Universität Stuttgart
Institut für
Maschinelle Sprachverarbeitung

Show-don't-tell – How emotions are communicated in text and how psychological theories can help us in computational emotion analysis

CLIN, Ghent/Online

July 9, 2021

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Appraisal Theories for Emotion Analysis in Text

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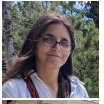
Slides and Collaborators

https://www.romanklinger.de/talks/Klinger-CLIN-2021-07.pdf

Evgeny Kim



Laura Oberländer

Enrica Troiano

Felix Casel, Jan Hofmann, Amelie Heindl, Sebastian Padó, Kai Sassenberg

Outline

Emotion Examples

Which emotion is associated with each example?

How did you recognize that?

- "She became angry."
- "A tear is running down his face."
- "We are going for a walk at the beach."
- "I want to run away."

With this exercise, we discussed two things:

- What is an appropriate set of emotions? (what we do next)
- How are they expressed/recognized? (later today)

Emotion Models – Basic Emotions

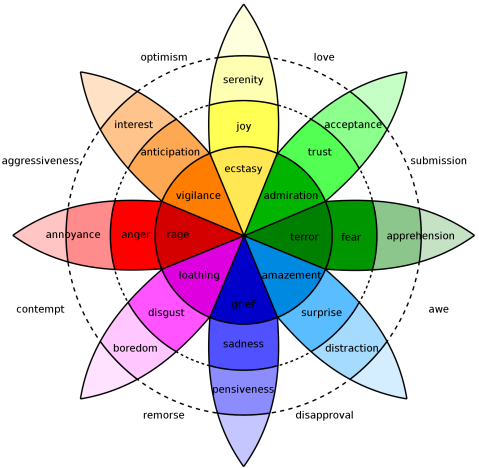
How to define a categorical system of emotions?

- Distinctive universal signals
- Presence in other primates
- Distinctive physiology
- Distinctive universals in antecedent events
- Coherence among emotional response
- Quick onset
- Brief duration
- Automatic appraisal
- Unbidden occurrence

Ekman (1992): An argument for basic emotions.

Emotion Models – Basic Emotions

Are these categories structured?

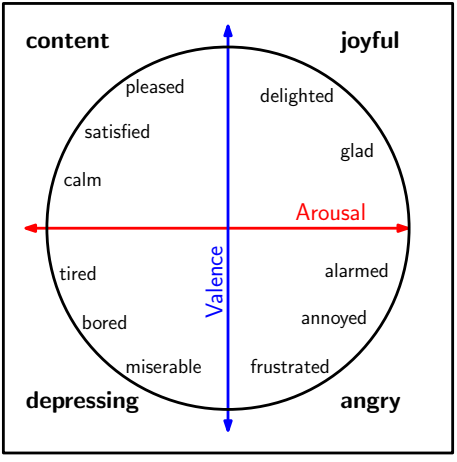


Plutchik, R. (1980).

A general psychoevolutionary theory of emotion.

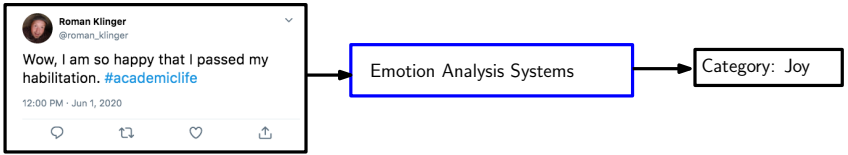
Emotion Models – Valence-Arousal Model of Affect

- Perhaps mixtures and opposites do not make sense, but there are other ways to explain the relations between emotions?



Russell, R. (1980). A Circumplex Model of Affect.

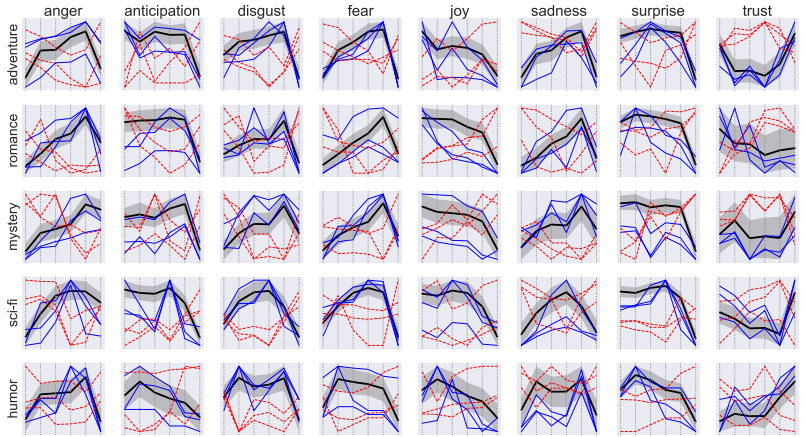
Emotion Analysis: What we want to do.



