**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

Introduction
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What are Emotions?
○○○○○

Emotion Models
○○○○○○○○

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?

*Joy / Happiness*

I enjoy riding the bicycle.

*Satisfaction / Joy / relief*

This medication helps me best.

Donald Trump is the best president ever.

*admiration / support / respect / pride*

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

*grief / love*

*sadness*

He is crying.

*fear / excitement*

She likes to drive fast.

*admiration*

*disgust*

This cake is aweful

**Introduction**
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What are Emotions?
○○○○○

Emotion Models
○○○○○○○○

Goals and Formalities of this Class
○○○○○○○○○○○○○○

# 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
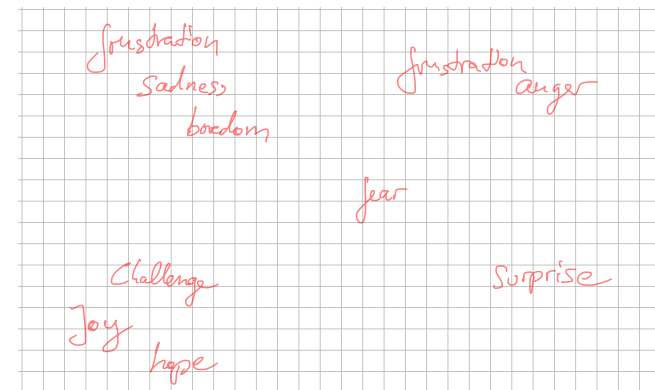
Ask yourself:

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

# Outline

Introduction
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What are Emotions?
⭘⬤⭘⭘⭘⭘

Emotion Models
⭘⭘⭘⭘⭘⭘⭘⭘

Goals and Formalities of this Class
⭘⭘⭘⭘⭘⭘⭘⭘⭘⭘⭘⭘⭘⭘

# James Lang (1884)/Cannon Bard (1925)

Introduction
○○○○

What are Emotions?
○○●○○

Emotion Models
○○○○○○○○

Goals and Formalities of this Class
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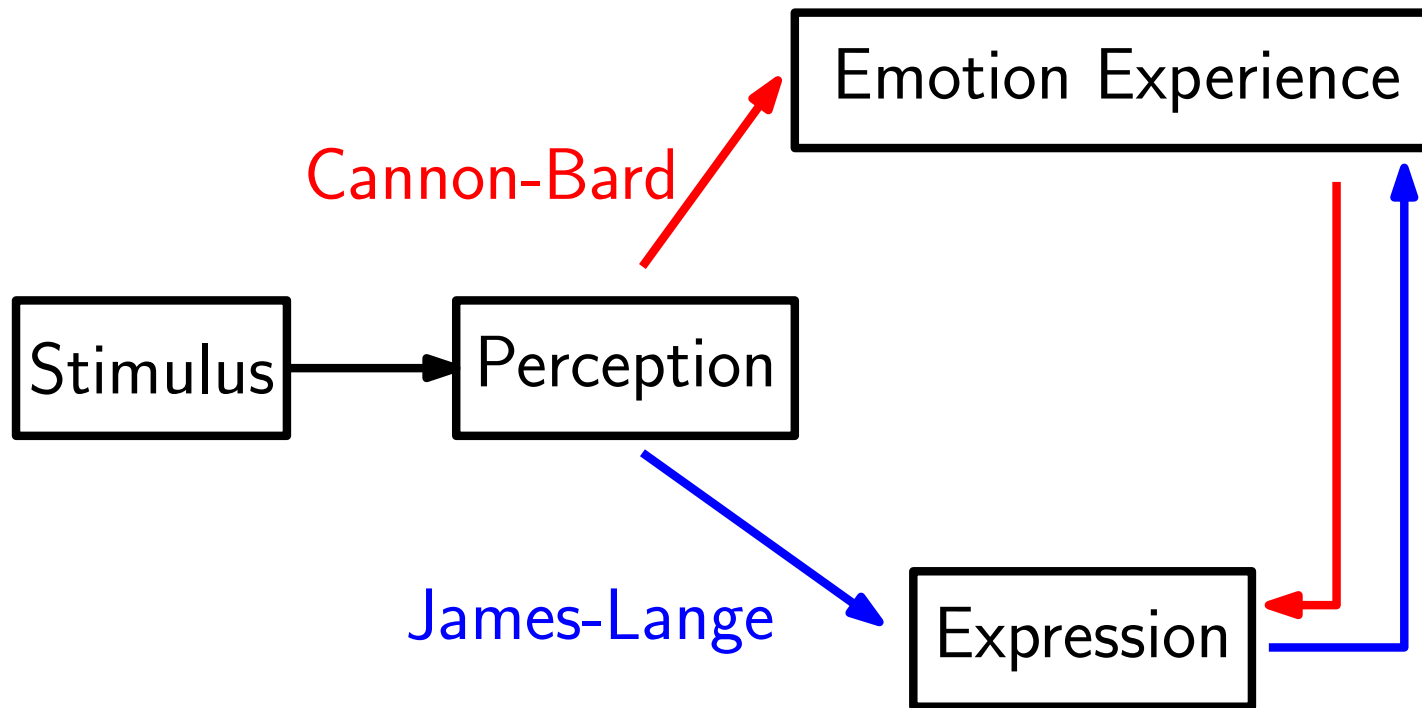
# Emotions:
# Expression, Reaction, Function, Feeling

