

2023-12-06

# Neuromarketing algorithms for digital marketing strategies: ethics

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M. Goncalves. 2023. "Neuromarketing Algorithms for Digital Marketing Strategies: Ethics" <https://doi.org/10.13140/RG.2>  
<https://hdl.handle.net/2144/50285>

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Metropolitan College



APPLIED RESEARCH  
INTERNATIONAL  
CONFERENCES

Presented at

Applied Research International Conference on Multidisciplinary Studies &  
Education (ARICME), 2023

University of Oxford, Oxford, United Kingdom

December 06-07, 2023

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# Neuromarketing Algorithms' Consumer Privacy and Ethical Considerations: Challenges and Opportunities



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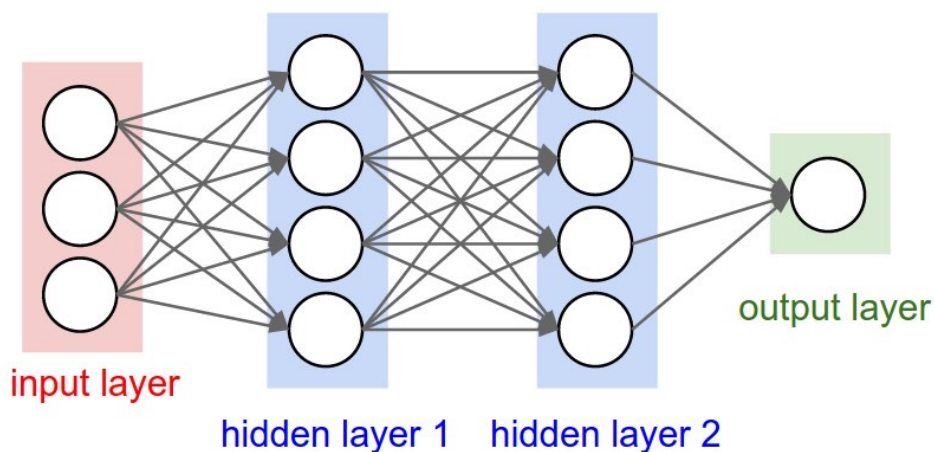
## Research Over

- ✓ New advances in neuromarketing contribute to the competitiveness of businesses and their marketing strategies.
- ✓ Nevertheless, the increasing use of neuromarketing algorithms in consumer response analysis, such as Artificial Neural Networks (ANN), Support Vector Machine (SVM), and Latent Dirichlet Allocation (LDA), among other machine learning (ML) algorithms for analyzing customer behavior, is followed by ethical concerns.
- ✓ This research relies on a rule utilitarianism theory, which attempts to develop guidelines and strategies to develop and capture value within the ethical boundaries of customer behavior targeting.
- ✓ Neuromarketing opportunities and ethical considerations are investigated through a combination of semi-structured interviews with neuromarketing practitioners and academic researchers.
- ✓ By combining the theoretical and practical insights, ethical issues were identified, and guidelines divided into stakeholder groups.
- ✓ The model can serve as a framework for ethical neuromarketing strategies and practices.

# Standardization of Terms

**Artificial Neural Networks**, or neural networks (neural nets), are computing systems inspired by the biological neural networks that constitute animal brains. An ANN is based on a collection of connected units or nodes called artificial neurons, which loosely model the neurons in a biological brain.

