Identifying Expressions of Opinion

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Why Opinions?

- Subjective IE – *"How does X feel about Y?"*

- Given a subjective sentence, we need
  - Polarity - positive, negative, or neutral?
  - Strength - mild, medium, strong or extreme?
  - Source/holder of the opinion?
  - Target - what is the opinion about?

- Example

  Tsvangirai said the election result was "illegitimate" and a clear case of "highway robbery".

Opinion Expressions

- DSE – Direct Subjective Expression
  - Explicitly express an attitude or opinion
  - Example
    - Minister Vedrine criticized the White House reaction.
    - … were killed by sharpshooters faithful to the president.

- ESE – Expressive Subjective Expression
  - Specific choice of words
  - Example
    - Tsvangirai said the election result was "illegitimate" and a clear case of "highway robbery".
    - Criminals have been preying on Korean travellers

-Weibe

Story thus far…

- Identifying opinion expressions in
  - Subjectivity Classification
    - Riloff and Wiebe, 2003
    - Wiebe and Wilson, 2002
  - Subjective IE
    - Stoyanov et al., 2005

- However, not evaluated on the expression level

Why is it difficult?

- Problems with identifying expressions
  - The expressions can vary in length from 1-20 words.
  - Can include verb phrases, noun phrases, or anything else
  - No short fixed list can capture all expressions of interest (creative phrases)
  - An expression which is subjective in one context is not always subjective in another context

Machine Learning Approach

- Tagging task
  - IOB : ... be/O faithful/B to/I the/O president/O ./O
  - IO : ... be/O faithful/I to/I the/O president/O ./O
- Conditional Random Fields
- Evaluation Metric
  - Exact vs Overlap
  - Correct (C)
    - … be faithful to the president .
  - Predicted (P)
    - … be faithful to the president .
    - … be faithful to the president .
    - … be faithful to the president .

$$SP^a = \frac{|\{p|p \in P \wedge \exists\, c \in C \ s.t.\ a(c,p)\}|}{|P|}$$

$$SR^a = \frac{|\{c|c \in C \wedge \exists\, p \in P \ s.t.\ a(c,p)\}|}{|C|}$$

Data

- The MPQA corpus
  - 535 newswire documents annotated with DSE and ESE
  - 135 (Development) – 400 (Evaluation)

- Statistics on evaluation set

number of sentences	8297
number of DSEs	6712
number of ESEs	8640
average length of DSEs	1.86 words
average length of ESEs	3.33 words

Table 1: Statistics for test data

Features

- Lexical (around 18k)
  - Actual lexical item
- Syntactic (around 100)
  - POS tags
  - Prev, Curr and Next POS tags
- Dictionary based
  - Wordnet (around 30K)
  - Levin
  - Framenet
  - Wilson

Results

	overlap			exact		
method	recall	precision	F	recall	precision	F
Wiebe baseline	$45.69^{2.4}$	$31.10^{2.5}$	$36.97^{2.3}$	$21.52^{1.8}$	$13.91^{1.4}$	$16.87^{1.4}$
Wilson baseline	$55.15^{2.2}$	$30.73^{1.9}$	$39.44^{1.9}$	$25.65^{1.7}$	$13.32^{1.0}$	$17.52^{1.2}$
crf-1-DSE	$60.22^{1.8}$	$\mathbf{79.34^{3.2}}$	$68.44^{2.0}$	$42.65^{2.9}$	$\mathbf{57.65^{2.8}}$	$\mathbf{49.01^{2.8}}$
crf-1-DSE&ESE	$62.73^{2.3}$	$77.99^{3.1}$	$69.51^{2.4}$	$\mathbf{43.23^{2.9}}$	$55.38^{2.8}$	$48.54^{2.8}$
crf-0-DSE	$65.48^{2.0}$	$74.85^{3.5}$	$69.83^{2.4}$	$39.95^{2.4}$	$44.52^{2.2}$	$42.10^{2.2}$
crf-0-DSE&ESE	$\mathbf{69.22^{1.8}}$	$72.16^{3.2}$	$\mathbf{70.65^{2.4}}$	$42.13^{2.3}$	$42.69^{2.5}$	$42.40^{2.3}$