Interesting from different perspectives:

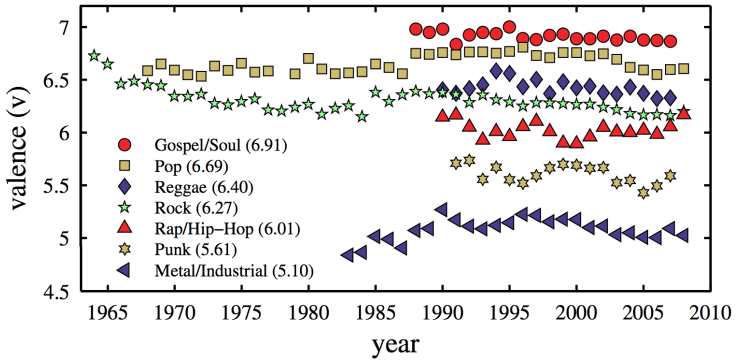
- Computational linguistics and modelling:
  - How to represent emotions as they occur in language?
- Psychology/Social sciences:
  - Better understand emotions and their effects
- Applications ranging from humanities, social sciences over pharmacovigilance to robotics and intelligent agents.

Literary Studies: Kim et al., 2017



Kim et al., 2017.
Investigating the Relationship between Literary Genres and Emotional Plot Development.

Happiness in Art and Public: Dodds 2009



Dodds et al. 2009. Measuring the Happiness of Large-Scale Written Expression: Songs, Blogs, and Presidents.

How do these emotion models help NLP?

- Ekman:
  - Serves as a categorical system for text classification.

> Introduced the role of events and to study emotions based on observable characteristics (following ideas of Darwin).

  -
- Plutchik:
  - Serves as a categorical system for text classification.
  - Models have been proposed which build classifiers that consider the structure of the wheel.
    (e.g., Suttles/Ide (2013): Distant Supervision for Emotion Classification with Discrete Binary Values. CICLING.)
- Russel:
  - Serves as a basis for regression tasks.

Emotions and Events

Emotions and Events are linked in (at least) two ways:

Emotions are events

- "Donald is happy about his birthday present."
- FrameNet Emotion Directed Frame:
  - Event: "happy"
  - Experiencer: "Donald"
  - Stimulus: "his birthday present"
  - ...

⇒ Motivated the task of emotion semantic role labeling (not the topic of today's talk)

Events cause emotions

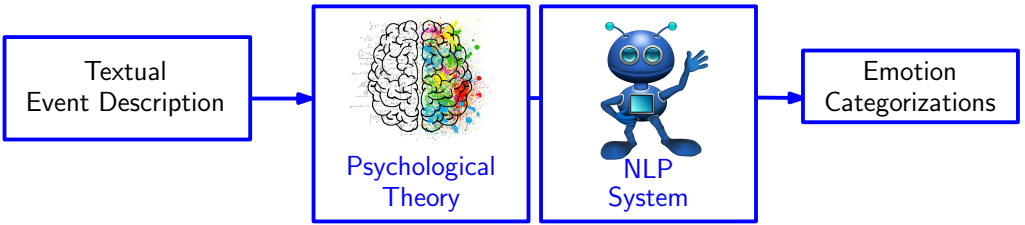
- "There is a car on fire."
  - Relevant event for the speaker, might cause fear.
  - Requires interpretation of events to infer possible emotions.
- (main part of today's talk)

Show-don't-tell

Show-don't-tell

Paradigm for authors of texts:

- Let the reader experience the story through actions, thoughts, senses, and feelings.
- Don't directly mention the emotion.
- Do describe bodily reactions, actions, events.

