Twitter as a Corpus for Sentiment Analysis and Opinion Mining

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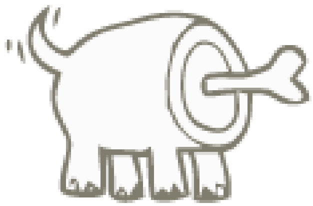
Microblogging

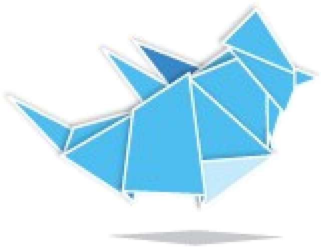
Microblogging = posting small blog entries

Eg.: “@alex: I'm presenting now my paper at LREC'10”

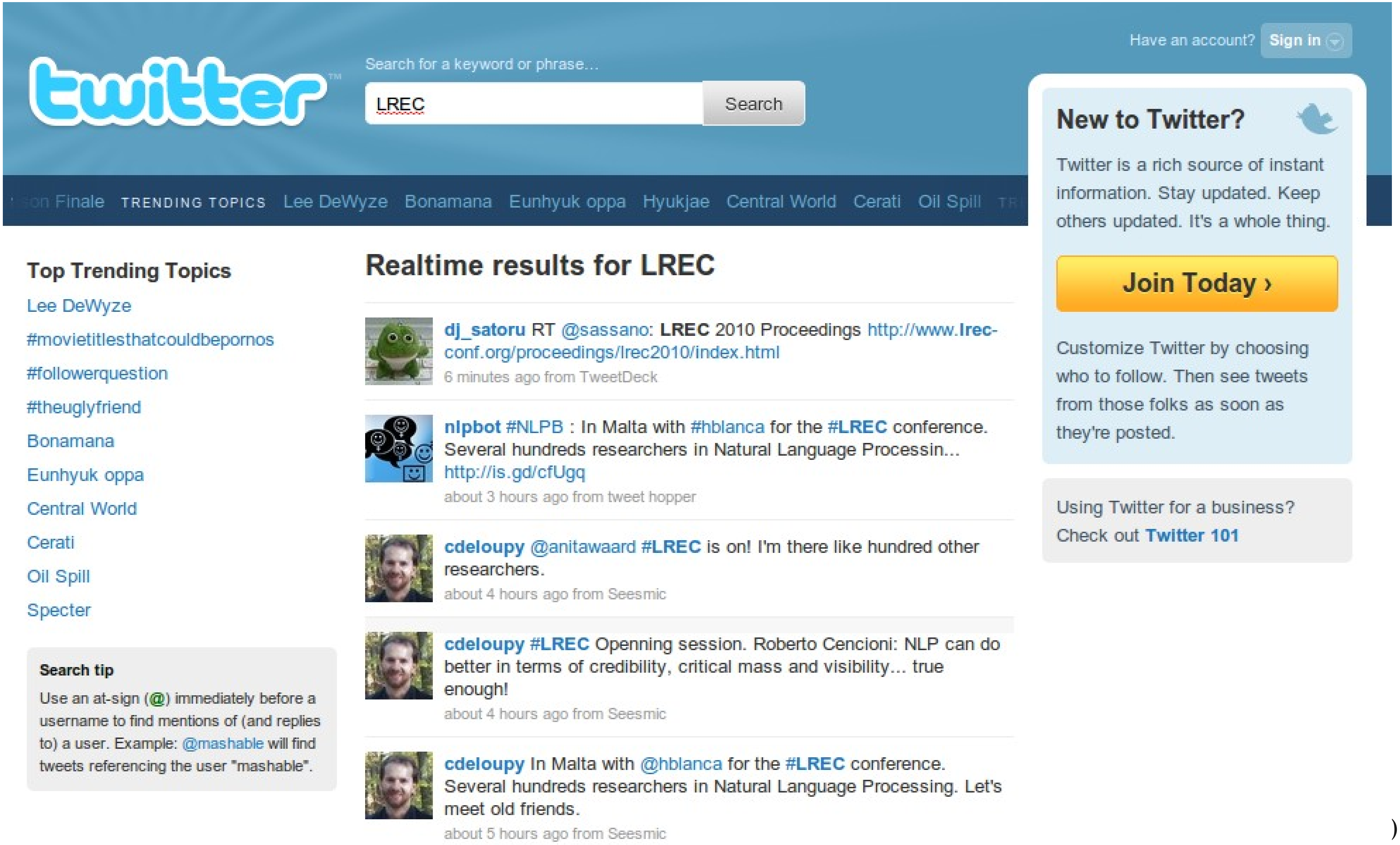
Platforms:

- Twitter
- Tumblr
- Plurk





Twitter



Have an account? Sign in

Search for a keyword or phrase...