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.

Introduction
○○○○

What are Emotions?
○○○●○

Emotion Models
○○○○○○○○

Goals and Formalities of this Class
○○○○○○○○○○○○○

# 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?"
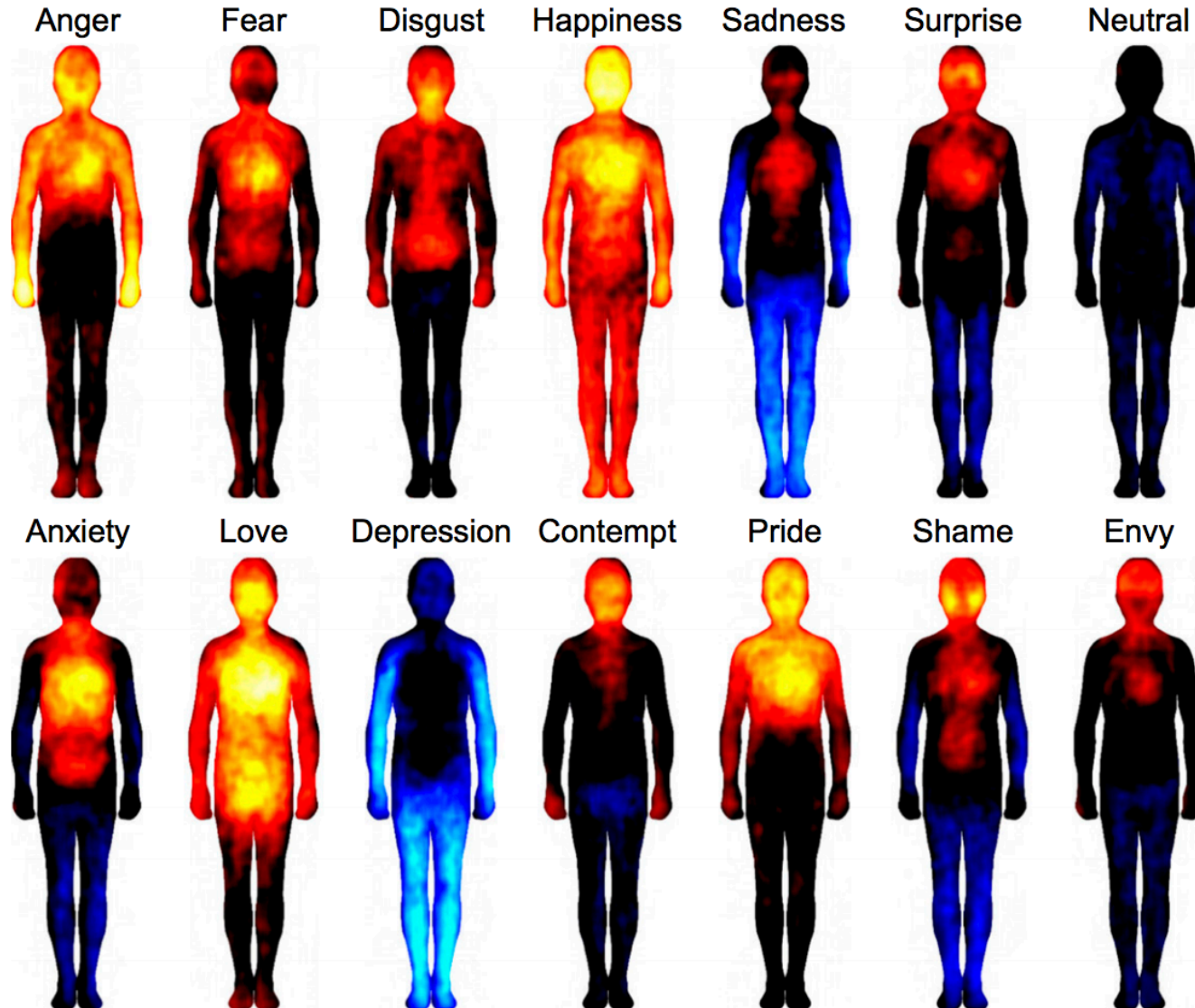
Introduction
○○○○

What are Emotions?
○○○○●

Emotion Models
○○○○○○○○

Goals and Formalities of this Class
○○○○○○○○○○○○○

# Emotions and the Body: Activation Patterns

# Outline

Introduction
⭘⭘⭘⭘

What are Emotions?
⭘⭘⭘⭘⭘

Emotion Models
⭘●⭘⭘⭘⭘⭘⭘

Goals and Formalities of this Class
⭘⭘⭘⭘⭘⭘⭘⭘⭘⭘⭘⭘⭘⭘

# Scherer Typology (1984)

- <u>Emotion</u>:
  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

Introduction
○○○○

What are Emotions?
○○○○○

Emotion Models
○○●○○○○○

Goals and Formalities of this Class
○○○○○○○○○○○○

# Emotion Models: Ekman

Introduction
○○○○

What are Emotions?
○○○○○

Emotion Models
○○○●○○○○

Goals and Formalities of this Class
○○○○○○○○○○○○

# Emotion Models: Ekman

Introduction
○○○○

What are Emotions?
○○○○○

Emotion Models
○○○○●○○○

Goals and Formalities of this Class
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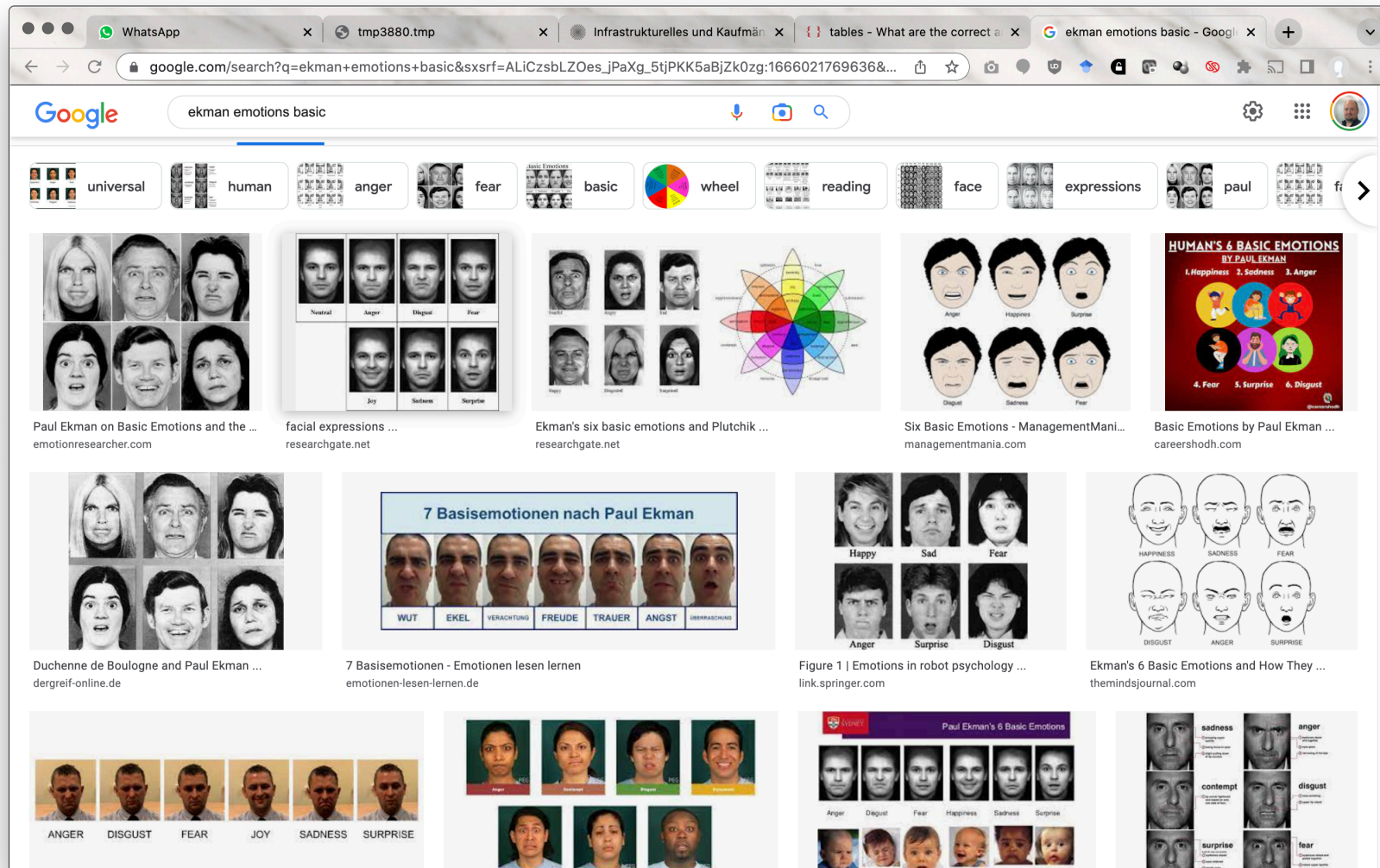
# Measure Emotions with Facial Expressions



