Emotion Recognition under Consideration of the Emotion Component Process Model

September 9, 2021
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**Introduction**

- Most popular subtask in **emotion analysis**: Emotion classification

- Which emotion is ...
  - ...expressed in a textual message?
  - ...felt by the sender?
  - ...evoked in the reader?

- Exact setup follows from data collection procedure or annotation guidelines.
Emotion Classification

- Emotion inventories follow psychological models (next slide)
- Systems are often end-to-end transfer learning/ fine-tuning methods from general language models
- Multi-task learning with other concepts often helps
  - Emotion+Sentiment: Akhtar NAACL 2019
  - Emotion+Sentiment+Sarcasm: Chauhan ACL 2020
  - Metaphers+Emotions: Dankers EMNLP 2019
  - Emotions+Genre: Tafreshi CoNLL 2018
  - Emotion+Abusive Language: Rajamanickam ACL 2020
Emotion Models

Ekman

Plutchik

Affect

Appraisal

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Emotion Analysis: Existing Corpora

Plenty of **various corpora** available nowadays for **various domains**:

- **Literature**: Tales (Alm 2005), REMAN (Kim/Klinger 2018)
- **Blogs**: Aman/Szpakowicz 2007
- **Dialogues**: DailyDialogs (Li et al. 2017)
- **Event self-reports**: ISEAR (Scherer et al. 1994) and de/enISEAR (Troiano/Padó/Klinger 2019)

Many more, see Bostan/Klinger 2019

- Little research how to transfer models from one domain to another: **How do emotion descriptions differ?**
Observations, Motivation and Goals

Observations

- Multi-task learning with other (presumably related) concepts is promising
- Classifiers are typically not informed about emotion theories from psychology
- We do not know a lot about differences in emotion references across domains

Research Goals

- Make use of psychological theories in our models...
- ...to see if that improves emotion classification (via multi-task learning)
- ...to understand how emotions are expressed and how such expressions differ between domains
What we need

1. An emotion theory that helps us to understand how emotions are described.
2. A corpus annotated with that theory and emotions.
3. A joint model of that theory and emotions.
An Emotion Theory: The Emotion Component Process Model

Emotion (Scherer, 2005)

Emotions are “an episode of interrelated, synchronized changes in the states of [...] five organismic subsystems in response to the evaluation of a [...] stimulus-event ...”
A Corpus annotated with Emotions and Components

- Partial component annotation of two existing emotion-annotated corpora
  - TEC (Tweets, Mohammad *SEM 2012)
  - REMAN (literature, Kim/Klinger COLING 2018)
- Annotation Procedure:
  - Training of two annotators in two rounds, single annotations afterwards.

<table>
<thead>
<tr>
<th>Component</th>
<th>round 1</th>
<th>round 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive appraisal</td>
<td>0.288</td>
<td>0.777</td>
</tr>
<tr>
<td>Neurophysiological symptoms</td>
<td>0.459</td>
<td>–</td>
</tr>
<tr>
<td>Motiv. Action tendencies</td>
<td>0.444</td>
<td>0.732</td>
</tr>
<tr>
<td>Motor expressions</td>
<td>0.643</td>
<td>0.617</td>
</tr>
<tr>
<td>Subjective feelings</td>
<td>0.733</td>
<td>0.793</td>
</tr>
</tbody>
</table>

- 2041 Tweets, 1000 sentence triples from Project Gutenberg
## A Corpus annotated with Emotions and Components (2)

### Examples

#### Cognitive
- I can’t stop.
- found my old lava lamp!

#### Bodily Reaction
- She did not know; she trembled.
- Apparently i might have alcohol poisoning. #stupidgirl

#### Subjective
- Woman–woman–I love thee!
- bad day

#### Motivation
- We’re going out tonight.
- Sometimes I wanna take your head and ram it into mirrors.

#### Expression
- An expression of annoyance appeared on the emperor’s face.
- Finals tomorrow... ugh
A Joint Model of Emotions and Components
Corpus: Are emotions expressed differently in the two domains
**Joint Model:**

Does Component Prediction help Emotion Categorization?

![Graph showing F1 Measure for different models](chart.png)
**Joint Model:** Where does it help?

@justinbieber noticed a girl the first day she got a twitter! :(

<table>
<thead>
<tr>
<th></th>
<th>Emotion</th>
<th>CPM, MTL-XS</th>
<th>Emotion, MTL-XS</th>
<th>CPM Gold</th>
<th>Emotion Gold</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>joy</strong></td>
<td>Emo-NN-Base</td>
<td>cognitive appraisal, subjective feeling</td>
<td>sadness</td>
<td>cognitive appraisal, subjective feeling</td>
<td>sadness</td>
</tr>
<tr>
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<td>CPM Gold</td>
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<td>cognitive appraisal</td>
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</tr>
</tbody>
</table>

when the love of your life is halfway across the world
Outline

1. Introduction and Motivation
2. Methods
3. Results
4. Summary
Summary and Outlook

- We presented the first work that combines emotion component process model with emotion classification
- Emotion component prediction helps to improve emotion classification
- The model is a helpful tool to quantify how emotions are expressed differently in differing domains.

Limitations/Future Work

- The corpus is of a limited size and only includes two domains.
- ⇒ Build component corpora for more domains.
- Does the component depend on the topic also?
- What are the reasons for people to chose different components to refer to emotions?
- Does that knowledge help for domain transfer?
Advertisement

Check out the resources for this paper and others

- https://www.romanklinger.de/data-sets/
- https://www.ims.uni-stuttgart.de/data/emotion

Check out our lecture on emotion analysis!

https://www.emotionanalysis.de
Thank you for your attention.
Questions? Remarks?
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