LREC

Search

son Finale TRENDING TOPICS Lee DeWyze Bonamana Eunhyuk oppa Hyukjae Central World Cerati Oil Spill TR

Top Trending Topics

- Lee DeWyze
- #movietitlesthatcouldbepornos
- #followerquestion
- #theuglyfriend
- Bonamana
- Eunhyuk oppa
- Central World
- Cerati
- Oil Spill
- Specter

Search tip

Use an at-sign (@) immediately before a username to find mentions of (and replies to) a user. Example: @mashable will find tweets referencing the user "mashable".

Realtime results for LREC

dj_satoru RT @sassano: **LREC** 2010 Proceedings http://www.**lrec**-conf.org/proceedings/lrec2010/index.html
6 minutes ago from TweetDeck

nlpbot #NLPB : In Malta with #hblanca for the **#LREC** conference. Several hundreds researchers in Natural Language Processin... http://is.gd/cfUgq
about 3 hours ago from tweet hopper

cdeloupy @anitawaard **#LREC** is on! I'm there like hundred other researchers.
about 4 hours ago from Seesmic

cdeloupy **#LREC** Openning session. Roberto Cencioni: NLP can do better in terms of credibility, critical mass and visibility... true enough!
about 4 hours ago from Seesmic

cdeloupy In Malta with @hblanca for the **#LREC** conference. Several hundreds researchers in Natural Language Processing. Let's meet old friends.
about 5 hours ago from Seesmic

New to Twitter?

Twitter is a rich source of instant information. Stay updated. Keep others updated. It's a whole thing.

Join Today ›

Customize Twitter by choosing who to follow. Then see tweets from those folks as soon as they're posted.

Using Twitter for a business? Check out **Twitter 101**

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Twitter

Twitter – social network for publishing short messages (tweets)

1 tweet contains:

- maximum: 140 character
- in average: 1 sentence

More than 1 billion tweets per month

Twitter as a Corpus for Sentiment Analysis and Opinion Mining (A. Pak and P. Paroubek)

Twitter for opinion mining

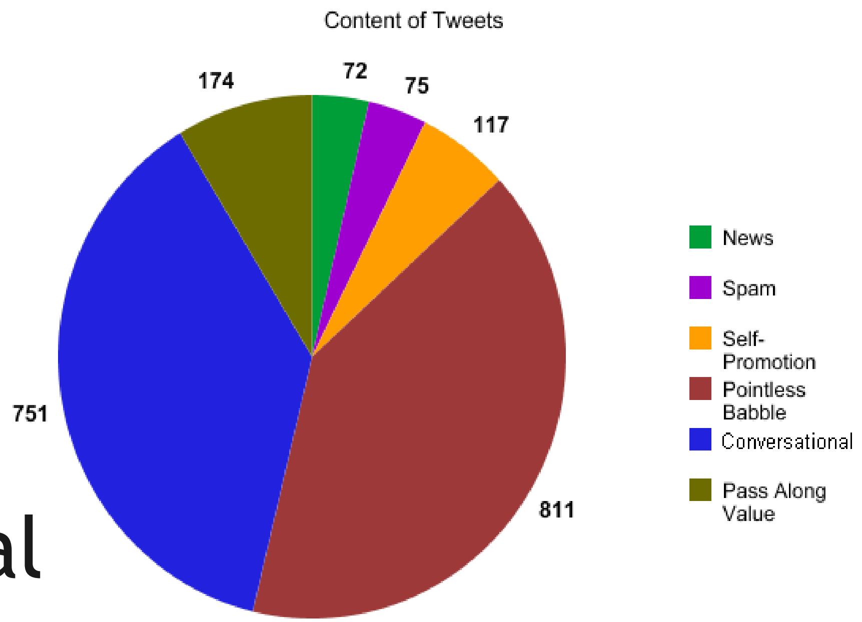
People are expressing their opinions in tweets

Eg.: “CelineBG: @itsRyanButler u should come to Malta (europe) it's below Italy..we have sun nearly all year round =) we have amazing beaches =) follow me”

Twitter is multilingual

More than 14 billion tweets

Twitter API for data retrieval



Kelly, Ryan, ed. (2009-08-12), "Twitter Study - August 2009" (PDF), Twitter Study Reveals Interesting ResultsAbout Usage, San Antonio, Texas: Pear Analytics. http://www.pearanalytics.com/wp-content/uploads/2009/08/Twitter-Study-August-2009.pdf

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Corpus collection

Use emoticons as noisy sentiment labels

Positive tweets with :) =) :D

@mia_jones oh lovely! I'm heading to Malta & Italy next week!! Can't wait :)