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# Standardization of Terms

**Support Vector Machine**  
supervised learning model  
that analyze data for classifi

## ML-SVM Applications

01

Face  
Detection

02

Text and  
Hypertext  
Classification

03

Classification  
of Images

04

Stenographic  
Detection  
in Digital  
Images

05

Protein Fold  
and Remote  
Homology  
Detection

06

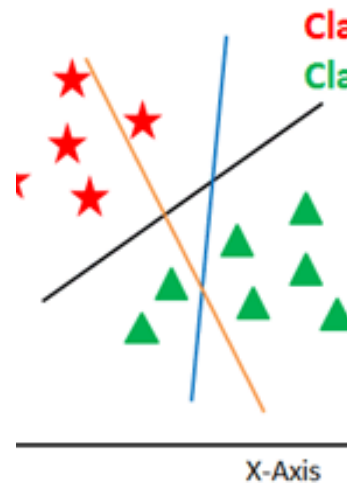
Handwriting  
Recognition

07

Generalized  
Predictive  
Control

08

Inverse  
Geosounding  
Problem

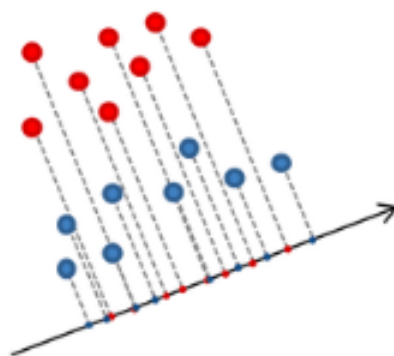


# Linear Discriminant Analysis

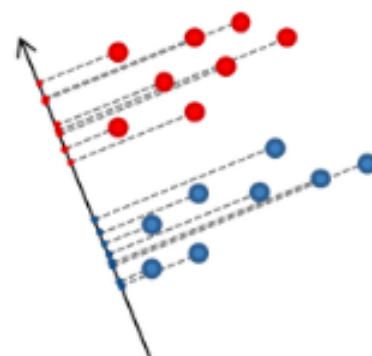
Labelled data



PCA projection:  
Maximising the variance of  
the whole set



LDA projection:  
Maximising the distance  
between groups

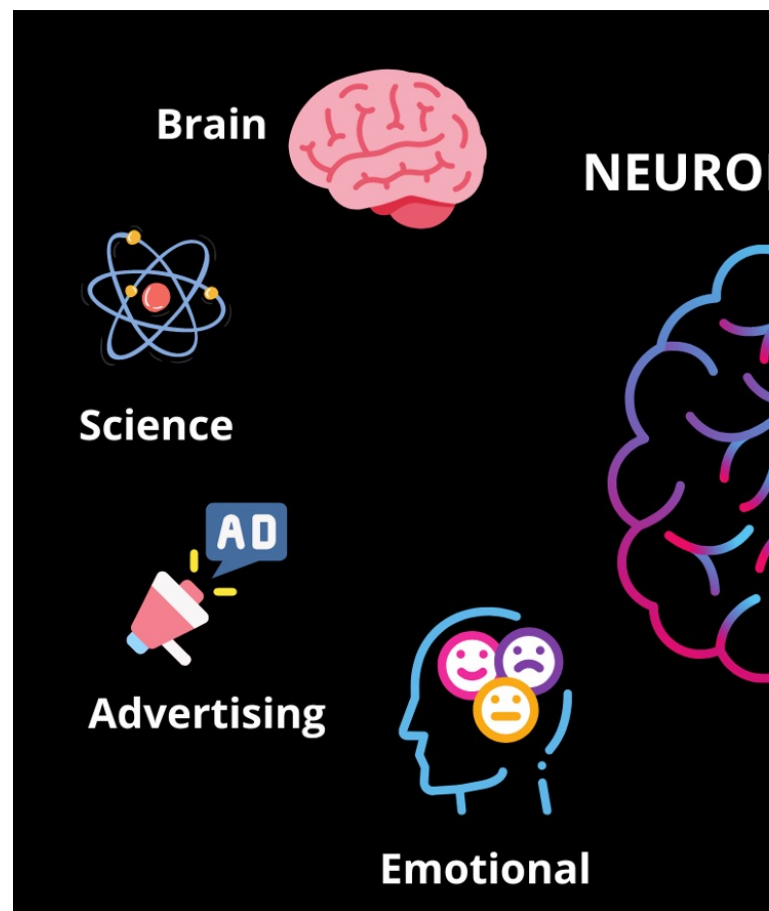


# Neuromarketing Applications

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Greater availability of neuromarketing technologies and often embedded AI software enables marketers to reduce the time spent analyzing consumer behavior and preferences, segmentation, and organizing targeting campaigns, thus, increasing the marketing strategies success and productivity ratios.

The general belief is that neuromarketing technologies and AI algorithms improve marketing and sales operations and customer service and personalization. NeuroFocus is a good example.



# Review of the Literature

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Several scholars have investigated the ethical risks of AI and ML algorithms (Stanton, Sinnott-Armstrong, and Huettel, 2017; Hensel, Wolter, and Znanewitz, 2017; Kritikos, 2018; Magalhães, 2018; Susser, 2019; Sample et al., 2020; Sætra, 2020; Attié, Bars, and Quenel, 2021; Sidorenko, Khisamova, and Monastyrsky, 2021), ***but the emphasis has not explicitly been on those in neuromarketing.***

As a result, the literature on ethical issues of ML algorithms and how they emerge in the neuromarketing industry is addressed in this study.