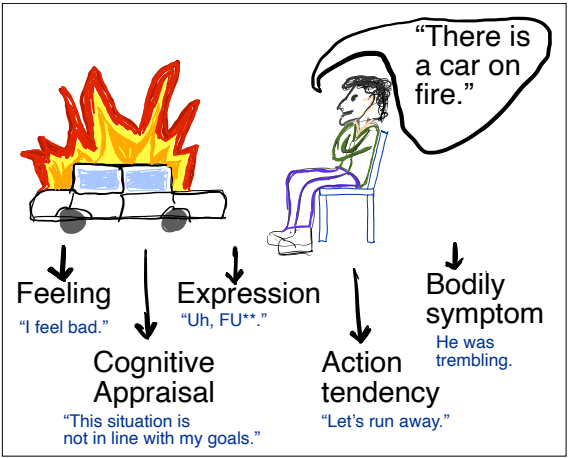


Outline

Definition of Emotions: Components

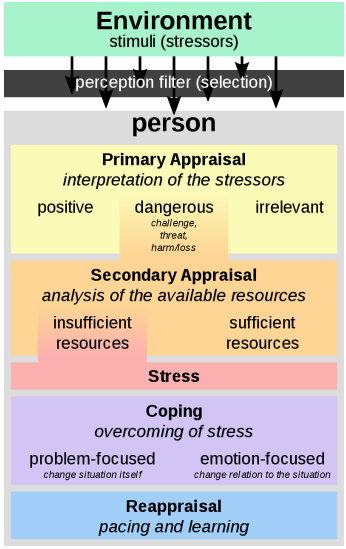
Emotion (Scherer, 2005)

Emotions are "an episode of interrelated, synchronized changes in the states of [...] five organismic subsystems in response to the evaluation of a [...] stimulus-event ..."

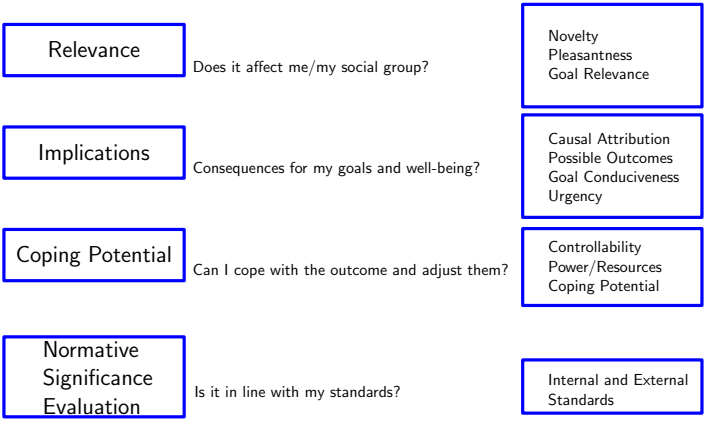


Cognitive Appraisals: Lazarus Model of Stress

R.S. Lazarus, (1966).
Stress, appraisal, and coping.



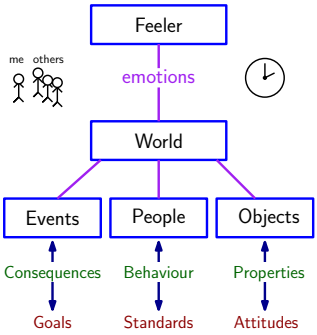
Cognitive Appraisal in Scherer's Component Process model



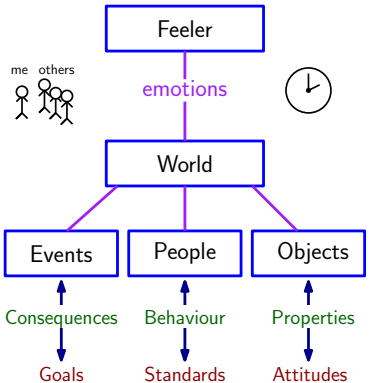
K.R. Scherer (2001). Appraisal Considered as a Process of Multilevel Sequential Checking.

OCC Model of Emotions (1)

Ortony, Clore, Collings (1988):
The Cognitive Structure of Emotions.