Negative tweets with :(:'(;(

Supposed to be flying tonight, now stuck in Malta until Thursday. Homesick :(

Use newspapers' tweets for neutral texts

@nytimes: Iron Man Defeats Robin Hood at North American Box Office

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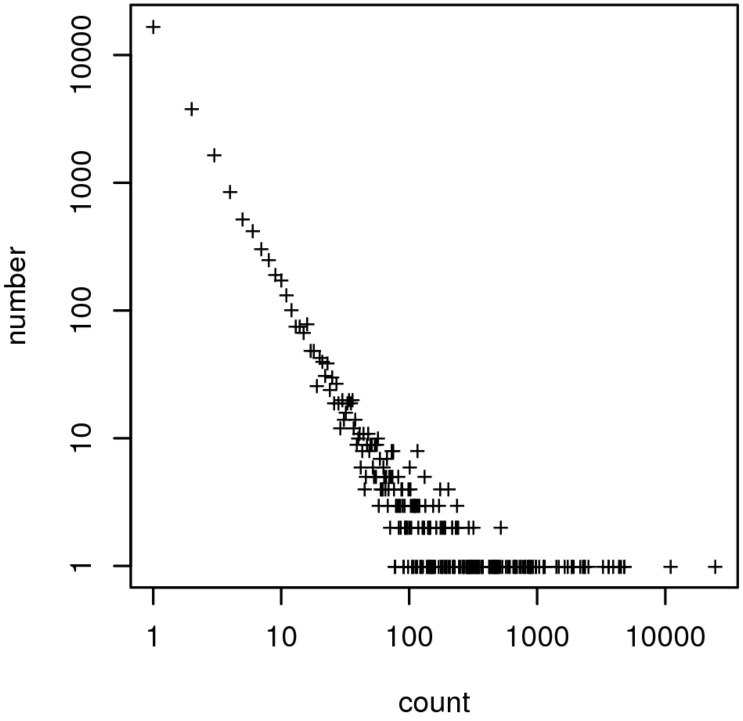
Corpus analysis

Collected 300'000 positive, negative and neutral tweets

Distribution of word frequencies is Zipfian

Use TreeTagger for POS tagging



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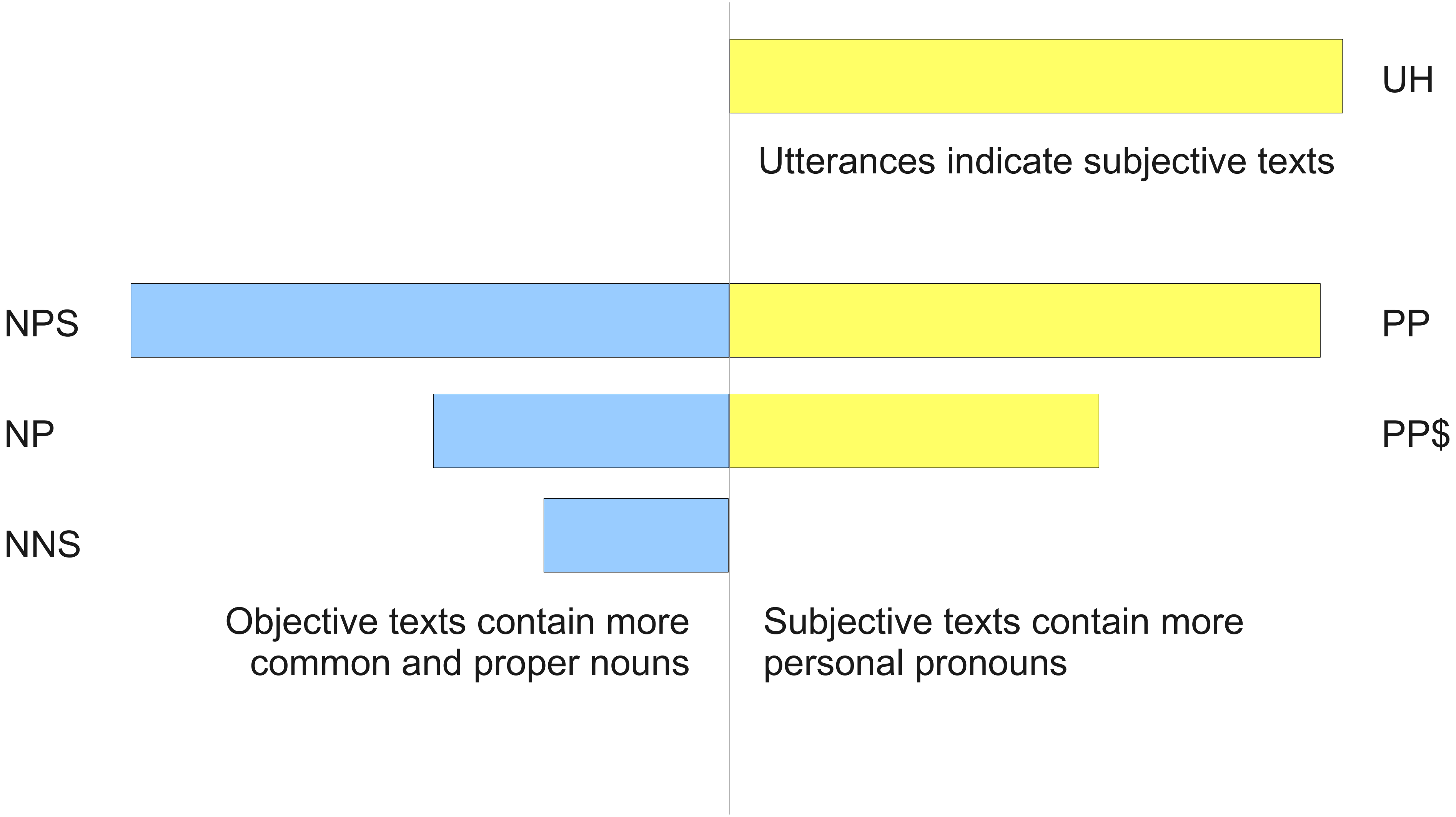
Objective vs. subjective tweets



