What is text mining?

TEXT MINING WITH BAG-OF-WORDS IN R

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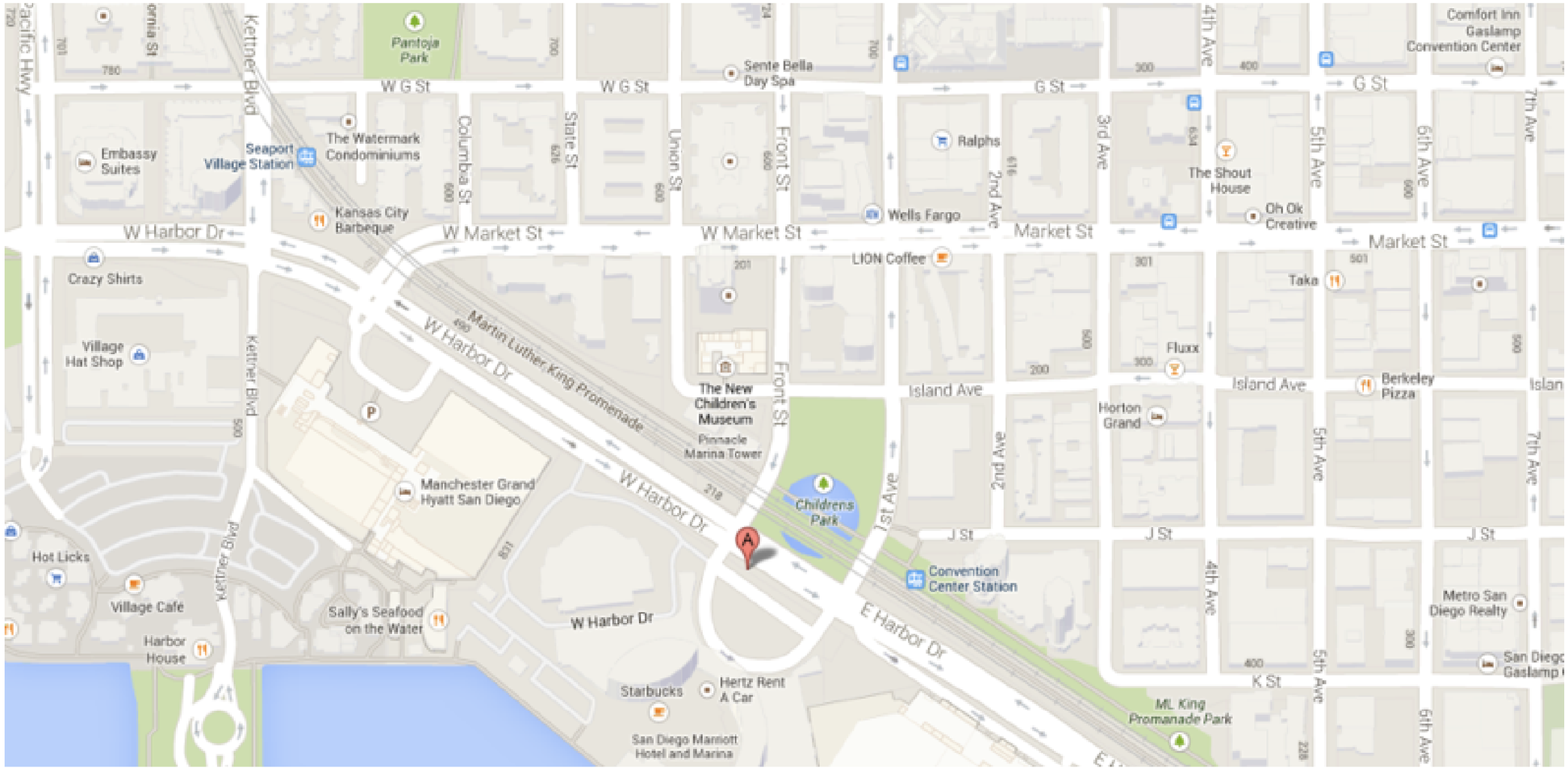
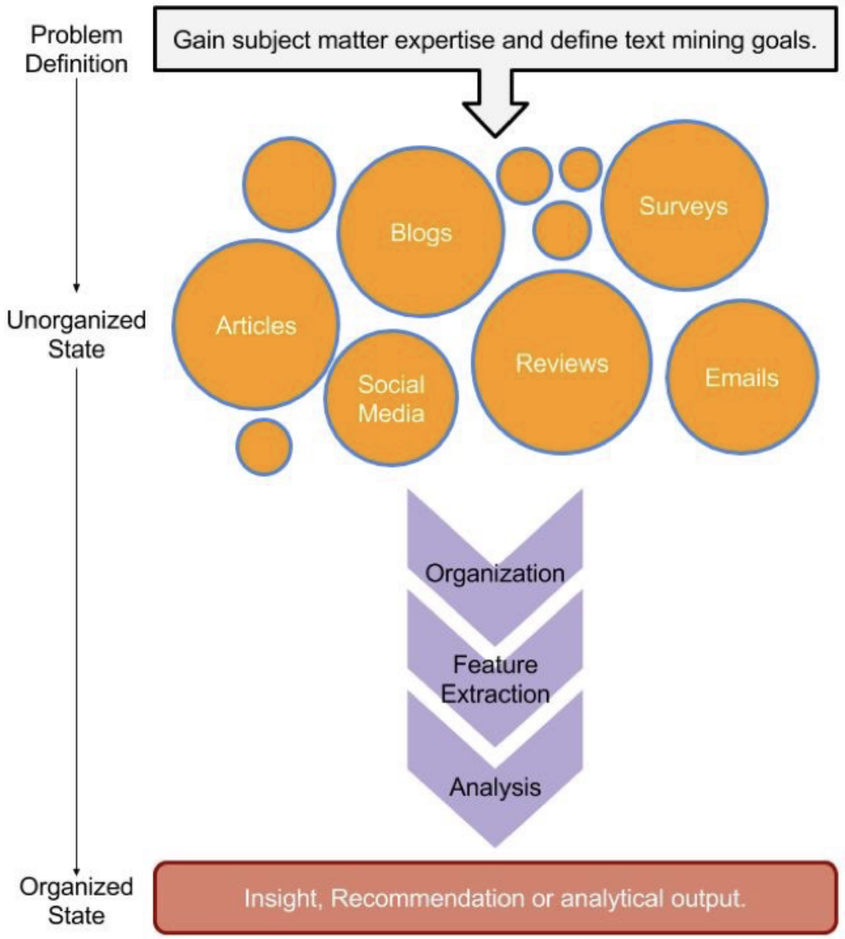
What is text mining?

