4N - Negative News
Neural Nets Project

Classifying Media Articles with Machine Learning Models

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Goal

A model that determines whether a given article contains adverse media
Preprocessing & Cleaning

Before pre-processing:

<table>
<thead>
<tr>
<th>article</th>
<th>label</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Top 10 Crooked CEOs Bernie Madoff, who is sche... 1</td>
</tr>
<tr>
<td>10</td>
<td>Top fund manager forced to resign after BBC in... 1</td>
</tr>
</tbody>
</table>

After pre-processing:

<table>
<thead>
<tr>
<th>article</th>
<th>label</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>crooked ceos bernie madoff schedule sentence j... 1</td>
</tr>
<tr>
<td>1</td>
<td>fund manager force resign bbc investigation pu... 1</td>
</tr>
</tbody>
</table>
Negative results (a.k.a. the path not to take)

● Additional automatically collected data
● Text augmentation
● LSTM
● Logistic Regression
● GloVe
● XLNet
● etc.
Negative results

Probability Scores Returned from Logistic Regression
Naive Bayes

- Public test F1-score: 93.9%
### BERT

**Bidirectional Encoder Representations from Transformers**

- **Max length of ~500 words**
- **Full articles result in OoM errors**

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<table>
<thead>
<tr>
<th>Input</th>
<th>[CLS]</th>
<th>my</th>
<th>dog</th>
<th>is</th>
<th>cute</th>
<th>[SEP]</th>
<th>he</th>
<th>likes</th>
<th>play</th>
<th># # ing</th>
<th>[SEP]</th>
</tr>
</thead>
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</tr>
</tbody>
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**Token Embeddings**

- $E_{[CLS]}$
- $E_{my}$
- $E_{dog}$
- $E_{is}$
- $E_{cute}$
- $E_{[SEP]}$
- $E_{he}$
- $E_{likes}$
- $E_{play}$
- $E_{# # ing}$
- $E_{[SEP]}$

---

**Position Embeddings**

- $E_0$
- $E_1$
- $E_2$
- $E_3$
- $E_4$
- $E_5$
- $E_6$
- $E_7$
- $E_8$
- $E_9$
- $E_{10}$

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**References**

BERT Results

- Public test F1-score: 94.3%
Learnings

- Quality over quantity
- Keep it simple
Links:
https://github.com/kristjanr/ut-ml-adverse-media