Utterances indicate subjective texts

Objective texts contain more common and proper nouns

Subjective texts contain more personal pronouns

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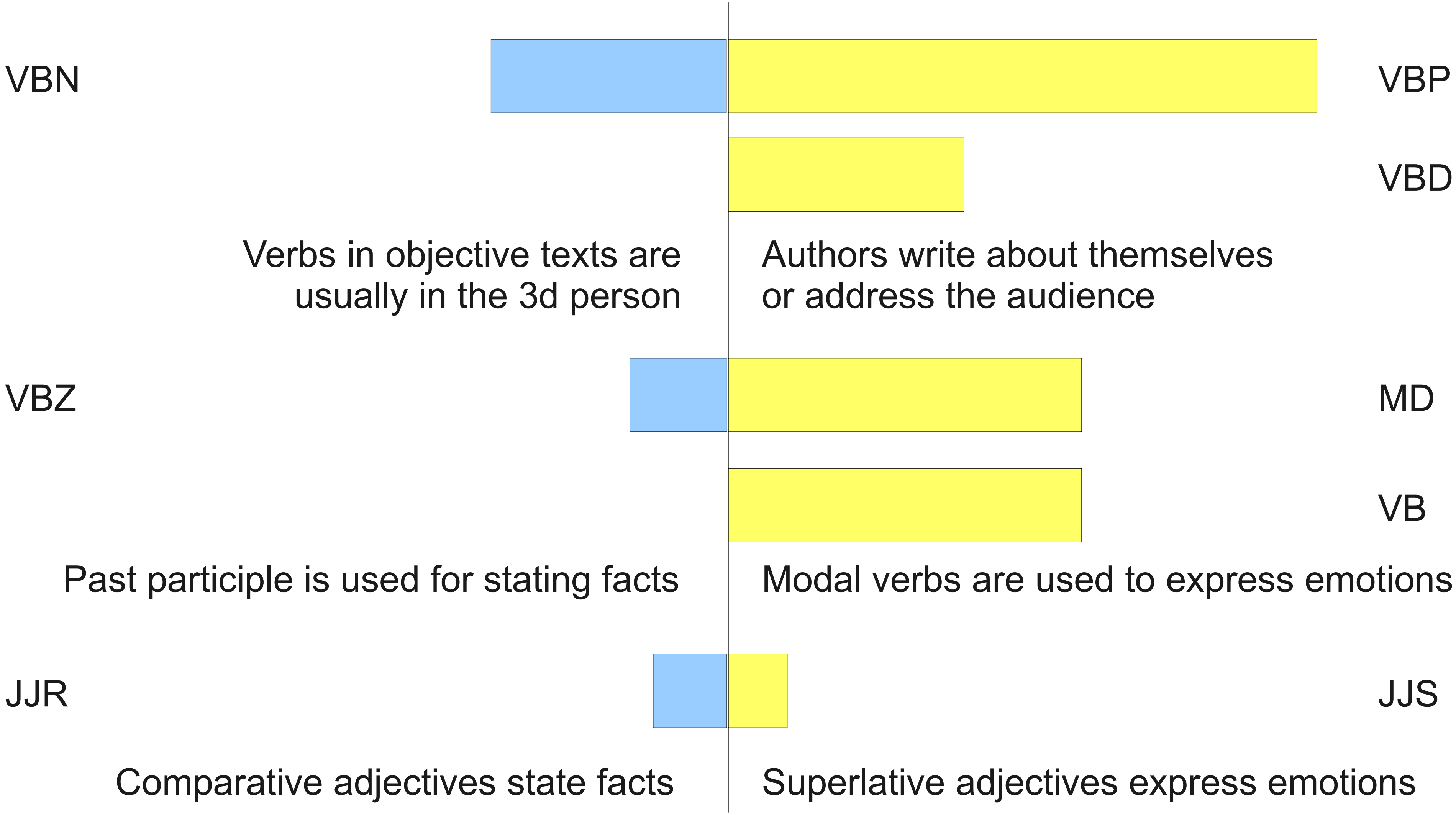
Objective vs. subjective tweets