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

Introduction
○○○○

What are Emotions?
○○○○○

Emotion Models
○○○○○●○○

Goals and Formalities of this Class
○○○○○○○○○○○○○○

# Facial Expressions and Emotions

Introduction
○○○○

What are Emotions?
○○○○○

Emotion Models
○○○○○○●○

Goals and Formalities of this Class
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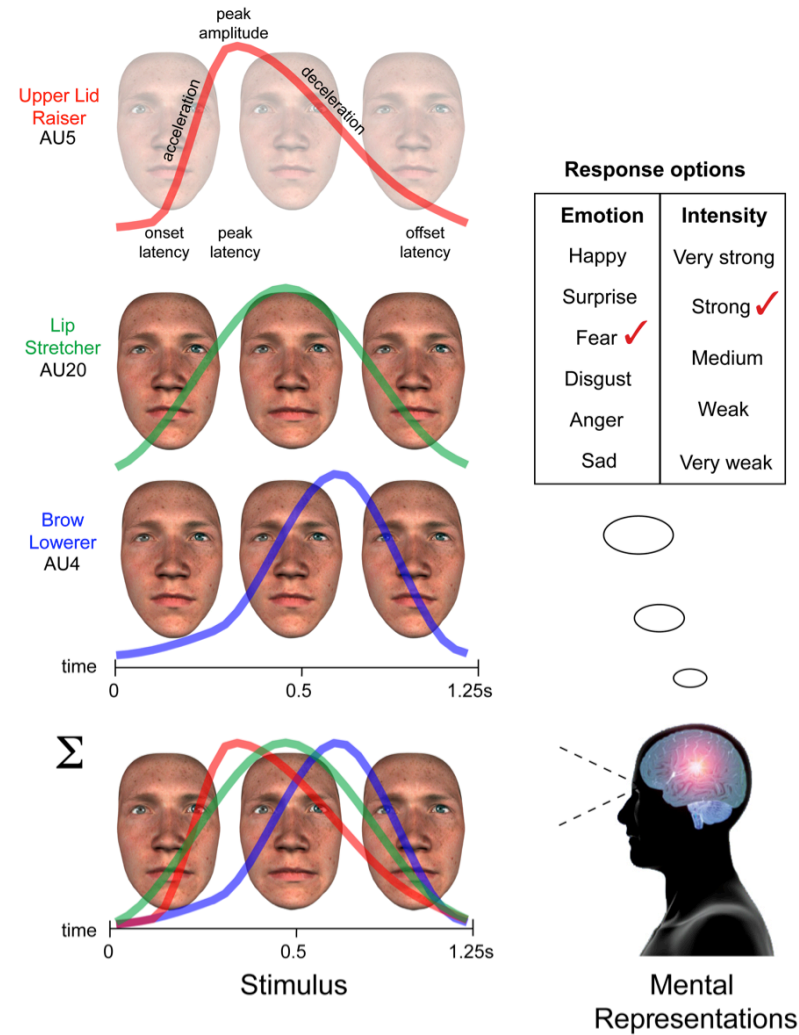
# Emotion Models: Plutchik's Wheel