OCC Model of Emotions (2)



Model proposes rules, for instance:

if `Consequences of Events negative` and
`consequences for self` and
`relevant` and
`unconfirmed/in future` `disconfirmed`
⇒ `fear` `relief`

OCC Text Interpretation

Chapter 4
A Linguistic Interpretation of the OCC Emotion Model for Affect Sensing from Text

Mostafa Al Masum Shaikh, Helmut Prendinger, and Mitsuru Ishizuka

Abstract Numerous approaches have already been employed to 'sense' affective information from text; but none of those ever employed the OCC emotion model, an influential theory of the cognitive and appraisal structure of emotion. The OCC model derives 22 emotion types and two cognitive states as consequences of several cognitive variables. In this chapter, we propose to relate cognitive variables of the emotion model to linguistic components in text, in order to achieve emotion recognition for a much larger set of emotions than handled in comparable approaches. In particular, we provide tailored rules for textural emotion recognition, which are inspired by the rules of the OCC emotion model. Hereby, we clarify how text components can be mapped to specific values of the cognitive variables of the emotion model. The resulting linguistics-based rule set for the OCC emotion types and cognitive states allows us to determine a broad class of emotions conveyed by text.

A Rule-Based Approach to Implicit Emotion Detection in Text

Orizu Udochukwu(✉) and Yulan He

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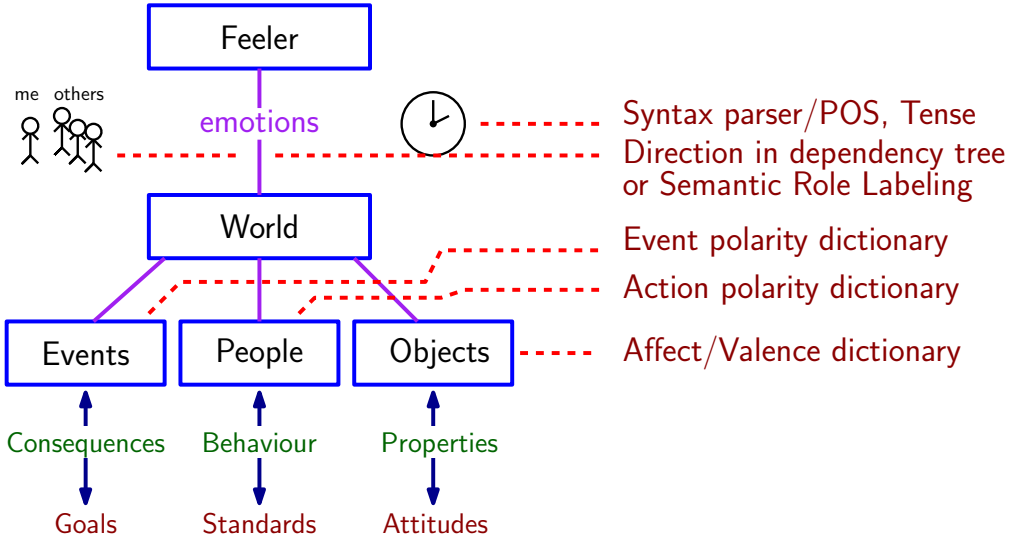
Abstract. Most research in the area of emotion detection in written text focused on detecting explicit expressions of emotions in text. In this paper, we present a rule-based pipeline approach for detecting implicit emotions in written text without emotion-bearing words based on the OCC Model. We have evaluated our approach on three different datasets with five emotion categories. Our results show that the proposed approach outperforms the lexicon matching method consistently across all the three datasets by a large margin of 17–30 % in F-measure and gives competitive performance compared to a supervised classifier. In particular, when dealing with formal text which follows grammatical rules strictly, our approach gives an average F-measure of 82.7 % on "Happy", "Angry-Disgust" and "Sad", even outperforming the supervised baseline by nearly 17 % in F-measure. Our preliminary results show the feasibility of the approach for the task of implicit emotion detection in written text.