Verbs in objective texts are usually in the 3d person

Authors write about themselves or address the audience

Past participle is used for stating facts

Modal verbs are used to express emotions

Comparative adjectives state facts

Superlative adjectives express emotions

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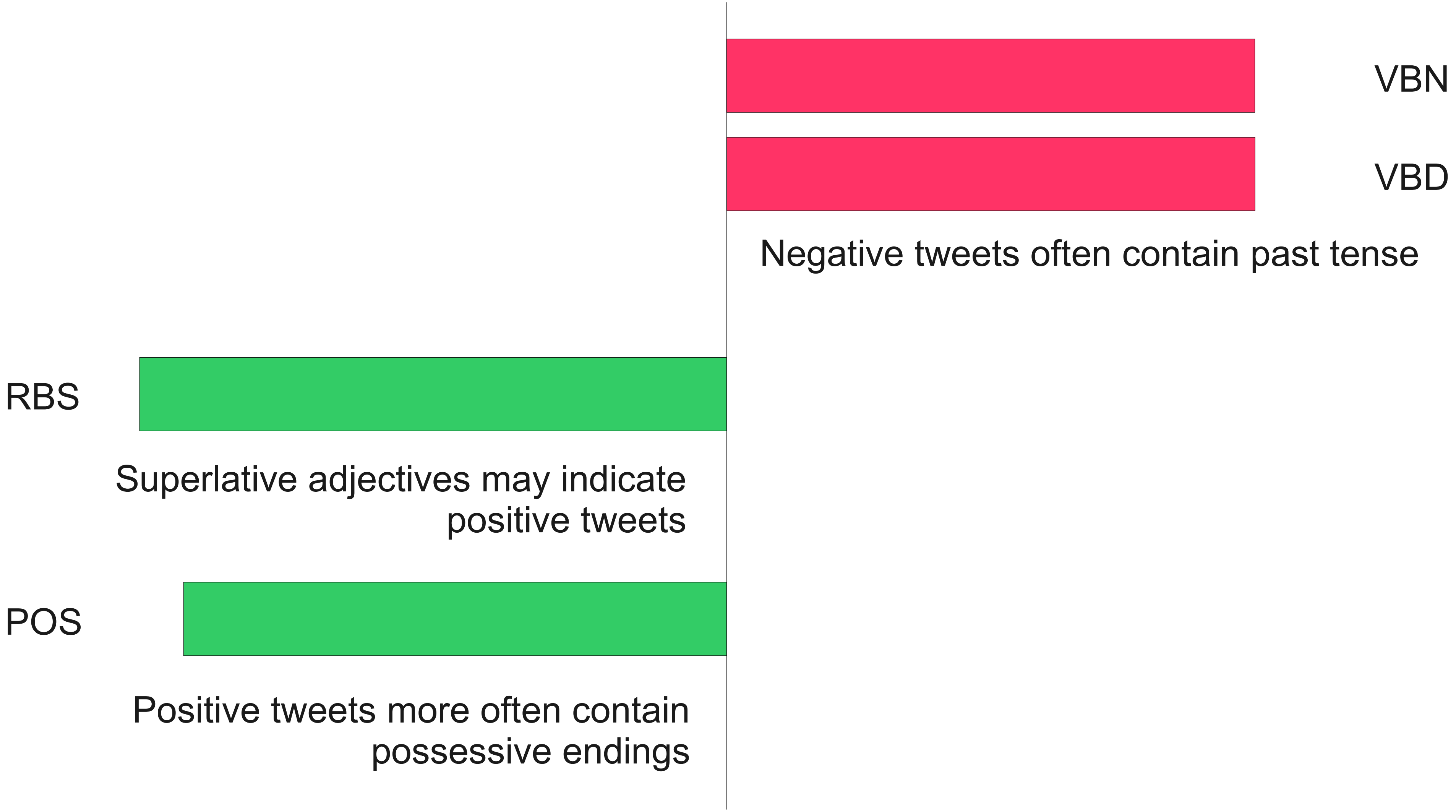
Positive vs. negative tweets



