



University of Stuttgart
Institute for
Natural Language Processing

Emotion Analysis

(from text)

Introduction + Psychology 1

Session 01: 2022-10-18

Roman Klinger



Outline

- 1 Introduction
- 2 What are Emotions?
- 3 Emotion Models
- 4 Goals and Formalities of this Class

Take Away

- Sets of emotions
- Emotion theories
- Components of emotions
- Formalities of this class

About me

Background:

- Studied computer science with minor subject psychology
- Ph.D.: biomedical information extraction
- Postdoc: sentiment analysis

Research interests:

- **Machine learning**, including deep learning, optimization, probabilistic models, structured prediction, zero/few-shot learning
- **Psychological concepts**, including emotions, sentiment, personality traits
- **Information extraction, argument mining, fact checking**
- **Applications** in digital humanities, computational social sciences, social media mining, web mining

Which emotion is associated with each text?

How can you recognize the emotion?

I enjoy riding the bicycle.

This medication helps me best.

Donald Trump is the best president ever.

He says: "She is my one and only."

He is crying.

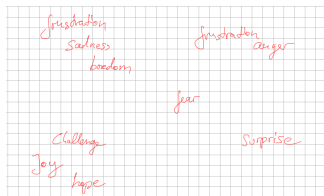
She likes to drive fast.

This cake is awful

Warm Up

Groups of 3–4 people

- **Step 1: List emotion names**
(≈10 minutes)
(some piece of paper)
- **Step 2: Group emotions by similarity/dissimilarity, organize them somehow (≈20 minutes)**
(flipchart paper, put on wall when done)
- **Step 3:**
See posters by other groups



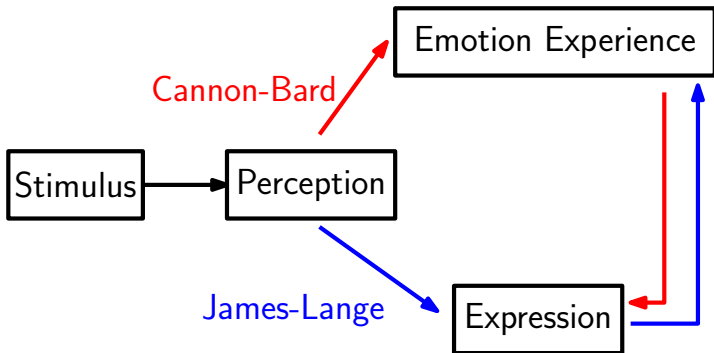
Ask yourself:

- What is an emotion?
- How can emotions be considered to be similar?
- Create categories, or a distributional space, or...

Outline

- 1 Introduction
- 2 What are Emotions?
- 3 Emotion Models
- 4 Goals and Formalities of this Class

James Lang (1884)/Cannon Bard (1925)



Emotions: Expression, Reaction, Function, Feeling

What makes two emotions similar?

We could consider components of emotions:

- **Reaction:** Emotions that occur in the context of the same behaviour are similar.
- **Function:** Emotions that serve the same purpose are similar.
- **Expression:**
Emotions that are expressed similarly are similar.
- **Feeling:**
Emotions that are perceived similarly are similar.

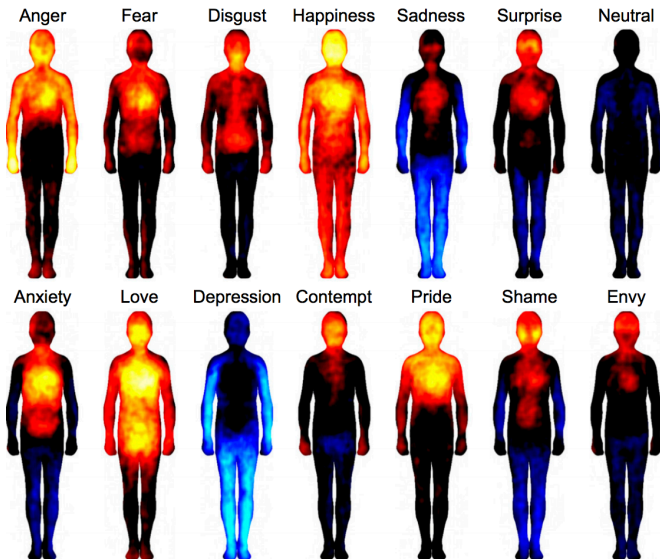
Emotions and the Body: Activation Patterns

Let's ask people about emotions and body (Nummenmaa, 2014).

- 700 people tested in Finland, Sweden, Taiwan
- Subjects colored body maps according to where they felt an emotion.
- The emotions were evoked with emotion words, pictures, stories, movies, facial expressions.

"Where do you feel happiness?"