# Research Objectives

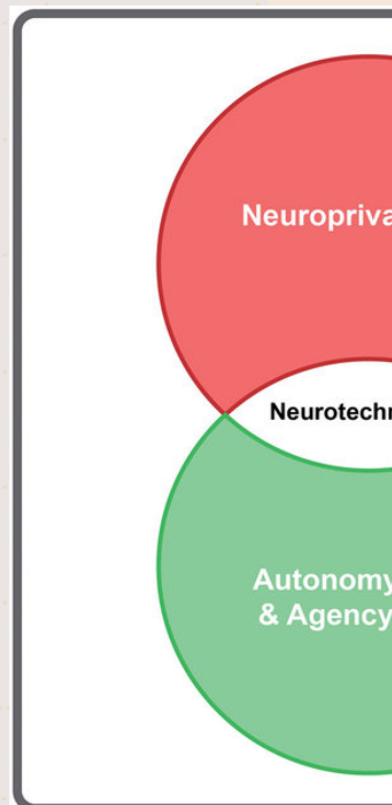
The extant literature **lacks explicit guidance on how neuromarketing algorithms, and machine learning, can continue to operate effectively and ethically.**

This research seeks to offer guidelines to assist market researchers, marketing professionals, data scientists, and developers in using neuromarketing and machine learning algorithms ethically for consumer behavior and preferences, customer segmentation, and buyer targeting while maintaining the benefits provided to customers and businesses across industries.

The overarching question this research attempts to answer is: **How can businesses create and retain value within the ethical boundaries of neuromarketing, customer segmentation, and targeting?**

Such overarching question can be broken down into the following questions:

1. What are the advantages of neuromarketing algorithms in understanding consumer preferences, customer segmentation, and targeting?
2. What are the ethical perils of neuromarketing algorithms in understanding consumer preferences, customer segmentation, and targeting?
3. What are the existing guidelines for ethical neuromarketing algorithms and their limitations?
4. What further guidelines are needed for the use of neuromarketing algorithms in consumer behavior and targeting?





# Research

A qualitative approach based on secondary and primary data:

✓ Secondary:

- ✓ Literature review from the U.S. and Spain, in English and “Spanish” (Castilian & Catalan) for the past seven years.

✓ Primary:

- ✓ Online survey (Qualtrics) in the U.S. and Spain
- ✓ Semi-structured interviews in the U.S. and Spain with neuromarketing industry practitioners and academic scholars
- ✓ n= 120 responses and ~13 interviews (7 in the U.S. and 6 in Spain)
- ✓ Data analysis and testing for statistical significance
- ✓ Implication to theory and management
- ✓ Policy recommendations

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# Summary of Semi-Structure



## AI/ML Algorithms Added Value to Business & Consumers

- Ability to handle large amount of data
- Ability to handle unstructured/structured data
- Fast and efficient
- Predictive capabilities
- Customized/personalized services
- Greater content generation
- Greater consumer engagement.
- Lower CPA.

- Privacy
- Bias
- Prejudice
- Autonomy and nudging
- Opacity.



## GDPR Guidelines

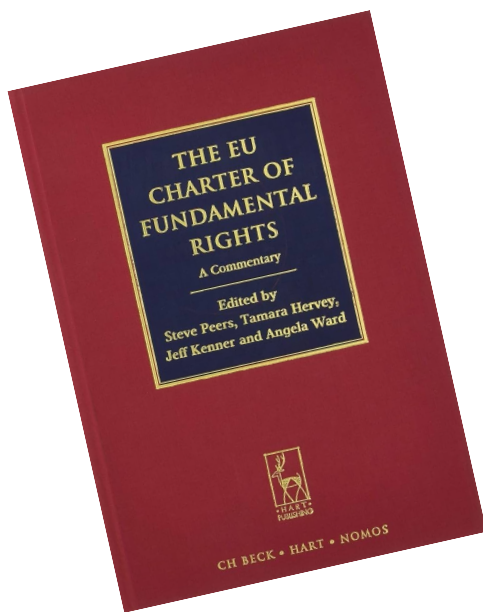
- Security certification
- Output fairness
- Consent data collection and analysis
- Education of data subjects on profiling
- Discrimination is prohibited
- Privacy-preserving design
- Establish international organizational policy
- Enable data subject to access and object their personal data.

- Bans re-identifiable d
- Can stifle innovation
- Creativity hindering
- High cost of complian
- Unclear who and how
- Consent does not me
- Does not address up-
- Almost no connection
- importance of decisio

