

E6893 Big Data Analytics:

Twitter-Based Products / Sales Events Recommendation System

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December 9, 2014

•General Purpose

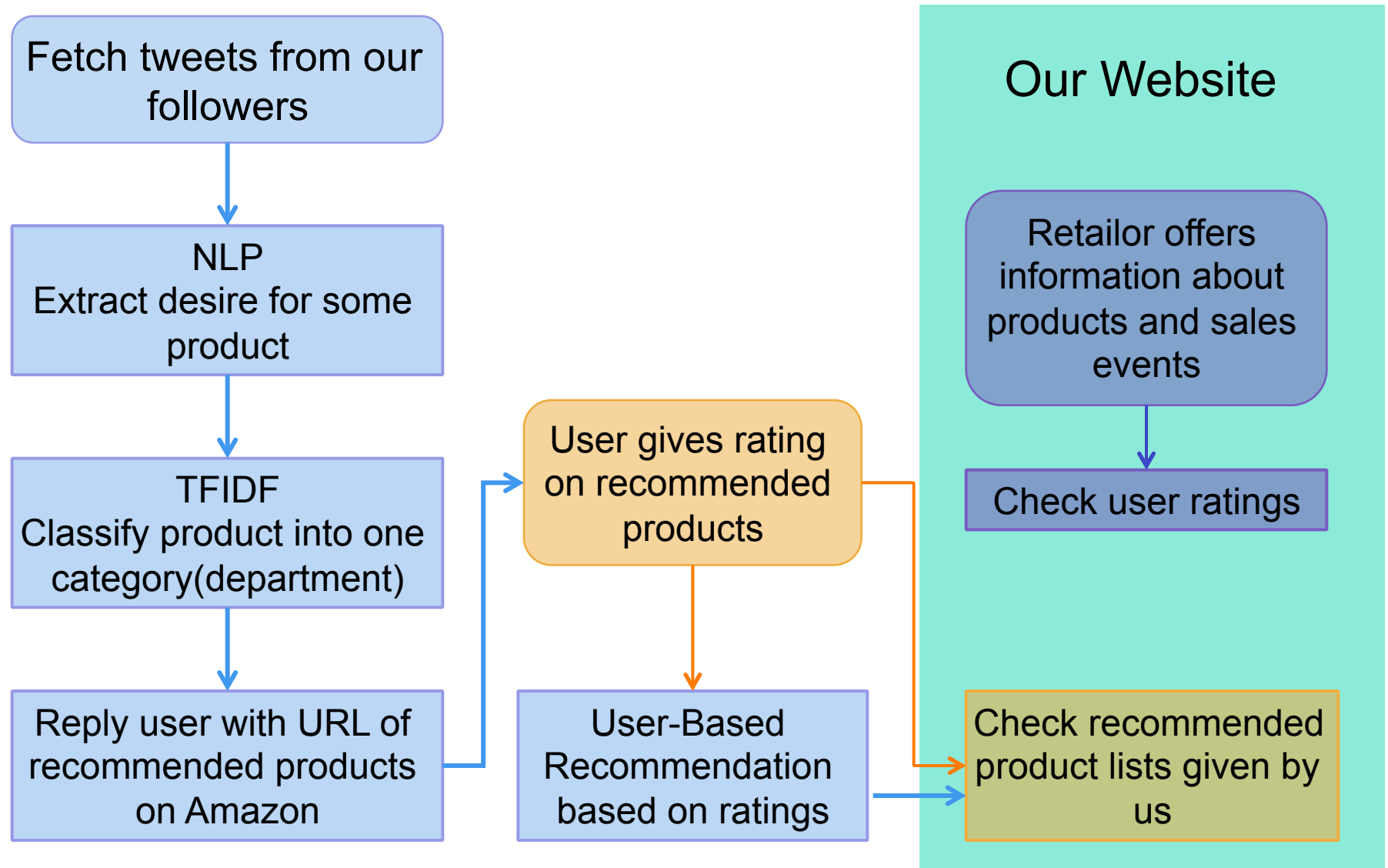
Discover potential purchase demand in social network (Twitter)

