UNIVERSITÄT OSNABRÜCK

DECODING EMOTIONAL CONTENT FROM GIFS USING MEG DATA

by

Vera Klütz

A thesis submitted in partial fulfillment of the requirements
for the degree of Master of Science
Department of Cognitive Science
University of Osnabrück

First Supervisor: PD. Dr. rer. nat. Gordon Feld
Second Supervisor: Prof. Dr. rer. nat. Gordon Pipa
Submitted: August 9, 2024

Eidesstattliche Erklärung

Hiermit erkläre ich, Vera Klütz, die vorliegende Arbeit *Decoding emotional content from GIFs using MEG data* selbständig verfasst zu haben und keine anderen Quellen oder Hilfsmittel als die angegebenen verwendet zu haben.

Mannheim, den 9.8.2024

_____
Vera Klütz, 991846

Affirmation Statement

I, Vera Klütz, hereby certify that the work presented here is, to the best of my knowledge and belief, original and the result of my own investigations, except as acknowledged, and has not been submitted, either in part or whole, for a degree at this or any other university.

Mannheim, August 9, 2024

_____
Vera Klütz, 991846

Abstract

1 page This is going to be great! Keep on reading!

Acknowledgements

less than 1 page Thank you everyone!

Contents

List of Figures

List of Tables

1 Introduction

ca 40 pages for whole thesis
   3-4 pages
   Motivation to do this project,
   background
   aim of the project
   shortly say which methods are being used
   (Structure of this thesis?)

1.1   Section One

Hello. This is a citation: [Engel et al., 2013]. This is a figure (ref. Figure 1.1)

Figure 1.1: Data sampling rates per subject, controller condition

1.2   Section Two

Hello. This is a table (ref. Table 1.1).

Table 1.1: LMM Regression Results Overview

Model:	MixedLM	Dependent Variable:	Gaze
No. Observations:	1400	Method:	REML
No. Groups:	10	Scale:	1.0
Min. group size:	90	Log-Likelihood:	-1700.0
Max. group size:	130	Converged:	Yes
Mean group size:	120		

2 Current State of Research

15 pages

Literature overview and stand der Forschung
theoretical concepts and models
conceptual framework
'Something like: In order to assess the current state of research for this task, it has to be divided into three subtasks. For each of one of them, major choices have to be made in order to successfully

2.1 Emotional Processing

In order to be able to decode emotional content it has to be stated what 'emotional' means. Since the adjective links to the broader concept of 'emotions', the question arises what emotions are and how to measure them.

Ekman and Cordaro define that 'Emotions are discrete, automatic responses to events, forming a family of related states with at least 12 characteristics' [Ekman and Cordaro, 2011]. This definition highlights the automatic nature of emotional responses as well as the connectedness between those emotional states. However, it is debatable which characteristics fully describe the different states and how many core emotions there are. Vytal and Hamann conducted a meta-analysis and 'identified consistent neural correlates for five basic emotions: fear, anger, disgust, sadness, and happiness' [Vytal and Hamann, 2010]. It is important to note that this meta-analysis does not divide emotions based on philosophical conclusion or by observing facial expressions, but by looking at neural correlates. For this thesis, being able to measure emotions is a necessary premise and neural activity is a measurable physiology. Still, the continuous neural activity has to be mapped to discrete emotions, as Ekman and Cordaro already pointed out above.

Another way to describe an emotion, which is easier to standardize between people and less dependent on the usage of the same linguistic terms, is by using the valence and arousal model. According to Colibazzi et al., 'Emotions are linear combinations of valence and arousal' [Colibazzi et al., 2010]. This means that an emotion can be assessed by its position on these two scales, with valence ranging from 'negative' to 'positive' and arousal diverging from 'calming' to 'exciting' [Kensinger, 2004].

Elicit emotions? chromatic map?
- Scherer

- Valence Arousal Wund is the first one - e.g., Lang, Greenwald, Brad- ley, Hamm, 1993; Mehrabian Russell, 1974; Russell, 1980) Hello

2.2 Data Preprocessing

Hello

2.3 Feature Selection

Hello

2.4 machine learning model, classifier,.. selection

Hello

3 Methodology

5-10 pages
    Description of Methods:
    preprocessing
    state/ explain data getting procedure, high arousal, different valences
    Machine learning, ´classification vs regression, linear regression

3.1 Section One

Hello

3.2 Section Two

Hello

4 Results

5-20 pages

4.1 Section One

Hello

4.2 Section Two

Hello

5 Discussion

5-10 pages
 Interpretation of Results
 Answering the Forschungsfrage if applicable
 bring it back to the literature/theoretical background
 implications for further research

 Conclusion/Fazit at the end? 3-4 pages
 -¿ leave it out at it is the same as above!?!
 summary of most important findings
 critical refelction

5.1 Section One

Hello

5.2 Section Two

Hello

Bibliography

[Colibazzi et al., 2010] Colibazzi, T., Posner, J., Wang, Z., Gorman, D., Gerber, A., Yu, S., Zhu, H., Kangarlu, A., Duan, Y., Russell, J., and Peterson, B. (2010). Neural systems subserving valence and arousal during the experience of induced emotions. *Emotion*, 10 3:377–89.

[Ekman and Cordaro, 2011] Ekman, P. and Cordaro, D. T. (2011). What is meant by calling emotions basic. *Emotion Review*, 3:364 – 370.

[Engel et al., 2013] Engel, A. K., Maye, A., Kurthen, M., and König, P. (2013). Where's the action? The pragmatic turn in cognitive science. *Trends in Cognitive Sciences*, 17(5):202–209.

[Kensinger, 2004] Kensinger, E. (2004). Remembering emotional experiences: The contribution of valence and arousal. *Reviews in the Neurosciences*, 15:241 – 252.

[Vytal and Hamann, 2010] Vytal, K. and Hamann, S. (2010). Neuroimaging support for discrete neural correlates of basic emotions: A voxel-based meta-analysis. *Journal of Cognitive Neuroscience*.

A Appendix One

This is the first appendix
Hello

B Appendix Two

This is the second appendix
Hello