Models opposing emotions and intensity!
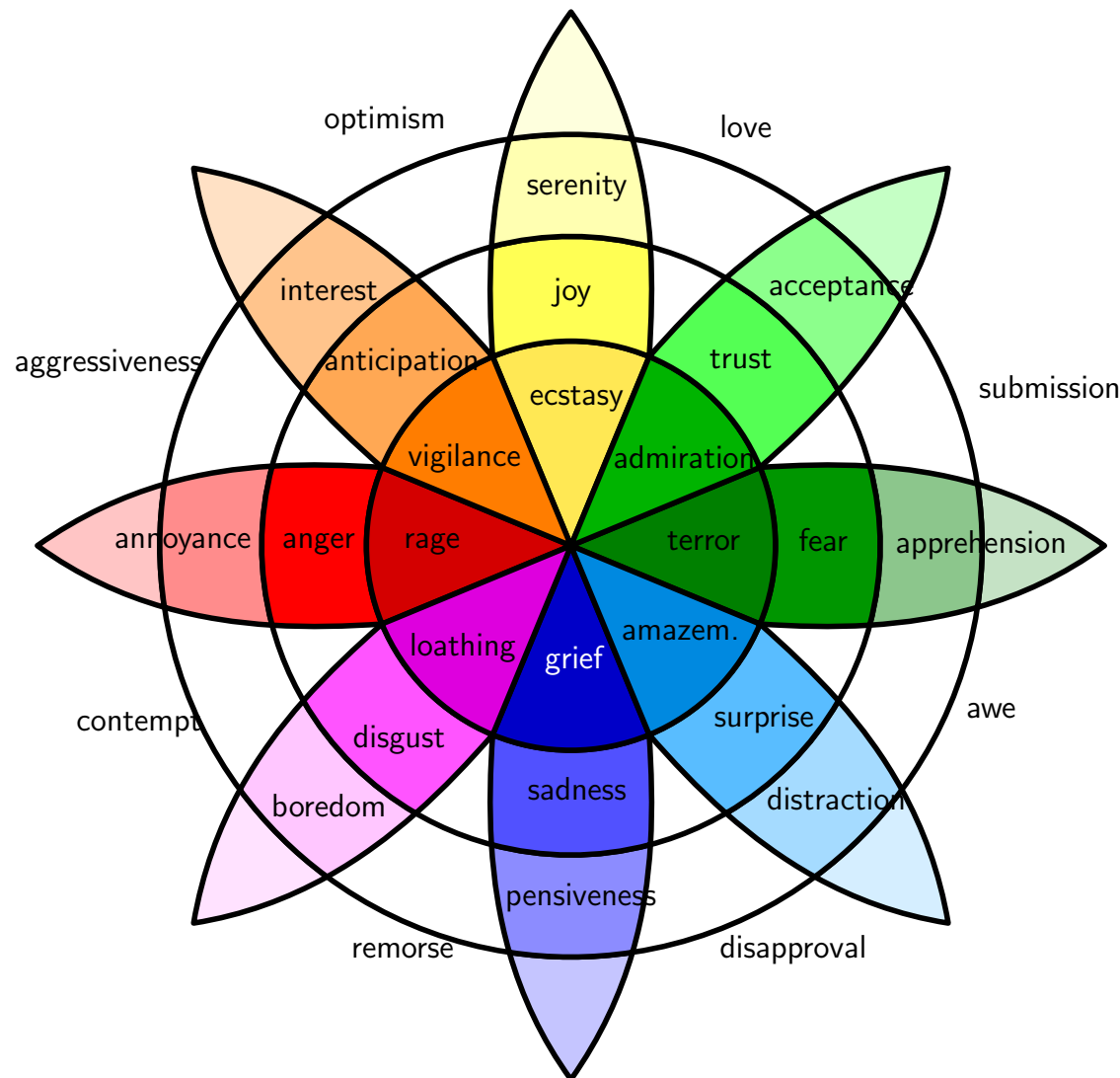
- Anger
- Anticipation
- Disgust
- Fear
- Joy
- Sadness
- Surprise
- Trust

# These and other emotion models…

…will be discussed briefly in the next session.

# Outline

Introduction
○○○○

What are Emotions?
○○○○○

Emotion Models
○○○○○○○

Goals and Formalities of this Class
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# 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.