Figure 6 – Summary of Semi-Structure Inter

# Ethical Issues of AI/ML Segmentation

**Table 2: Charter of the Fundamental Rights of the EU's violated by (2000).**

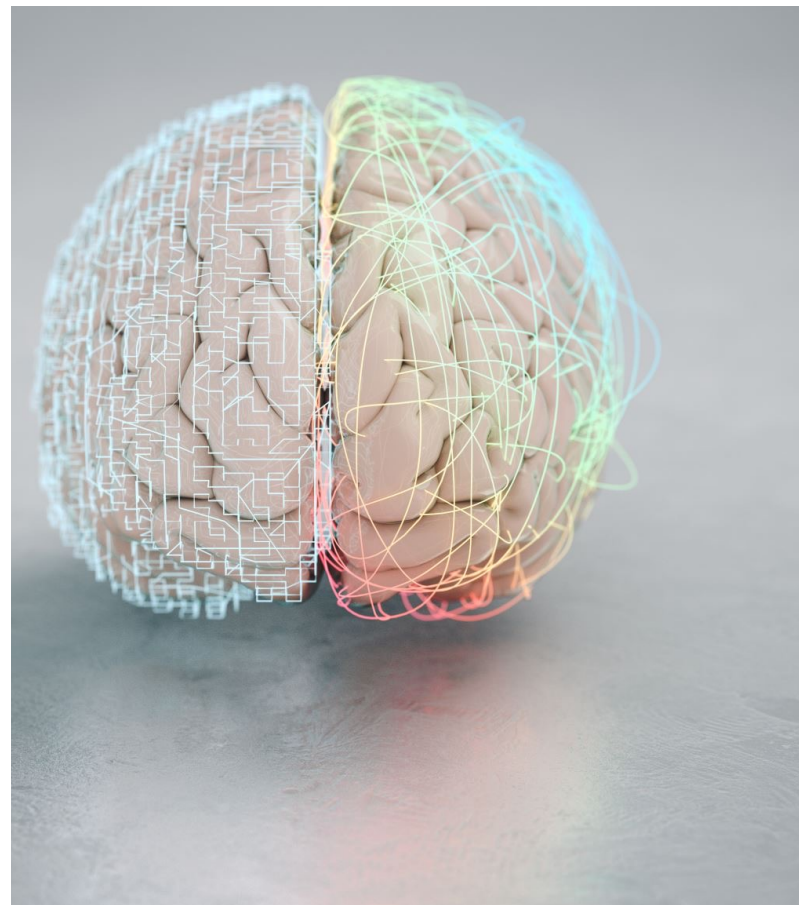


Article No	Fundamental Human Rights
1	Human dignity
3	Right to the integrity of the person
7	Respect for private and family life
8	Protection of personal data
10	Freedom of thought, conscience, and religion
21	Non-discrimination
23	Equality between men and women
26	Integration of persons with Disabilities



# Findings: Eth

One of the key ethical concerns surrounding neuromarketing is the potential for manipulation. By understanding how the brain responds to marketing stimuli, critics suggest, companies might be able to manipulate consumers into making decisions that they would not have made otherwise.

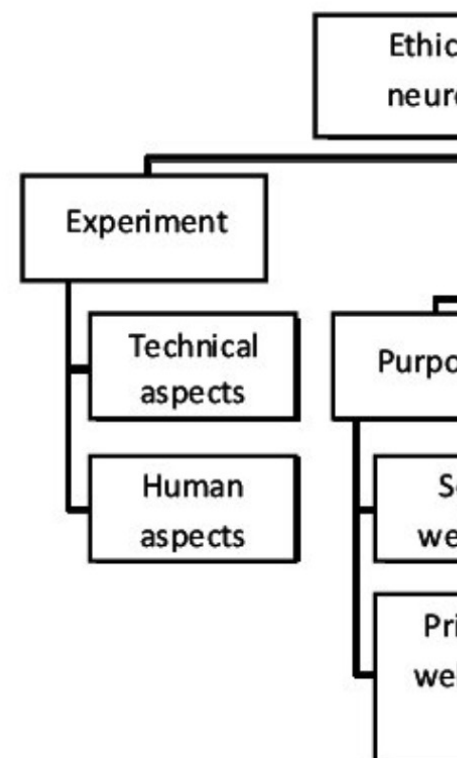


# Summary of Recommendations and Neuroethics Implications

Scope of management and public policy recommendations, especially in the absence of an EU GDPR-style regulation. The California Privacy Rights Act and the 2021 California Consumer Privacy Act brings hope to more comprehensive consumer protection.

Primary ethics' public policy recommendations for neuromarketing include:

- **Informed consent:** During experiments, participants must be fully informed regarding the objectives, data gathered, and its application and have the right to withdraw at any time.
- **Confidentiality and privacy:** Personal and related data must be kept confidential and secure. It should be used only for the purposes for which it was collected and not be shared with anyone without consent.
- **Avoid manipulation:** Neuromarketing must not be used to manipulate consumers into making choices not in their best interests. Marketing messages must be transparent and genuine and not use subconscious cues to exploit their behavior.
- **Respect for autonomy:** Consumers should make their own choices. Neuromarketing should not undermine this autonomy. Marketing messages inform and educate rather than coerce them into making informed choices.
- **Social responsibility:** Research should be performed with social responsibility and DEI in mind, considering the possible effects of marketing messages on vulnerable populations such as children, minorities, and those with mental health issues. Marketers should develop socially responsible campaigns promoting positive values and behaviors.





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