Unit 1: Preprocessing

IPM Text Analysis

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July 2018

Goal: Prepare texts into format used for computational text analysis
Method: Preprocessing recipe
Decisions: Feature selection

Key Terms:

- Corpus / document
- Encoding
- Preprocessing
- Tokens, grams
- Stemming / Lemmatize,
- Bag of Words
- Document-Term Matrix

Key R Packages

- `tm`

Preparing a Corpus

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My preferred structure: Each document a row, one column for text, and other columns for metadata.

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Caution

```
``Turkey'' = ``turkey''
```

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[now, we, are, engaged, in, a, great, civil, war, testing,
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[a, any, are, civil, engaged, great, in, nation, now, or,
testing, that, war, we, whether]
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Bigrams `[now we, we are, are engaged, engaged in, in a, a great, great civil, civil war, war testing, testing whether, whether that, that nation, nation or, or any, any nation]`

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Bigrams `[now we, we are, are engaged, engaged in, in a, a great, great civil, civil war, war testing, testing whether, whether that, that nation, nation or, or any, any nation]`

Trigrams `[now we are, we are engaged, are engaged in, engaged in a, in a great, a great civil, great civil war, civil war testing, war testing whether, testing whether that, whether that nation, that nation or, nation or any, or any nation]`

Bigrams

Bigram	Count
now we	1
we are	1
are engaged	1
engaged in	1
in a	1
a great	1
great civil	1
civil war	1
war testing	1
testing whether	1
whether that	1
that nation	1
nation or	1
or any	1
any nation	1

Trigrams

Trigram	Count
now we are	1
we are engaged	1
are engaged in	1
engaged in a	1
in a great	1
a great civil	1
great civil war	1
civil war testing	1
war testing whether	1
whether that nation	1
that nation or	1
nation or any	1
or any nation	1

How Could This Possibly Work?

Speech is:

- Ironic

  `Thanks, Obama`

- Subtle Negation (Source: Janyce Wiebe) :

  `They have not succeeded, and will never succeed, in breaking the will of this valiant people`

- Order Dependent (Source: Arthur Spirling):

  `Peace, no more war`

  `War, no more peace`

How Could This Possibly Work?

Three answers

1) It might not: Validation is critical (task specific)
2) Central Tendency in Text: Words often imply what a text is about `war, civil, union` or tone `consecrate, dead, died, lives`.

   Likely to be used repeatedly: create a theme for an article
3) Proof in the pudding: Bag-of-words assumption works for a number of applications.

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- Stemming/Lemmatizing algorithms: Many-to-one mapping from words to stem/lemma

Comparing Stemming and Lemmatizing

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Lemmatizing algorithm:

- Condition on part of speech (noun, verb, etc)

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- Weight some terms more than others (tf-idf)

All together now...

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this continent a new nation, conceived in liberty, and
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Step 2: Tokenize:

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four score and seven years ago our fathers brought forth on
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Step 2: Tokenize:

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four, score, and, seven, years, ago, our, fathers, brought,
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Step 3: Remove stop words:

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Step 4: Applying Stemming Algorithm

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Step 4: Applying Stemming Algorithm

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Step 5: Create Count Vector

Stem	Count
ago	1
brought	1
seven	1
creat	1
conceiv	1
men	1
father	1
⋮	⋮

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To the R code!