Introduction
○○○○

What are Emotions?
○○○○○

Emotion Models
○○○○○○○○

Goals and Formalities of this Class
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# Isn't that just text classification?

Peter is afraid of Paul.

Peter hates Paul.

# Is it relevant? EA in Pharma Industry

Introduction
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What are Emotions?
○○○○○

Emotion Models
○○○○○○○○

Goals and Formalities of this Class
○○○○●○○○○○○○

# Is it relevant? EA in DH

Introduction
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What are Emotions?
○○○○○

Emotion Models
○○○○○○○○
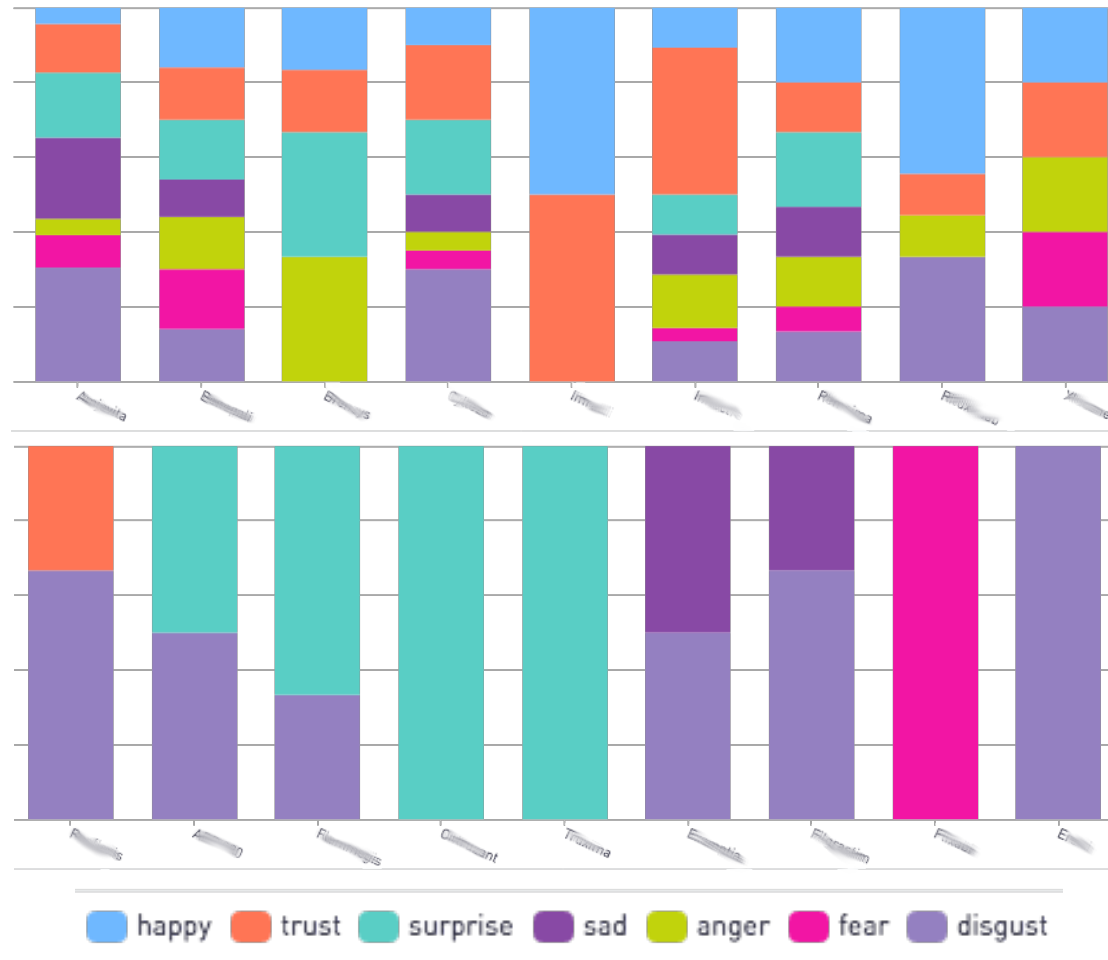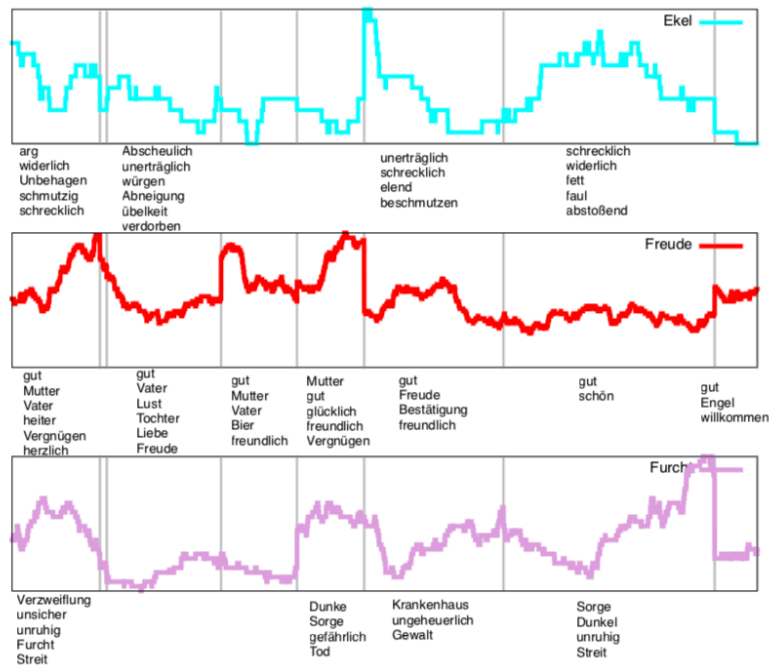
Goals and Formalities of this Class
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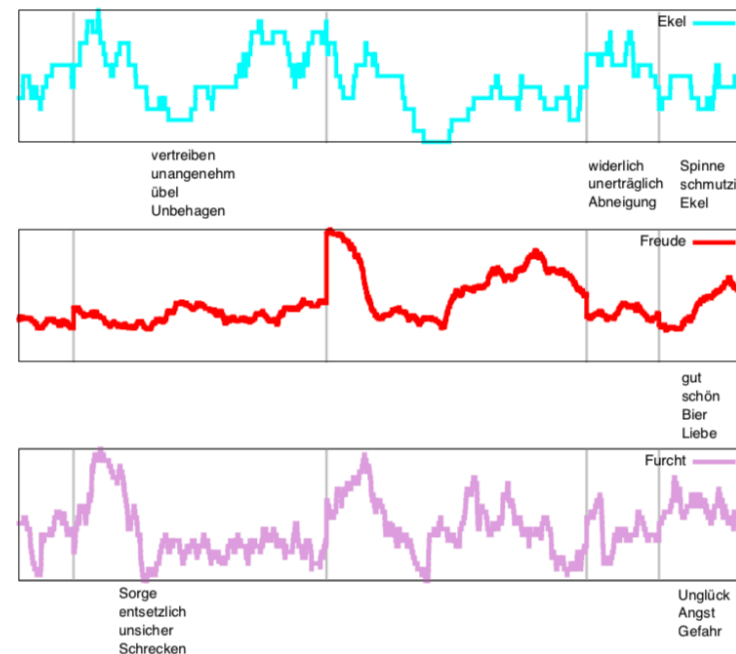
# Contact