Provide a reciprocal platform to benefit retailers and customers

•Dataset

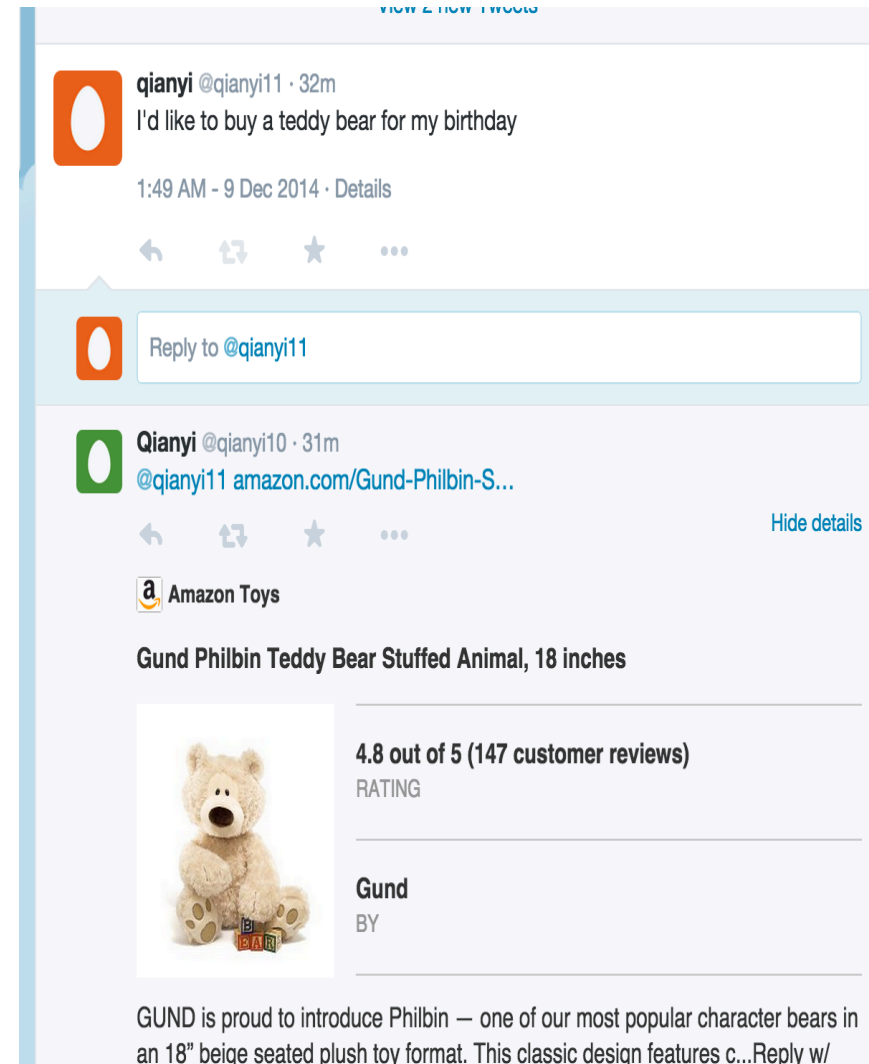
Tweets collected via Twitter API

Web data: Amazon product information, provided by J.McAuley and J. Leskovec. Hidden factors and hidden topics: understanding rating dimensions with review text. RecSys, 2013




Recommendation:

- Fetch tweets from the followers
Using Twitter API
- Detect purchase demand by NLP
and get the product name
- Get the product department by
classification
(TFIDF, Naïve Bayes, MapReduce)
- Query product with department
information on Amazon



- Read the tweet that users respond to our recommendation on twitter
- Implement sentiment algorithm to convert the tweet to rating (MapReduce)
- Store the rating into DB, for further user-based recommendation in our own website app.

Gund Philbin Teddy Bear Stuffed Animal, 18 inches



4.8 out of 5 (147 customer reviews)
RATING

Gund
BY

GUND is proud to introduce Philbin — one of our most popular character bears in an 18" beige seated plush toy format. This classic design features c...Reply w/ #AmazonWishList to add it.

[View on web](#)

1:52 AM - 9 Dec 2014 · Details

 **qianyi** @qianyi11 · 40m
[@qianyi10](#) That bear is so cute, nice present.

← ↻ ★ ⋮

- Twitter Classification/ Short Text Classification
Data set : Define Five Department----Books , Electronics, Clothing Toys,
Manually Tagged tweets, 1000 tweets for each group

Features: TF-IDF weighting

Algorithm: MapReduce, Naïve Bayes

Online Classification: Once we get a response from the user and the response is positive, we add the tweet that shows the desire to our training set.

