Automatic identification of emotions and their causes in texts

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Summary

1. Sentiment and emotion analysis
2. Cognitive Analysis of Emotions
3. Corpus composed of written emotion episodes
4. Emotion prediction based on its components
5. Semantic role labeling for emotions inspired by psychology theories

Natural language processing meets psychological theories of emotion

Sentiment and emotion analysis in text

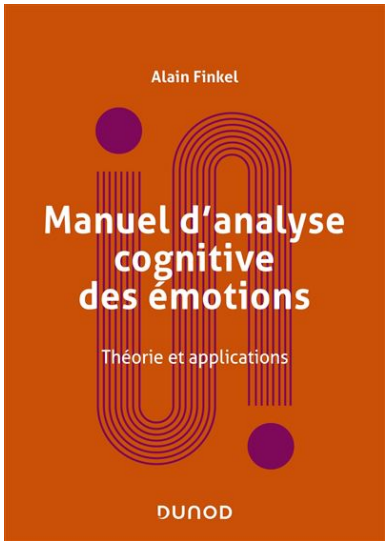
"Gustave loves carnivorous plants because they are beautiful" $\rightarrow$ joy

Limitations [9]

- Annotated corpora are mostly small and limited to a few domains and languages.
- Often simplified as a sentence-level classification problem $\rightarrow$ **Solution**: Structured Sentiment and Emotion Analysis.
- Rarely considers psychological theories to really understand emotions and their causes $\rightarrow$ **Solution**: Appraisal theories for text analysis [11].

Cognitive Analysis of Emotions

- It studies how emotions appear in a written emotion episode.
- It helps people improve their emotion management.



Finkel, april 2022

Alain Finkel. *Manuel d'analyse cognitive des émotions: Théorie et applications*. Paris: Dunod, 2022

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Corpus composed of written emotion episodes

Emotion as a multicomponent process (Scherer, 2005)

Component	Answer
BEHAVIOR	I'm teaching a lecture hall class on a Friday morning at 8:30. A student goes out and comes back a few moments later with a coffee in his hand.
FEELING	My heart compresses, and I freeze, waiting to know how to act.
THINKING	I think this student is overreacting and disrupting my class.
TERRITORY	The student attacks my ability to be respected in class and my recognition.

Table: Example of a written emotion episode structured according to the components. The author identified that he was angry.

Emotion prediction based on its components

To what extent a component influence the prediction of discrete emotion? Is the contribution of the components to the performance improvement equal or unequal? Does taking into account all the components lead to the best performance?

Component	Model	Accuracy	Recall	F_1 score
All	RL	71.2 ± 2.6	69.1 ± 2.2	67.8 ± 2.3
All	DCBERT	**85.1**	**84.8**	**84.7**
Without BEHAVIOR	RL	77.4 ± 2.3	75.8 ± 2.4	74.5 ± 2.6
Without BEHAVIOR	DCBERT	80.3	79.8	79.7
Without FEELING	RL	64.3 ± 1.9	61.5 ± 1.2	61.3 ± 2.2
Without FEELING	DCBERT	81.6	79.8	79.9
Without THINKING	RL	70.9 ± 1.8	69.1 ± 2.0	68.3 ± 2.2
Without THINKING	DCBERT	79.6	78.5	78.7
Without TERRITORY	RL	64.3 ± 4.1	64.5 ± 2.4	62.3 ± 2.8
Without TERRITORY	DCBERT	78.7	78.5	78.6
BEHAVIOR	RL	52.1 ± 3.5	54.6 ± 2.9	51.7 ± 2.9
BEHAVIOR	DCBERT	68.4	67.1	66.6
FEELING	RL	69.6 ± 1.5	68.9 ± 2.1	68.4 ± 2.0
FEELING	DCBERT	67.8	68.4	67.7
THINKING	RL	50.1 ± 3.4	53.8 ± 2.3	50.6 ± 2.7
THINKING	DCBERT	70.5	70.1	70.1
TERRITORY	RL	68.2 ± 1.8	66.8 ± 2.2	66.6 ± 2.3
TERRITORY	DCBERT	71.4	68.4	68.9

Table: Scores (± stdev) obtained from the linguistic realizations of the components for the prediction of discrete emotion. Logistic regression (LR) and DistilCamemBERT (DCBERT) [3] were trained.

Semantic role labeling for emotions

Annotation scheme (Campagnano, Conia, and Navigli, 2022)

- CUE : a marker indicating the presence of an emotion
- EXPERIENCER : an entity who feels an emotion
- TARGET : an entity targeted by an emotion
- CAUSE : an event that triggers an emotion

"Gustave loves carnivorous plants because they are beautiful" $\rightarrow$ Gustave (EXPERIENCER) exposes his love (CUE) towards carnivorous plants (TARGET) because they are beautiful (CAUSE).

Next step: Semantic role labeling for emotions inspired by psychological theories

Clarify and refine semantic roles

- CUE: can be SUGGESTED ("I just got my master's degree"), SAID ("I'm angry"), or SHOWN ("Ah!").
  Expression modes of an emotion [8, 4].
- TARGET: an ATTACKER of a TERRITORY.
  Cognitive analysis of emotions [5].
- CAUSE: an EVENT evaluated by an EXPERIENCER based on appraisal criteria (e.g., relevance, implication, coping, normative significance).
  Appraisal theories [7, 6].

Conclusion and future works

Natural language processing for emotion analysis using psychological theories of emotion

- New French dataset for emotion analysis
- Emotion prediction based on linguistic realizations of emotion components
- (Soon) Semantic role labeling for emotions with a new annotation scheme

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