- 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.)

Introduction
○○○○

What are Emotions?
○○○○○

Emotion Models
○○○○○○○

Goals and Formalities of this Class
○○○○○○●○○○○○

# 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 | |

Introduction
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What are Emotions?
○○○○○

Emotion Models
○○○○○○○○

Goals and Formalities of this Class
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# 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)

Introduction
○○○○

What are Emotions?
○○○○○

Emotion Models
○○○○○○○○

Goals and Formalities of this Class
○○○○○○○○●○○○○

# 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:

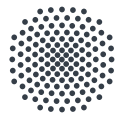`https://ilias3.uni-stuttgart.de/goto_Uni_Stuttgart_crs_`
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# Formalities

- 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:
  - $\approx$ 50 % Exercise submissions and presentations
  - $\approx$ 50 % Written exam at the end of the class (45 minutes)

- 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)

Introduction
○○○○

What are Emotions?
○○○○○

Emotion Models
○○○○○○○○

Goals and Formalities of this Class
○○○○○○○○○○○●○○

# Questions?

Introduction
○○○○

What are Emotions?
○○○○○

Emotion Models
○○○○○○○○

Goals and Formalities of this Class
○○○○○○○○○○○○●○

# Take Away

- Sets of emotions

- Emotion theories

- Components of emotions

- Formalities of this class

# Emotion Analysis

**(from text)**

Introduction + Psychology 1

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Roman Klinger