Negative tweets often contain past tense

Superlative adjectives may indicate positive tweets

Positive tweets more often contain possessive endings

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Building a classifier

Use the corpus to train a sentiment classifier

Use Naïve Bayes classifier

2 types of features: n-grams and POS

Bigrams showed the best performance

Handle negations by attaching negation particle

Eg.: I do not like fish: I do+not, do+not like, not+like fish

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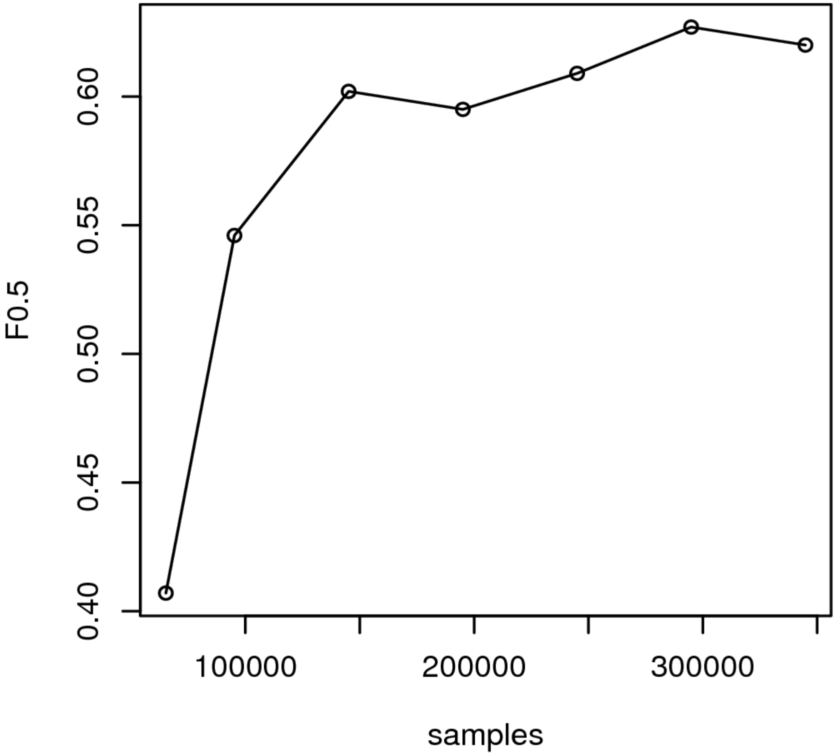
Building a classifier

Use hand annotated tweets for evaluation:

Positive: 108
Negative: 75
Neutral: 33
Total: 216



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Increasing accuracy

Classify tweets with high confidence of precision

Other tweets are left as “undecided”

“decision” = ratio of classified tweets

Select n-grams with high salience (ignore n-grams with same frequency in all three sets)

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Increasing accuracy

N-gram	Salience
So sad	0.975
Miss my	0.972
So sorry	0.962
Love your	0.961
I'm sorry	0.96
Sad I	0.959
I hate	0.959
Lost my	0.959
Have great	0.958