Table 2: Results for identifying direct subjective expressions. Superscripts designate one standard deviation.

	overlap			exact		
method	recall	precision	F	recall	precision	F
Wiebe baseline	$56.36^{2.1}$	$43.03^{4.5}$	$48.66^{3.3}$	$15.09^{1.1}$	$9.91^{1.6}$	$11.92^{1.4}$
Wilson baseline	$\mathbf{66.10^{2.6}}$	$40.94^{4.7}$	$50.38^{4.0}$	$17.23^{1.9}$	$8.76^{1.5}$	$11.56^{1.6}$
crf-1-ESE	$46.36^{4.1}$	$\mathbf{75.21^{6.6}}$	$57.14^{3.6}$	$15.11^{1.7}$	$\mathbf{27.28^{2.3}}$	$19.35^{1.5}$
crf-1-DSE&ESE	$48.79^{3.2}$	$74.09^{6.7}$	$58.70^{3.7}$	$15.58^{1.1}$	$26.18^{2.1}$	$\mathbf{19.46^{0.8}}$
crf-0-ESE	$61.22^{3.4}$	$64.84^{5.4}$	$62.82^{3.3}$	$18.31^{1.7}$	$17.11^{3.0}$	$17.61^{2.2}$
crf-0-DSE&ESE	$63.46^{3.3}$	$63.76^{5.7}$	$\mathbf{63.43^{3.3}}$	$\mathbf{18.96^{1.4}}$	$16.79^{2.5}$	$17.74^{1.8}$

Table 3: Results for identifying expressive subjective elements. Superscripts designate one standard deviation.

Results

	overlap			exact		
feature set	recall	precision	F	recall	precision	F
base	$47.14^{2.6}$	$70.91^{4.4}$	$56.60^{3.0}$	$30.55^{2.7}$	$\mathbf{45.12^{3.1}}$	$36.41^{2.8}$
base + Levin/FN	$50.57^{3.1}$	$70.51^{4.1}$	$58.86^{3.3}$	$32.20^{3.1}$	$44.11^{3.3}$	$37.20^{3.1}$
base + Wilson	$54.92^{2.4}$	$70.73^{4.0}$	$61.81^{2.9}$	$34.61^{2.5}$	$43.60^{2.9}$	$38.57^{2.5}$
base + Wilson + Levin/FN	$57.21^{2.6}$	$70.79^{4.1}$	$63.26^{3.0}$	$35.77^{2.4}$	$43.42^{2.8}$	$39.21^{2.5}$
base + WordNet	$68.29^{2.4}$	$71.82^{3.5}$	$70.00^{2.8}$	$41.80^{2.5}$	$42.71^{2.5}$	$42.24^{2.4}$
base + Wilson + WordNet	$68.93^{2.1}$	$72.06^{3.3}$	$70.45^{2.6}$	$42.10^{2.5}$	$42.71^{2.6}$	$42.40^{2.5}$
base + Levin/FN + WordNet	$68.48^{2.4}$	$71.87^{3.3}$	$70.13^{2.8}$	$41.92^{2.2}$	$42.80^{2.5}$	$42.34^{2.3}$
base + Levin/FN + WordNet + Wilson	$\mathbf{69.22^{1.8}}$	$\mathbf{72.16^{3.2}}$	$\mathbf{70.65^{2.4}}$	$\mathbf{42.13^{2.3}}$	$42.69^{2.5}$	$\mathbf{42.40^{2.3}}$

Table 5: Results for feature ablation for identifying DSEs. FN is the FrameNet dictionary features. "base" indicates the lexical features and the syntactic features. The bottom line represents the same model as CRF-0-DSE&ESE in Table 2.

Questions?