Emotions and the Body: Activation Patterns



Outline

- 1 Introduction
- 2 What are Emotions?
- 3 Emotion Models
- 4 Goals and Formalities of this Class

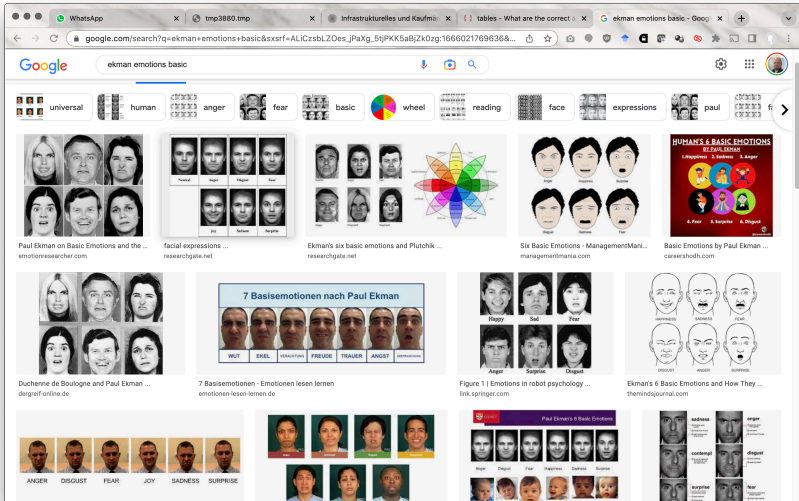
Scherer Typology (1984)

- **Emotion:**
brief organically synchronized evaluation of a major event
angry, sad, joyful, fearful, ashamed, proud
- **Mood:** diffuse non-caused low-intensity long-duration change
in subjective feeling
cheerful, gloomy, irritable, depressed
- **Interpersonal stances:**
affective stance toward another person in a specific interaction
friendly, distant, cold, warm, supportive
- **Attitudes:** enduring, affectively colored beliefs, dispositions
towards objects or persons
liking, loving, hating, valuing, desiring
- **Personality traits:** stable personality dispositions and typical
behavior tendencies
nervous, anxious, reckless, hostile, jealous

Emotion Models: Ekman



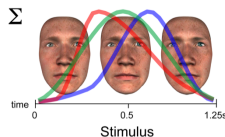
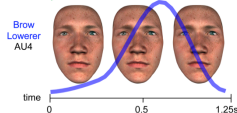
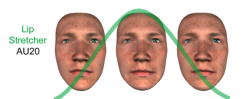
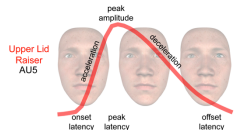
Emotion Models: Ekman



Kohn/Ambadar/Ekman 2007: Observer-Based Measurement of Facial Expression With the Facial Action Coding System

13 / 28

Facial Expressions and Emotions

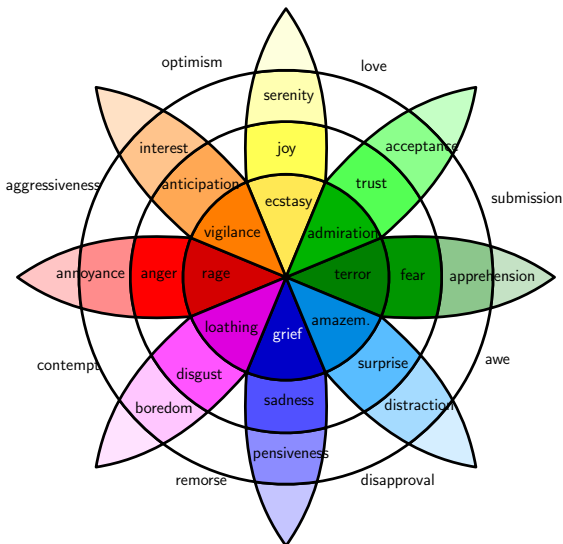


Response options

Emotion	Intensity
Happy	Very strong
Surprise	Strong ✓
Fear ✓	Medium
Disgust	Weak
Anger	Very weak
Sad	



Emotion Models: Plutchik's Wheel



- Anger
- Anticipation
- Disgust
- Fear
- Joy
- Sadness
- Surprise
- Trust

Models opposing emotions and intensity!

These and other emotion models...

...will be discussed briefly in the next session.

Outline

- 1 Introduction
- 2 What are Emotions?
- 3 Emotion Models
- 4 Goals and Formalities of this Class

Goals of this Class

Understand Emotions

- What is an emotion?
- How can they be structured and organized in a model?