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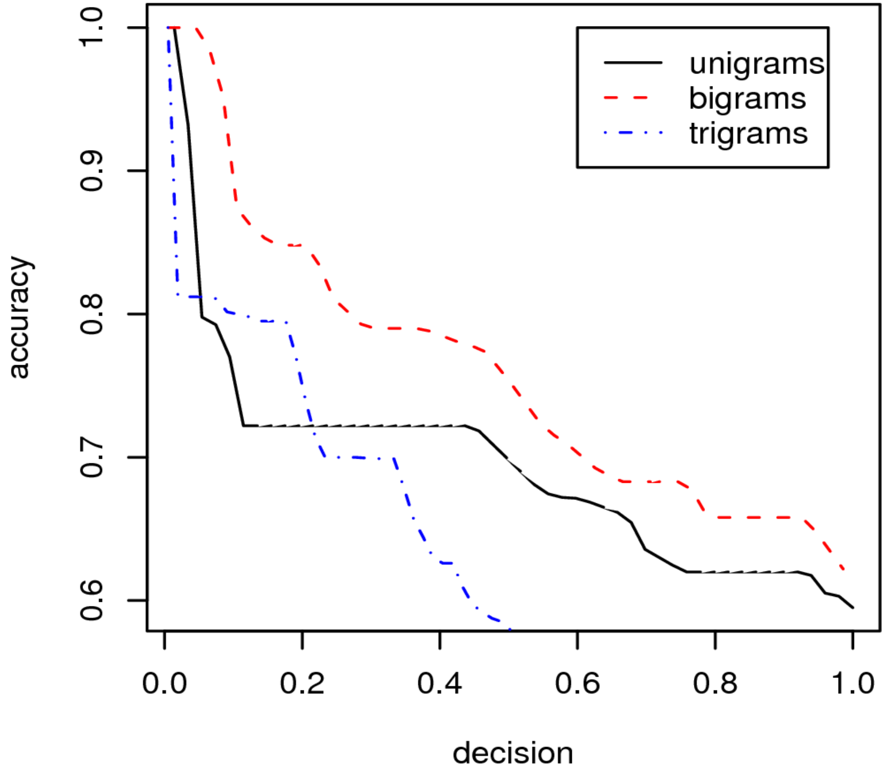
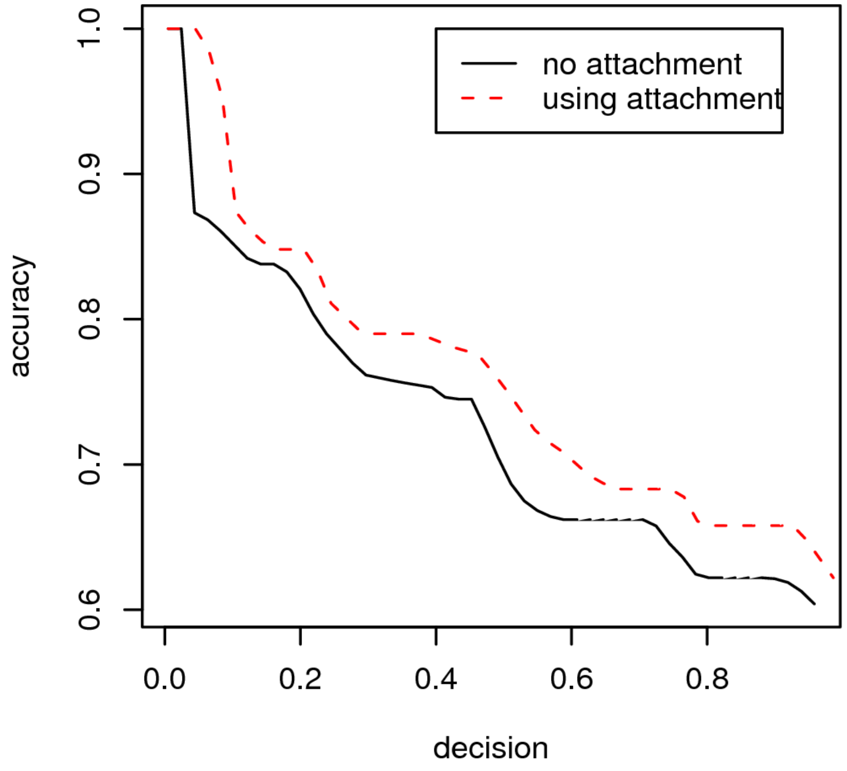
Results