The **process** of distilling **actionable insights** from **text**



Text mining workflow



1 - Problem definition & specific goals

2 - Identify text to be collected

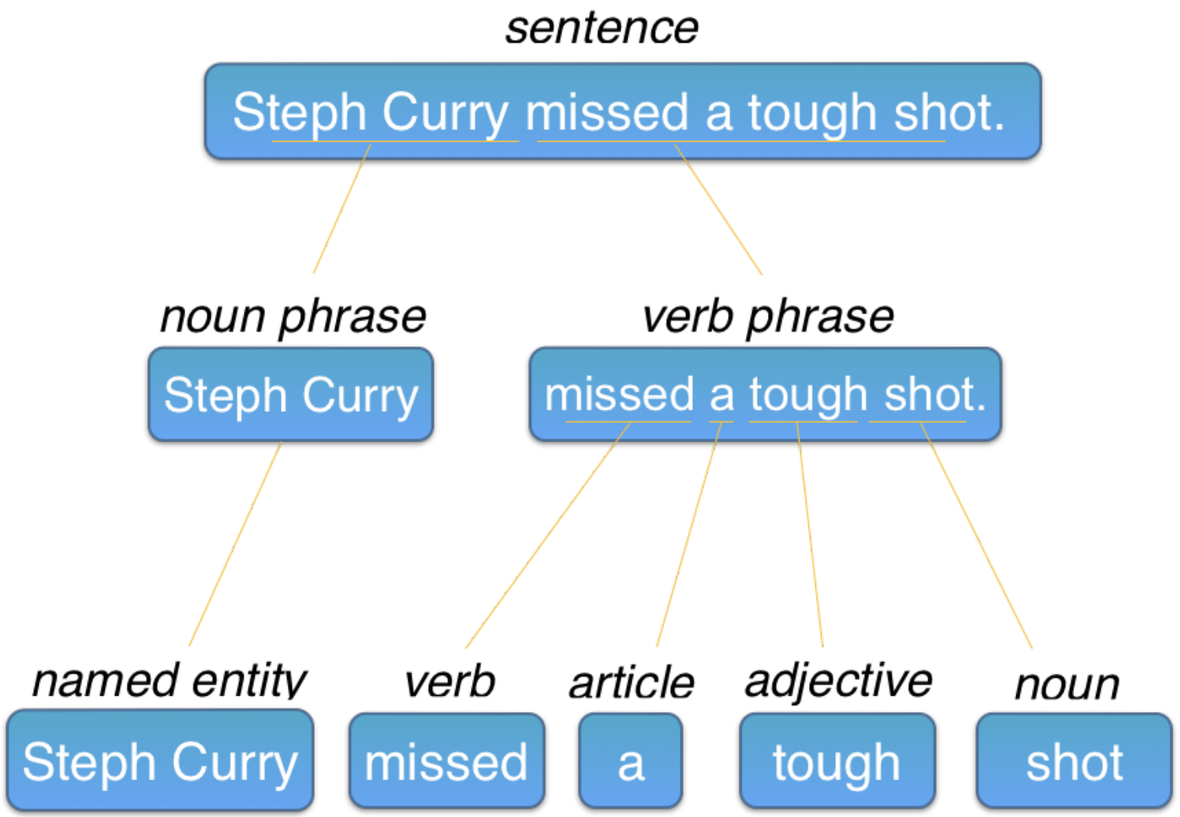
3 - Text organization

4 - Feature extraction

5 - Analysis

6 - Reach an insight, recommendation, or output

Semantic parsing vs. bag of words



Let's practice!

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Getting started

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Building our first corpus

```
# Load corpus
coffee_tweets <- read.csv("coffee.csv", stringsAsFactors = FALSE)
# Vector of tweets
coffee_tweets <- coffee_tweets$text
# View first 5 tweets
head(coffee_tweets, 5)
```

```
[1] "@ayyytylerb that is so true drink lots of coffee"
[2] "RT @bryzy_brib: Senior March tmw morning at 7:25 A.M. in the SENIOR lot. Get up early,
[3] "If you believe in #gunsense tomorrow would be a very good day to have your coffee any
[4] "My cute coffee mug. http://t.co/2udvMU6XIG"
[5] "RT @slaredo21: I wish we had Starbucks here... Cause coffee dates in the morning sound
```

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Cleaning and preprocessing text

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Common preprocessing functions

TM Function	Description	Before	After
`tolower()`	Makes all text lowercase	`Starbucks is from Seattle.`	`starbucks is from seattle.`
`removePunctuation()`	Removes punctuation like periods and exclamation points	`Watch out!  That coffee is going to spill!`	`Watch out  That coffee is going to spill`
`removeNumbers()`	Removes numbers	`I drank 4 cups of coffee 2 days`	`I drank  cups of coffee  days ago.`
`stripWhiteSpace()`	Removes tabs and extra spaces	`I like    coffee.`	`I like coffee.`