Test Accuracy 79%

```
Mapper<text, DoubleWritable> {  
    for each word k in text  
        if (negativeSet.contains(k))  
            negativeCount = negativeCount + 1;  
        if (positiveSet.contains(k)){  
            positiveCount = positiveCount + 1;  
  
    rating = (positiveCount - negativeCount) / (positiveCount + negativeCount);  
    word.set(productName);  
    context.write(word, new DoubleWritable(rating));
```

```
Reduce(Text key, Iterable<DoubleWritable> values, Context context {  
    int sum = 0;  
    for (DoubleWritable val : values) {  
        sum += val.get();  
    }  
    context.write(key, new DoubleWritable(sum));  
  
    }  
  
}
```

common trunk]
trunk]
-common trunk]
-common trunk]
ion trunk]

```
165 job.setOutputKeyClass(Text.class);
166 job.setOutputValueClass(DoubleWritable.class);
167
168 job.setMapperClass(Map.class);
```

Problems Javadoc Declaration Console

<terminated> Sentiment [Java Application] /Library/Java/JavaVirtualMachines/jdk1.7.0_40.jdk/Con

14/12/09 11:37:08 INFO mapred.MapTask: data buffer = 79691776/99614720

14/12/09 11:37:08 INFO mapred.MapTask: record buffer = 262144/327680

That

bear

is

14/12/09 11:37:0

so

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nice

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present.

1.0

1.0

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14/12/09 11:37:0

14/12/09 11:37:0

14/12/09 11:37:0

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part-r-00000
teddy bear 0.9980019980019981

Query Amazon by fetched tweets

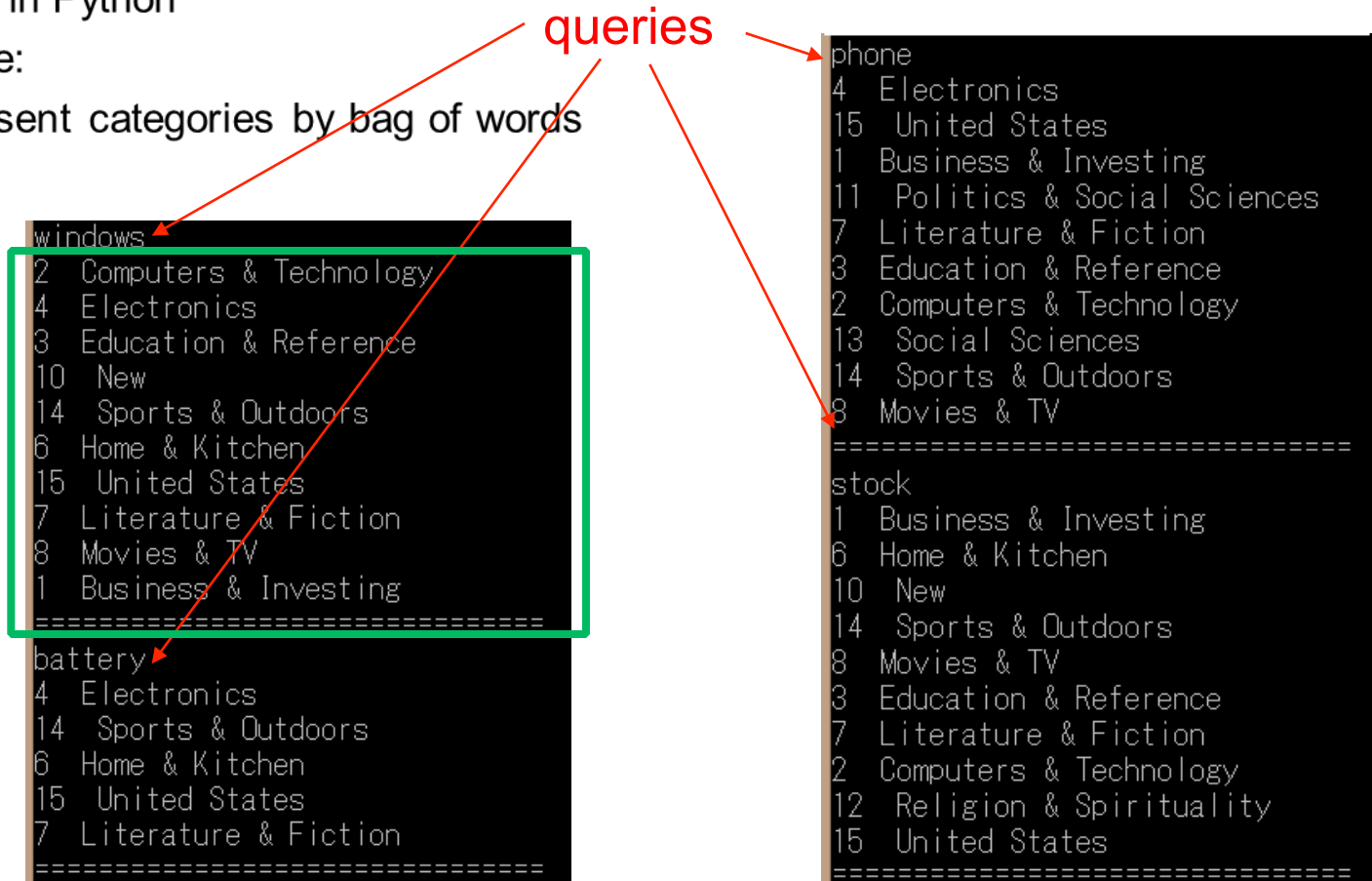
- Amazon API: Given product key word and department, return the best-matched products

