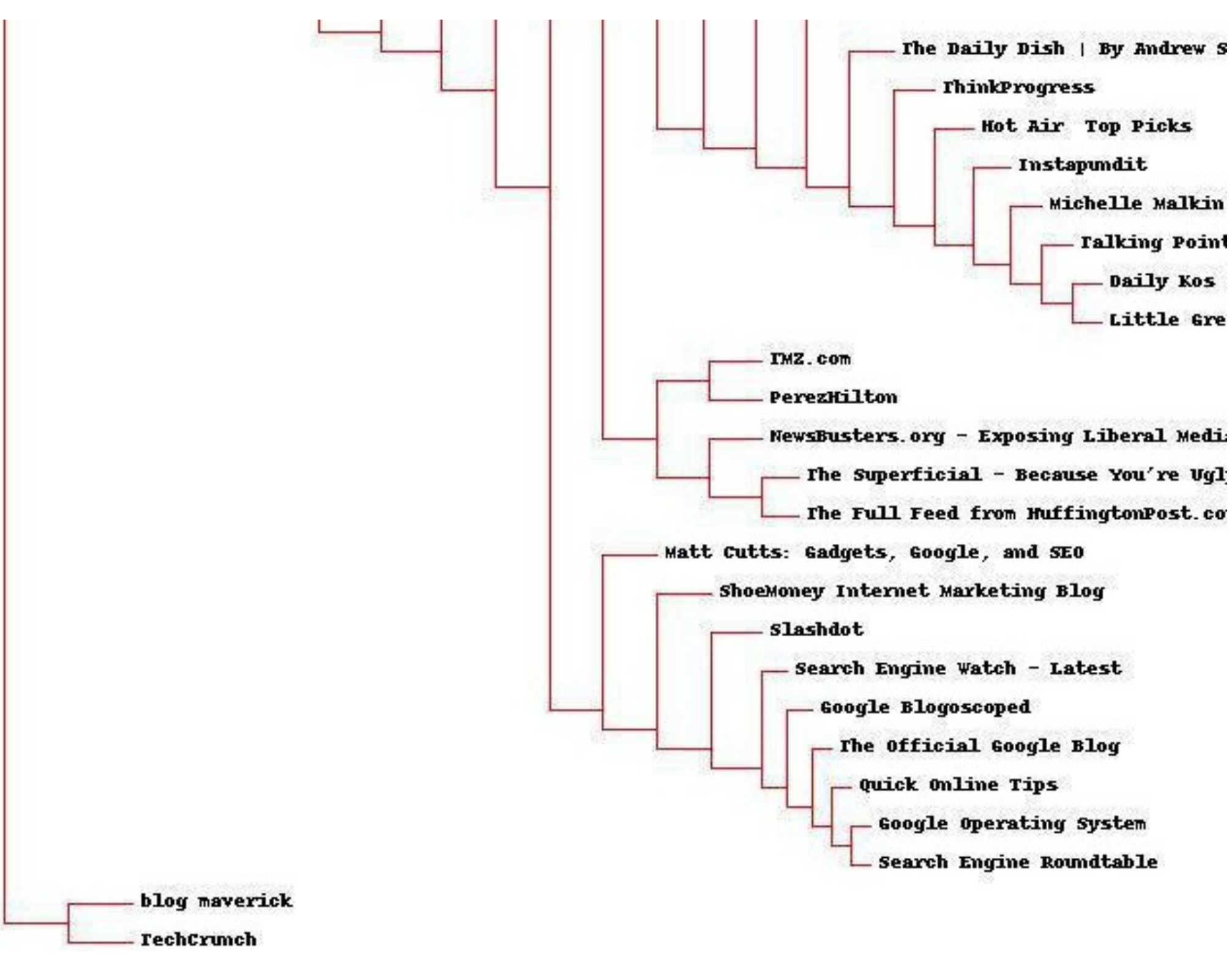
Slashdot
Search Engine Watch - Latest
Google Blogoscoped
The Official Google Blog
Quick Online Tips
Google Operating Systen
Search Engine Roundtable
blog maverick
TechCrunch
O'Reilly Radar
Scobleizer
mezzoblue
MAKE


The Daily Dish | By Andrew S
ThinkProgress
Hot Air Top Picks
Instapundit
Michelle Malkin
Talking Point
Daily Kos
Little Gre
TMZ.com
PerezHilton
NewsBusters.org - Exposing Liberal Media
The Superficial - Because You're Ugly
The Full Feed from HuffingtonPost.com
Matt Cutts: Gadgets, Google, and SEO
ShoeMoney Internet Marketing Blog
Slashdot
Search Engine Watch - Latest
Google Blogoscoped
The Official Google Blog
Quick Online Tips
Google Operating System
Search Engine Roundtable
blog maverick
TechCrunch

Clusters out of hierarchical clustering

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- Each cluster in a hierarchical clustering algorithm is either a point in the tree with two branches, or an endpoint associated with an actual row from the dataset.
- Each cluster also contains data about its location, which is the raw data for the endpoints and the merged data for points.

Implementation details


```
class bicluster:
  def __init__(self,vec,left=None,right=None,distance=0.0,id=None):
    self.left=left
    self.right=right
    self.vec=vec
    self.id=id
    self.distance=distance
```

Clustering - I

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```
def readfile(filename):
  lines=[line for line in file(filename)]

  # First line is the column titles
  colnames=lines[0].strip( ).split('\t')[1:]
  rownames=[]
  data=[]
  for line in lines[1:]:
    p=line.strip( ).split('\t')
    # First column in each row is the rowname
    rownames.append(p[0])
    # The data for this row is the remainder of the row
    data.append([float(x) for x in p[1:]])
  return rownames,colnames,data
```

Clustering - II

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```
def hcluster(rows,distance=pearson):
  distances={}
  currentclustid=-1

  # Clusters are initially just the rows
  clust=[bicluster(rows[i],id=i) for i in range(len(rows))]

  while len(clust)>1:
    lowestpair=(0,1)
    closest=distance(clust[0].vec,clust[1].vec)

    # loop through every pair looking for the smallest distance
    for i in range(len(clust)):
      for j in range(i+1,len(clust)):
        # distances is the cache of distance calculations
        if (clust[i].id,clust[j].id) not in distances:
          distances[(clust[i].id,clust[j].id)]=distance(clust[i].vec,clust[j].vec)

        d=distances[(clust[i].id,clust[j].id)]

        if d<closest:
          closest=d
          lowestpair=(i,j)
```

Clustering - III

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```
    # calculate the average of the two clusters
    mergevec=[
    (clust[lowestpair[0]].vec[i]+clust[lowestpair[1]].vec[i])/2.0
    for i in range(len(clust[0].vec))]

    # create the new cluster
    newcluster=bicluster(mergevec,left=clust[lowestpair[0]],
                         right=clust[lowestpair[1]],
                         distance=closest,id=currentclustid)

    # cluster ids that weren't in the original set are negative
    currentclustid-=1
    del clust[lowestpair[1]]
    del clust[lowestpair[0]]
    clust.append(newcluster)

  return clust[0]
```