

Normative Modeling a Framework for clinical Machine Learning

Computational Psychiatry Course

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INTRODUCTION

What is Machine Learning?



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What is Machine Learning?

Put simply, you program a machine to learn on its own.

You do this via algorithms of different complexity.



What is Machine Learning?

In the previous lectures you
may have heard terms such as

...

Supervised learning
Unsupervised learning
Reinforcement learning

...



INTRODUCTION

What is Machine Learning?

In the previous lectures you
may have heard terms such as

...

Supervised learning
Unsupervised learning
Reinforcement learning

...

as well as normative modeling



INTRODUCTION

What is Normative Modeling?

Normative modeling is
a framework for machine
learning

...

Normative modeling is not an
algorithm such as a Bayesian
Linear Regression

...

However, you can use
algorithms within this
framework

...

But How?



NORMATIVE MODELING





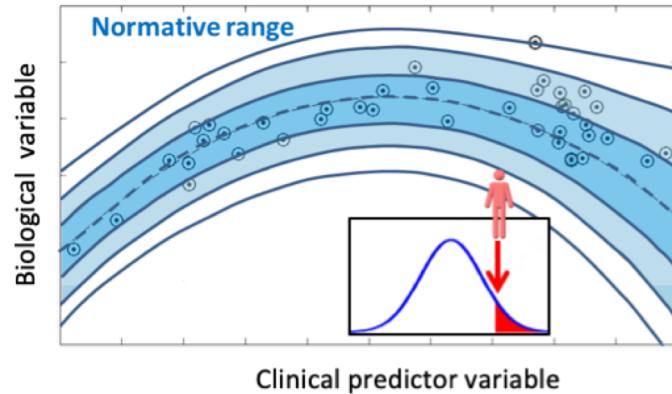
NORMATIVE MODELING





NORMATIVE MODELING

$$y = \mathbf{w}^T \phi(\mathbf{x}) + \epsilon_s$$

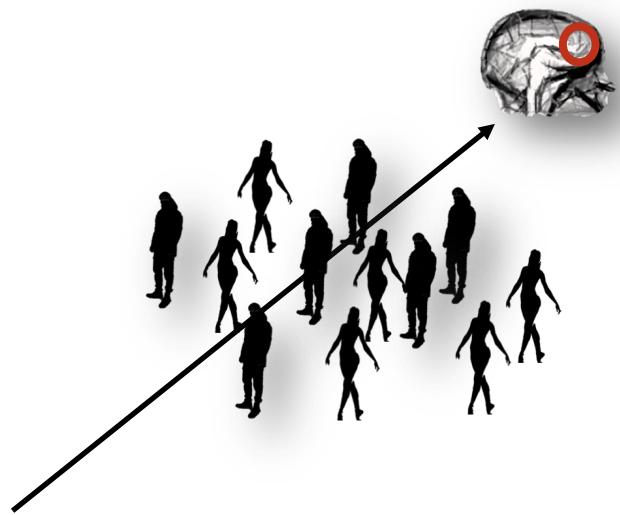


- Instead of (basic) polynomials we use B-spline basis functions.
- Parameter estimation based on Bayes Theorem and the priors are normally distribution over the model parameters.
- This regression approach can be plugged into the normative modeling framework and will be used for the practical.

Please read Huertas et al. 2017 (NeuroImage) as well as Fraza et al. 2021 (Archive) for more information on the algorithm. We can discuss the content of these papers in the end if there is an interest.