What categories are queries in?

- Category information is required when using Amazon API
- Precise category information can improve the performance of retrieving products (ratings, related reviews ...)

- $tf_{i,j} = \frac{n_{i,j}}{\sum_k n_{k,j}}$ $idf_i = \log \frac{|D|}{|\{j:t_i \in d_j\}|}$
- Randomly choose 100,000 product descriptions to compute TF-IDF and rank by categories
- Implement in Python
- Further use:
 - Represent categories by bag of words

Rank of
categories



- User-Based Recommendation
 - Mahout generic user-based recommender
 - Loglikelihood Similarity/Nearest User Neighborhood
 - Content-based recommendation with preference inferring
 - Gender-based preference

Front part: AngularJS, Bootstrap

Authentication of user: OAuth2.0 by Twitter

Restful Web Service: JAX-RS

Database: RDS by AWS

Container: Tomcat

Units

User:

1. search products/events by key words
2. get recommendations based on like/review history and twitter timeline (response to recommendation in Twitter app)

Retailer:

1. create account/login
2. post/update/retrieve/delete products/events
3. get feedback based on users review
4. change personal information

Products/Sales Recommendation System

Home

Customer

Retailer

Welcome to Recommend2U!

Online Product/Events Recommendation System

User Login 

 Sign in with Twitter

Retailer Login 

Name

Please enter your ID here...

Password

Please enter your password here...

 Retailer Log in



Authorize Recommend2U to use your account?

Sign In

Cancel

This application will be able to:

- Read Tweets from your timeline.
- See who you follow, and follow new people.
- Update your profile.
- Post Tweets for you.

Will not be able to:

- Access your direct messages.
- See your Twitter password.



Recommend2U

127.0.0.1:8080







A free reciprocal platform for retailers and users. Post your product and events! Get your recommendations!

You can revoke access to any application at any time from the [Applications tab](#) of your Settings page.














By authorizing an application you continue to operate under [Twitter's Terms of Service](#). In particular, some usage information will be shared back with Twitter. For more, see our [Privacy Policy](#).