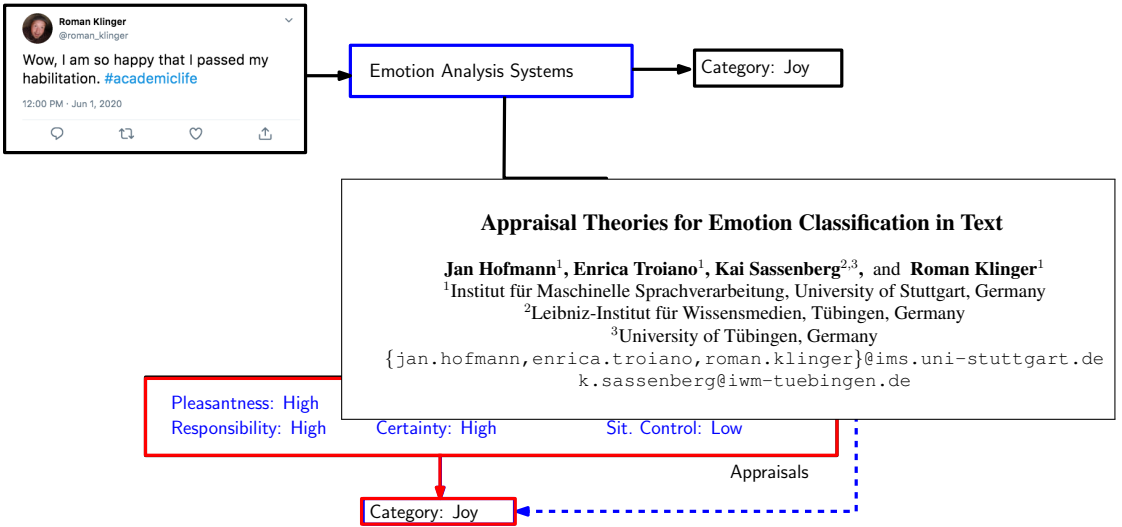
Keywords: Implicit emotions · OCC model · Emotion detection · Rule-based approach

OCC and Text


Feeler
me
others
emotions
World
Events
People
Objects
Consequences
Behaviour
Properties
Goals
Standards
Attitudes
Syntax parser/POS, Tense
Direction in dependency tree
or Semantic Role Labeling
Event polarity dictionary
Action polarity dictionary
Affect/Valence dictionary

Outline

Appraisal-based Emotion Classification



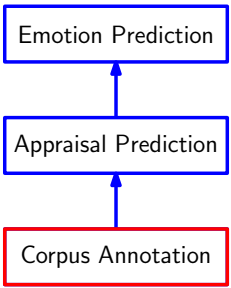
Appraisal Annotation

Most probably, at the time when the event happened, the writer...

- ...wanted to devote further attention to the event. (Attention)
- ...was certain about what was happening. (Certainty)
- ...had to expend mental or physical effort to deal with the situation. (Effort)
- ...found that the event was pleasant. (Pleasantness)
- ...was responsible for the situation. (Responsibility)
- ...found that he/she was in control of the situation. (Control)
- ...found that the event could not have been changed/influenced by anyone. (Circumstance)

(following concepts by Smith/Ellsworth, 1985)

Corpus Selection

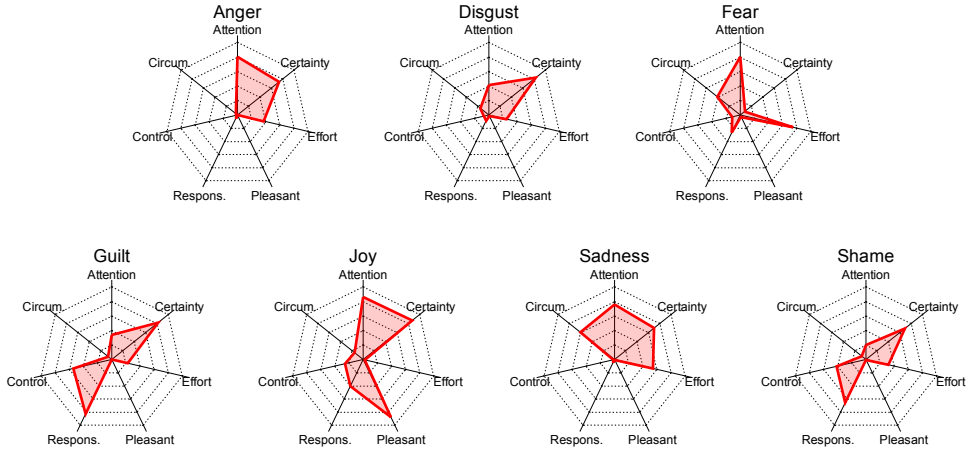


- Reannotation of event-centered corpus: Troiano/Padó/Klinger, 2019
  - "Remember an event which triggered [emotion] and describe it: 'I felt [emotion word], when...' "
  - 1001 event descriptions, stratified by emotion (anger, disgust, fear, guilt, joy, shame, sadness)

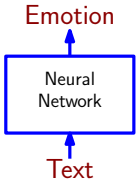
Examples

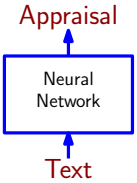
- I felt [sadness] when I saw a homeless cat on the street.
- I felt [shame] when someone commented that I was looking very untidy.
- I felt [anger] when the police did not update me on a crime.