Model Emotions

- Learn which resources and methods exist to automatically recognize emotions in text.
- Learn to create such resources ourselves

Machine Learning

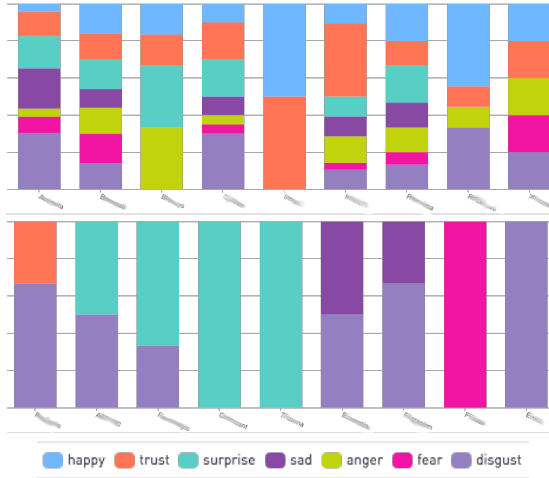
- Use emotion analysis as use case to learn how to create resources, corpora, tools.
- Practice to analyse models and resources.

Isn't that just text classification?

Peter is afraid of Paul.

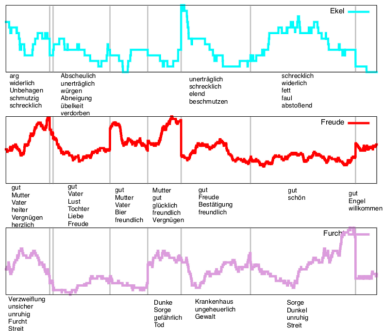
Peter hates Paul.

Is it relevant? EA in Pharma Industry

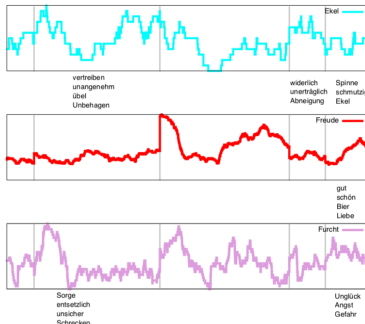


Is it relevant? EA in DH

Amerika



Das Schloss



Contact

- Roman Klinger
- Contact: roman.klinger@ims.uni-stuttgart.de
- Forum on Ilias
- WebEx Teams for short questions if not in DND mode
- Office: PWR 5b, 01.007, come in when my door is open.
- (I don't like phone calls.)

Schedule

Time Plan Emotion Analysis WS 2022/2023

Publication/ Session Date	No	Lecture	Exercise Sheet Publication
18.10.2022	1	Emotion Models 1, Introduction	
25.10.2022	2	Emotion Models 2	
08.11.2022	3	Corpus Creation	Corpus Creation Exercise
15.11.2022	4	Dictionary-based Systems	
22.11.2022	5	Corpus Creation Exercise Discussion	
29.11.2022	6	Evaluation-based Approaches	
06.12.2022	7	ML-based Emotion Classification	ML-based emotion classification Exercise
13.12.2022	8	Intensity Prediction and VAD	
20.12.2022	9	ML-based emotion classification Exercise Discussion	Literature Review Exercise
10.01.2023	10	Stimulus Detection and Role Labeling	Stimulus Detection Exercise
17.01.2023	11	Literature Review Exercise Discussion	
24.01.2023	12	Lecture; topic tbd	
31.01.2023	13	Stimulus Detection Exercise Discussion	
07.02.2023	14	Buffer	

Requirements

Recommended prior knowledge

- Basic knowledge on machine learning and natural language processing
- Programming experience in one high-level programming language
 - Inspect and convert Json, CSV or XML files
 - Create corpus statistics
 - Train and evaluate ML models
- Experience with using spreadsheet applications (e.g. Excel)

Statistics of Participants/Material

Studienbezeichnung	Anzahl	Prozent
Computational Linguistic (LHG)	28	77.8%
Digital Humanities (LHG)	3	8.3%
Informatik (LHG)	2	5.6%
Maschinelle Sprachverarbeitung (LHG)	1	2.8%
Software Engineering (LHG)	1	2.8%
Maschinenbau (LHG)	1	2.8%
	36	

Ilias Group:

https://ilias3.uni-stuttgart.de/goto_Uni_Stuttgart_crs_3014821.html

Formalities

- This is a **3 credit points** class.
- We expect **active participation** and your **presentations in exercises**.
- **Attendance** is **not checked**.
- With each exercise submission, you can indicate if you volunteer to present. If nobody volunteers, we pick somebody in class. Everybody needs to present.
- Exercise: Work in teams of 2–3 people (we encourage 3)
- Final grade:
 - ≈ 50 % Exercise submissions and presentations
 - ≈ 50 % 15 minutes oral exam at the end of the term
- For CL M.Sc. students, we offer to define a 6 LP project (towards the end of the class, talk to us in 5 weeks)

Questions?

Take Away

- Sets of emotions
- Emotion theories
- Components of emotions
- Formalities of this class



University of Stuttgart
Institute for
Natural Language Processing

Emotion Analysis

(from text)

Introduction + Psychology 1

Session 01: 2022-10-18

Roman Klinger