Welcome to Recommend2U



Recommendation List

Product ID	Name	Description	Category	Score	Price	Retailer	like	write a review!
B000K5JBZU	Optimum Care Anti-Breakage Therapy Moisture Replenish Cream Hairdress	Optimum Care Anti-Breakage Therapy features Oleo Ceramide Technology with reparative ceramide, strengthening panthenol and protein. It's proven to penetrate chemically relaxed, natural or color treated hair instantly, rebuilding damaged internal structure for more than 100% stronger hair after just 1 use. Moisture Replenish Cream Hairdress infuses moisture into fragile hair, shielding it with a long lasting barrier against dryness for increased manageability and healthy looking style.	Home	4	30	host	 like	 write a review
B00064C0IU	Oscar Eau de Toilette for Women by Oscar de La Renta	Introduced in 2009, this perfume has a distinct and excellent fragrance. When applying any fragrance please consider that there are several factors which can affect the natural smell of your skin and, in turn, the way a scent smells on you. For instance, your mood, stress level, age, body chemistry, diet, and current medications may all alter the scents you wear. Similarly, factor such as dry or oily skin can even affect the amount of time a fragrance will last after being applied	Home	4	24.19	host	 like	 write a review
B000G35MR2	Liz Claiborne Curve Eau de Toilette Spray	NA	Home	4.5	14.99	host	 like	 write a review





Product Posted

Product ID	Name	Description	Category	Score	Price	Retailer	update	delete
B0000630MB	Sassy Baby Warming Dish, Colors May Vary	Sassy baby Warming Dish has a spout to add warm water under plate to keep food warm during meal time. Can be used as a suctioned dish, or separately as a large bowl. Comes in assorted colors and is dishwasher safe. The Warming Dish offers an easy way to keep baby's food warm without cords or plugs. Add warm water through spout to keep food warm during mealtime. Warming dish can be used as a sectioned dish or separately for a large bowl. Suction base keeps Warming Dish securely in place.	Home	5	10	host	 update	 delete
B00064C0IU	Oscar Eau de Toilette for Women by Oscar de La Renta	Introduced in 2009, this perfume has a distinct and excellent fragrance. When applying any fragrance please consider that there are several factors which can affect the natural smell of your skin and, in turn, the way a scent smells on you. For instance, your mood, stress level, age, body chemistry, diet, and current medications may all alter the scents you wear. Similarly, factor such as dry or oily skin can even affect the amount of time a fragrance will last after being applied	Home	4	24.19	host	 update	 delete
B000FKGRT8	Artec Textureline Smoothing Serum, 8.4-Ounce Pump (Pack of 2)	Artec Textureline Smooth smoothing serum.	Home	5	25	host	 update	 delete
B000G35MR2	Liz Claiborne Curve Eau de Toilette Spray	NA	Home	4.5	14.99	host	 update	 delete
B000H5WLXM	ChildProTech #338 Door Knob Covers	Door Knob Covers Easy To Install. 3 Each (Carded)	Home	4.5	3.5	host	 update	 delete
B000K5JBZU	Optimum Care Anti-Breakage Therapy Moisture Replenish Cream Hairdress	Optimum Care Anti-Breakage Therapy features Oleo Ceramide Technology with reparative ceramide, strengthening panthenol and protein. It's proven to penetrate chemically relaxed, natural or color treated hair instantly, rebuilding damaged internal structure for more than 100% stronger hair after just 1 use. Moisture Replenish Cream Hairdress infuses moisture into fragile hair, shielding it with a long lasting barrier against dryness for increased manageability and healthy looking style.	Home	4	30	host	 update	 delete
B000MATPVI	Swazi - Picture Frame	NA	Home	3.5	6.71	host	 update	 delete

Events Posted

Event ID	Name	Category	Description	Location	Retailer	update	delete
0001	Pono by Joan Goodman sample sale	Clothing	Stock up on horn and resin fashion jewelry at this blowout sale. Shop locally designed baubles marked up to 80 percent off retail. From Italian jewel-toned sculpted resin bangles (\$20, were \$50) to chunky acid-tone necklaces (were \$300, now \$75), these jewels will add a bright pop of color to your winter wardrobe.	PONO sale 347 W 36th St , between Eighth and Ninth Aves, suite 405 , 10018	host	 update	 delete

Welcome to Recommend2U

-  Post Products/Events
-  Post History
-  Profile Management
-  Feedback

Post Product

Name:

Description:

Category:

Price:

Retailer:

Submit

Post Event

Name:

Category:


Description:

Location:

Retailer:

Submit

Welcome to Recommend2U

 [Post Products/Events](#)

 [Post History](#)

 [Profile Management](#)

 [Feedback](#)

Your Name (Can not
change):

Your Password:

- Combine KNN and Naïve Bayes to improve classification accuracy
- Employ perception algorithm to analyze the NLP result
- Implement Event recommendation by location of users
- Feedback to retailers in web app

Thanks!