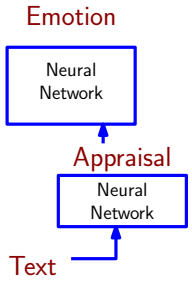
Annotation Results

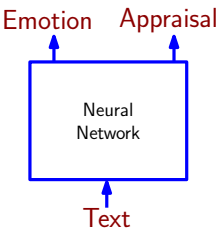


Machine Learning Models



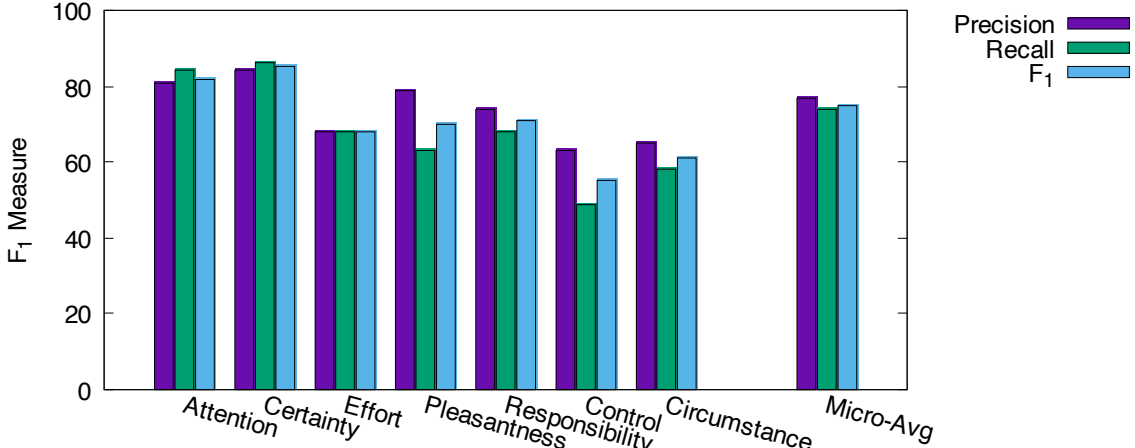






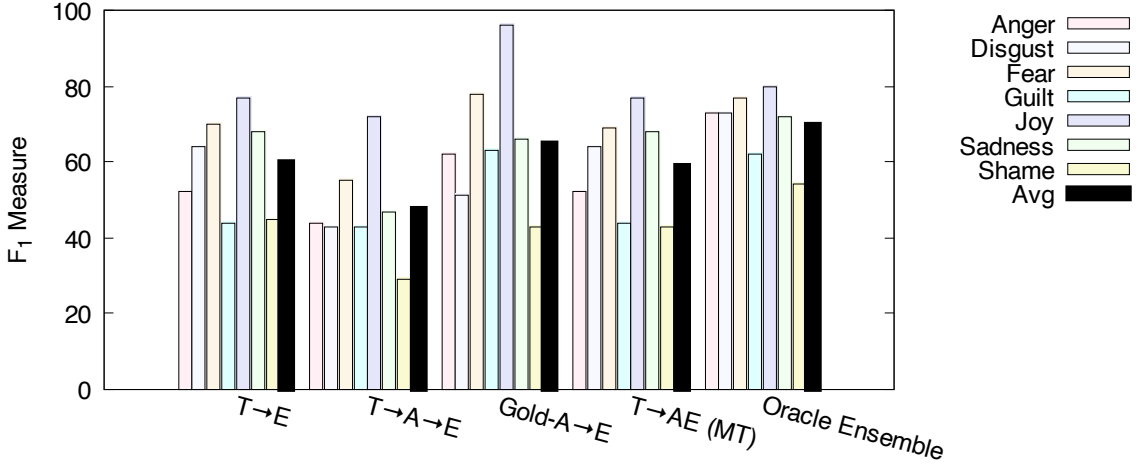
Modelling Results

How well can we predict appraisal dimensions from text?