Comparison of n-gram order



Impact of negation attachment

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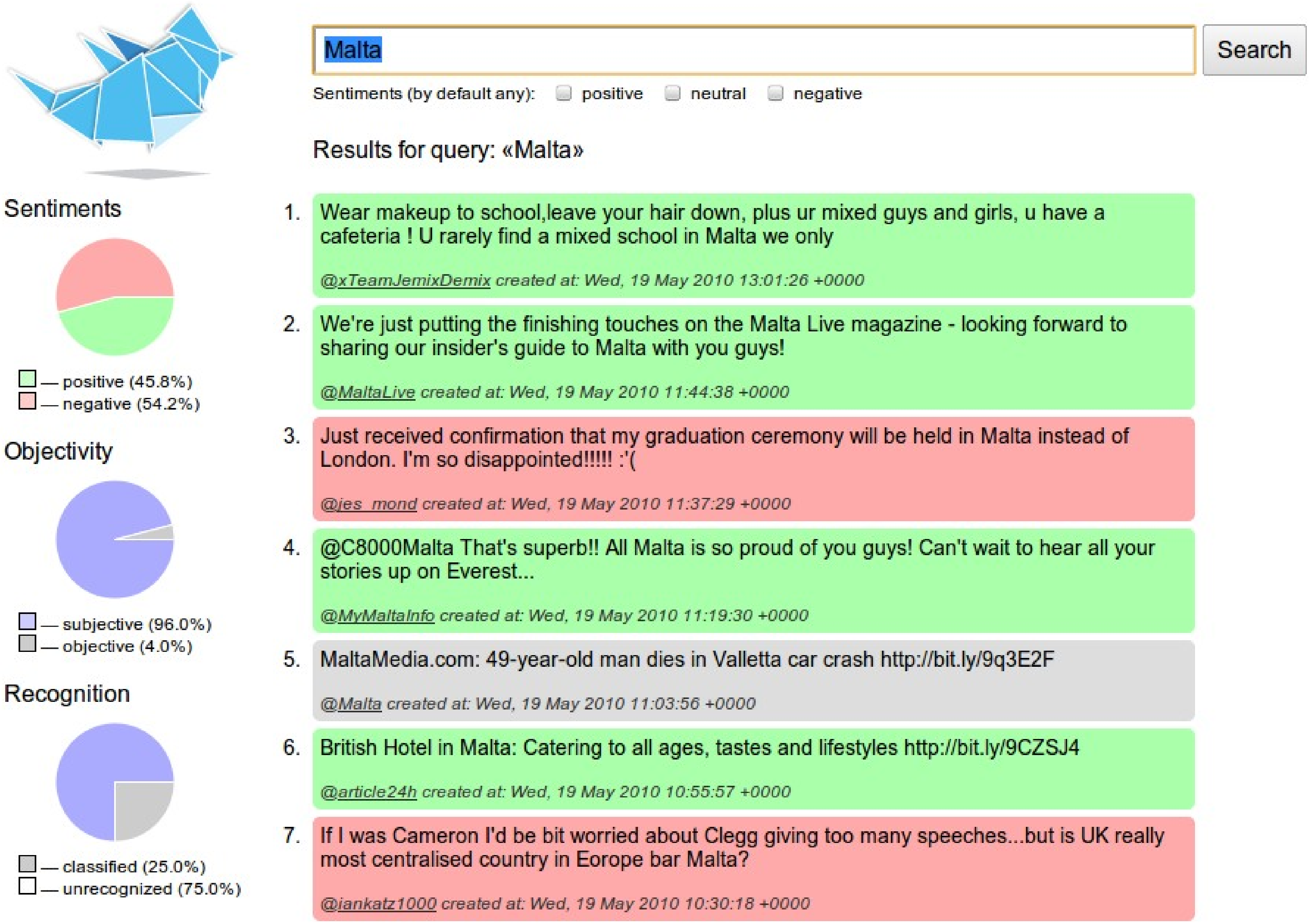
Prototype



Malta

Search

Sentiments (by default any): □ positive □ neutral □ negative

Sentiments

🟩 — positive (45.8%)
🟥 — negative (54.2%)

Objectivity

🟪 — subjective (96.0%)
⬜ — objective (4.0%)

Recognition

⬜ — classified (25.0%)
□ — unrecognized (75.0%)

Results for query: «Malta»

1. Wear makeup to school,leave your hair down, plus ur mixed guys and girls, u have a cafeteria ! U rarely find a mixed school in Malta we only

   @xTeamJemixDemix created at: Wed, 19 May 2010 13:01:26 +0000

2. We're just putting the finishing touches on the Malta Live magazine - looking forward to sharing our insider's guide to Malta with you guys!

   @MaltaLive created at: Wed, 19 May 2010 11:44:38 +0000

3. Just received confirmation that my graduation ceremony will be held in Malta instead of London. I'm so disappointed!!!!! :'(

   @jes_mond created at: Wed, 19 May 2010 11:37:29 +0000

4. @C8000Malta That's superb!! All Malta is so proud of you guys! Can't wait to hear all your stories up on Everest...

   @MyMaltaInfo created at: Wed, 19 May 2010 11:19:30 +0000

5. MaltaMedia.com: 49-year-old man dies in Valletta car crash http://bit.ly/9q3E2F

   @Malta created at: Wed, 19 May 2010 11:03:56 +0000

6. British Hotel in Malta: Catering to all ages, tastes and lifestyles http://bit.ly/9CZSJ4

   @article24h created at: Wed, 19 May 2010 10:55:57 +0000

7. If I was Cameron I'd be bit worried about Clegg giving too many speeches...but is UK really most centralised country in Europe bar Malta?

   @iankatz1000 created at: Wed, 19 May 2010 10:30:18 +0000

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Conclusion

Twitter can be used as a sentiment-labeled corpus

Naive-Bayes with bigram and POS features can perform a precise sentiment classification

Future work: collect more tweets, form a multilingual corpus

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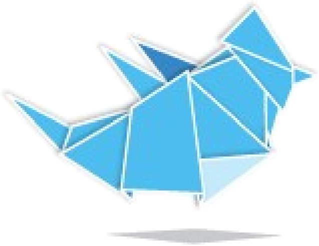

Thank you!