Adversarial Training for Aspect-Based Sentiment Analysis with BERT

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Video Presentation for ICPR 2020

Source Code: https://github.com/IMPLabUniPr/BERT-for-ABSA
Problem 1: Aspect Sentiment Classification (ASC)

How do consumers feel about a product (service) and its aspects?

- They look good and comfy
- Army boots
- My grandma wears those
Problem 2: Aspect Extraction (AE)

What aspects of a product (service) do they discuss?

patterns
Love the contrasting patterns

colour
Yes this colour is amazing
Adversarial Examples for Image

- Sometimes classifiers act strangely

![Image of dog, dog with noise, and ostrich]
Perturbations on input word embeddings:

\[ x = x - \epsilon \frac{g}{\|g\|} \]  

\( x \): input embedding  
\( \epsilon \): size of perturbation  
\( g \): gradient of loss w.r.t. \( x \)
BERT Adversarial Training (BAT) Model

- Input embeddings + adversarial examples
Experiments: Aspect Extraction (AE)

(a) BERT-PT (Laptop)

(b) BAT (Laptop)
• BAT improves post-trained BERT

### Table 1: Aspect Term Extraction

<table>
<thead>
<tr>
<th>Domain</th>
<th>Laptop</th>
<th>Restaurant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods</td>
<td>F1</td>
<td>F1</td>
</tr>
<tr>
<td>BERT-base (2018)</td>
<td>79.28</td>
<td>74.1</td>
</tr>
<tr>
<td>BERT-PT (2019)</td>
<td>84.26</td>
<td>77.97</td>
</tr>
<tr>
<td>BERT-PT (best)</td>
<td>84.88</td>
<td>80.69</td>
</tr>
<tr>
<td>BAT (Ours)</td>
<td>85.57</td>
<td>81.50</td>
</tr>
</tbody>
</table>

### Table 2: Aspect Sentiment Classification

<table>
<thead>
<tr>
<th>Domain</th>
<th>Laptop</th>
<th>Restaurant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods</td>
<td>Acc</td>
<td>Acc</td>
</tr>
<tr>
<td>BERT-base (2018)</td>
<td>75.29</td>
<td>81.54</td>
</tr>
<tr>
<td>BERT-PT (2019)</td>
<td>78.08</td>
<td>84.95</td>
</tr>
<tr>
<td>BERT-PT (best)</td>
<td>78.89</td>
<td>85.92</td>
</tr>
<tr>
<td>BAT (Ours)</td>
<td>79.35</td>
<td>86.03</td>
</tr>
</tbody>
</table>
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