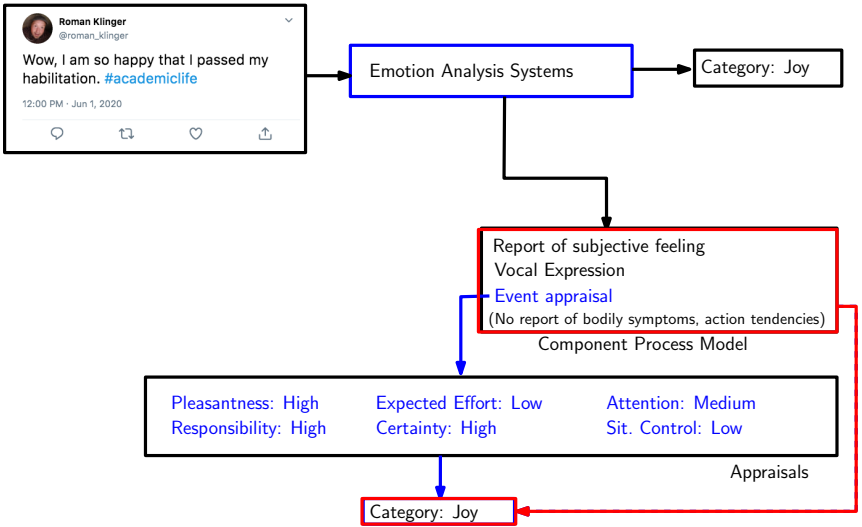


Modelling Results

Can this approach improve emotion classification?



Emotion Components



Does Component Knowledge help Emotion Classification?

- Annotation of two corpora: TEC (Tweets) and REMAN (literature) for components
- Labels of TEC (one-of):
  anger, disgust, fear, joy, sadness, surprise
- Labels of REMAN (many-of):
  anger, disgust, joy, sadness, fear, surprise, trust, anticipation, other, neutral
- 2041 Tweets, 1000 sentence triples from Project Gutenberg

Does Component Knowledge help Emotion Classification?

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

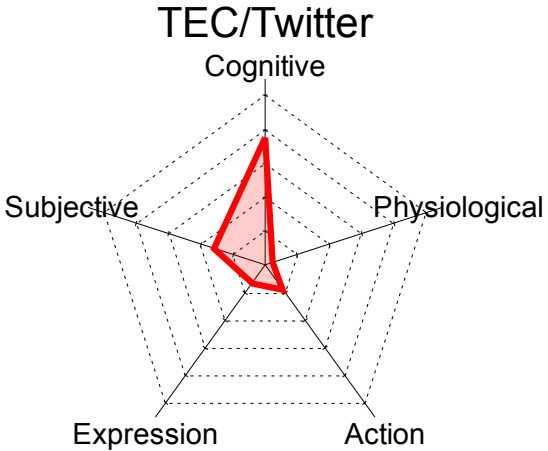
Motivation

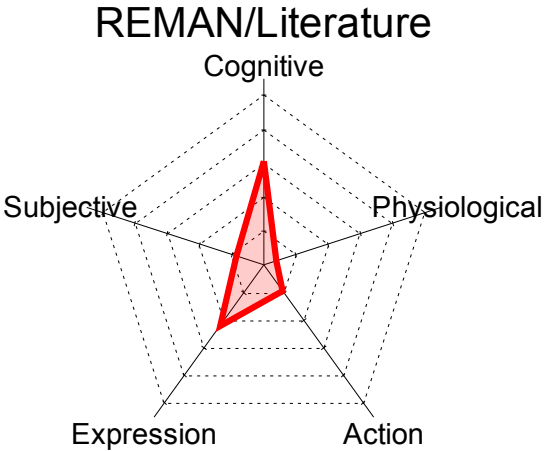
- We're going out tonight.
- Sometimes I wanna take your head and ram it into mirrors.

Expression

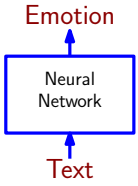
- An expression of annoyance appeared on the emperor's face.
- Finals tomorrow... ugh

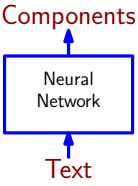
Corpus Statistics: Show-don't-tell?