`removeWords()`	Removes specific words (e.g. "the", "of") defined by the data scientist	`The coffee house and barista he visited were nice, she said hello.`	`The coffee house barista  visited nice,  said hello.`

Preprocessing in practice


```
# Make a vector source: coffee_source
coffee_source <- VectorSource(coffee_tweets)
# Make a volatile corpus: coffee_corpus
coffee_corpus <- VCorpus(coffee_source)
# Apply various preprocessing functions
tm_map(coffee_corpus, removeNumbers)
tm_map(coffee_corpus, removePunctuation)
tm_map(coffee_corpus, content_transformer(replace_abbreviation))
```

Another preprocessing step: word stemming

```
# Stem words
stem_words <- stemDocument(c("complicatedly", "complicated","complication"))
stem_words
```

```
"complic" "complic" "complic"
```

```
# Complete words using single word dictionary
stemCompletion(stem_words, c("complicate"))
```

```
     complic      complic      complic
"complicate" "complicate" "complicate"
```

```
# Complete words using entire corpus
stemCompletion(stem_words, my_corpus)
```

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The TDM & DTM

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TDM vs. DTM

	Tweet 1	Tweet 2	Tweet 3	…	Tweet N
Term 1	0	0	0	0	0
Term 2	1	1	0	0	0
Term 3	1	0	0	0	0
…	0	0	3	1	1
Term M	0	0	0	1	0

Term Document Matrix (TDM)

	Term 1	Term 2	Term 3	…	Term M
Tweet 1	0	1	1	0	0
Tweet 2	0	1	0	0	0
Tweet 3	0	0	0	3	0
…	0	0	0	1	1
Tweet N	0	0	0	1	0

Document Term Matrix (DTM)

```
# Generate TDM
coffee_tdm <- TermDocumentMatrix(clean_corp)
# Generate DTM
coffee_dtm <- DocumentTermMatrix(clean_corp)
```

Word Frequency Matrix (WFM)

```
# Load qdap package
library(qdap)
# Generate word frequency matrix
coffee_wfm <- wfm(coffee_text$text)
```

	Tweet 1
Term 1	0
Term 2	1
Term 3	1
...	0
Term M	0

Word Frequency Matrix (WFM)

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