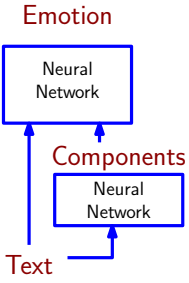


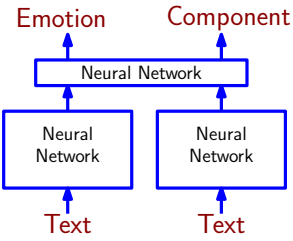


Machine Learning models

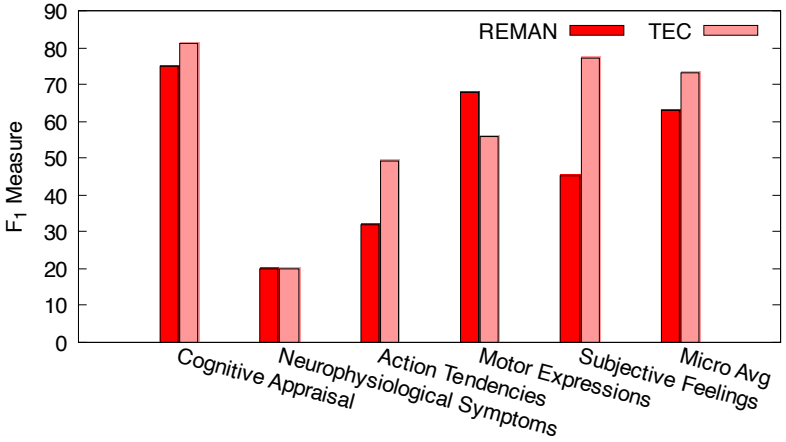




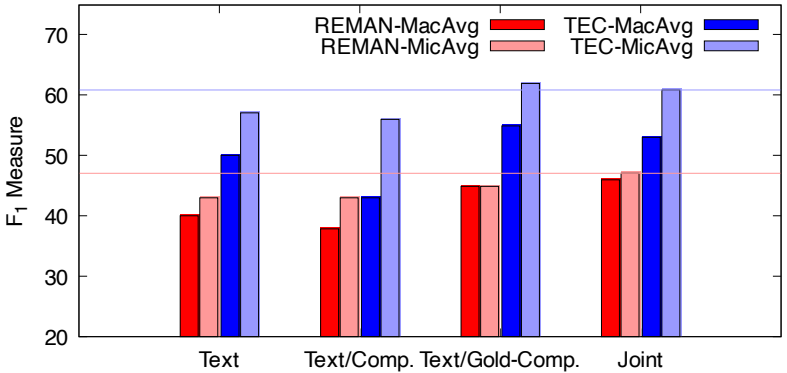




How well can we predict components?



Does Component Prediction help Emotion Categorization?



Outline

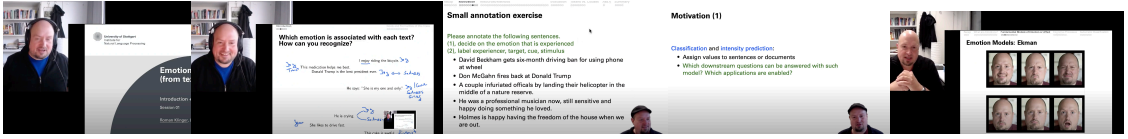
Summary

- We know a lot about emotions – this knowledge should not be ignored in NLP.
- In this talk, I discussed:
  - emotion component process model,
  - appraisal classification

  in combination with emotion classification
- Emotion component prediction helps to improve emotion classification
- Appraisal prediction has potential to improve emotion classification

- Psychology has a lot more to offer to be modelled computationally.

Check out our whole lecture on emotion analysis!



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Thank you for
your attention.
Questions? Remarks?

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Funded by
DFG Deutsche Forschungsgemeinschaft
German Research Foundation
Federal Ministry of Education and Research

Thanks to

- Ph.D. Students
  - Enrica Troiano
  - Evgeny Kim
  - Laura Oberländer née Bostan
- Collaborators
  - Kai Sassenberg
  - Sebastian Padó
- Undergrads+Master Students
  - Amelie Heindl
  - Felix Casel
  - Jan Hofmann
  - Valentino Sabbatino

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