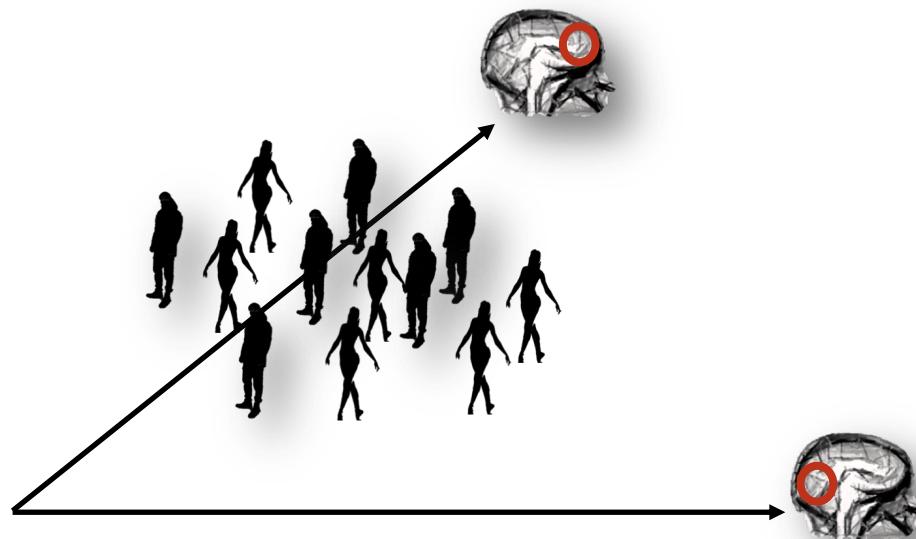


NORMATIVE MODELING



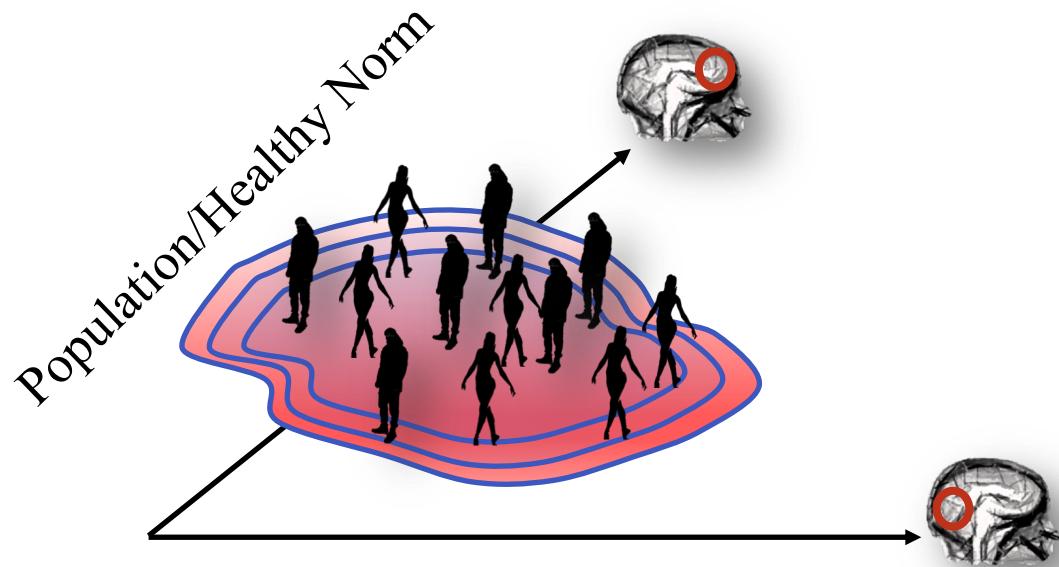


NORMATIVE MODELING



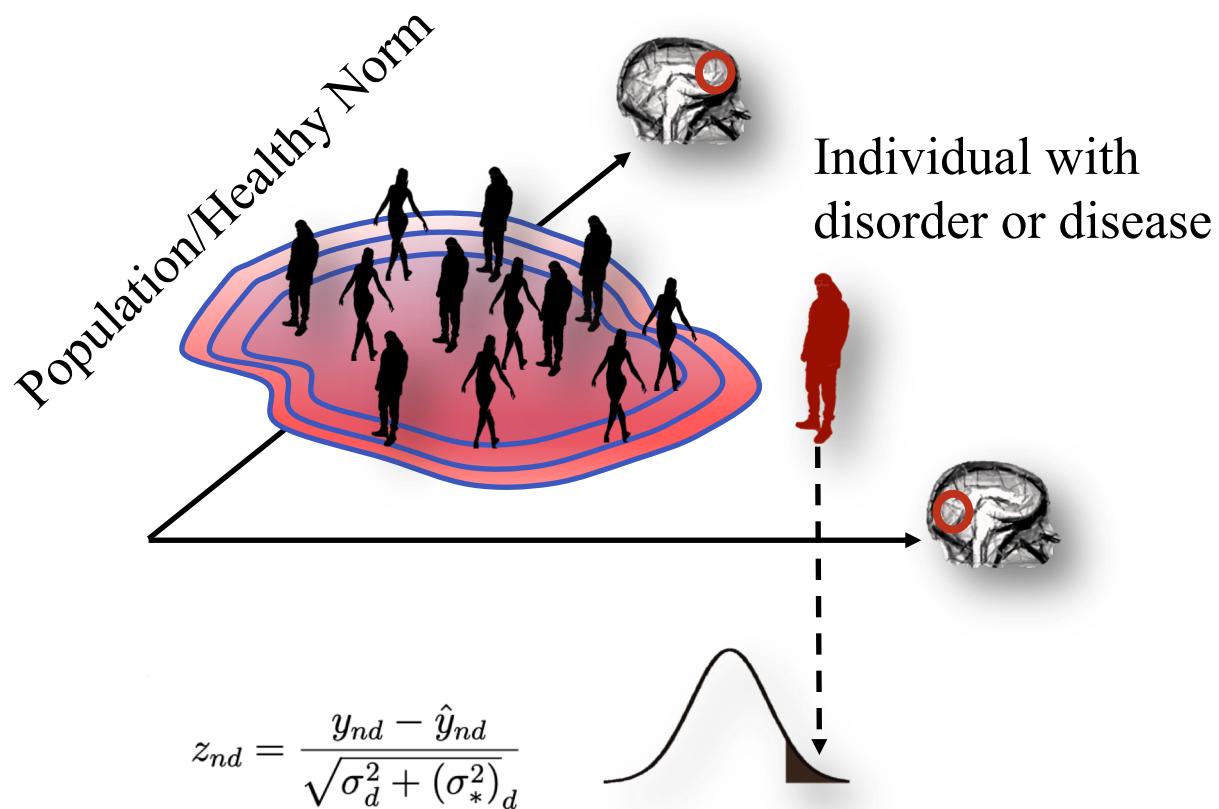


NORMATIVE MODELING



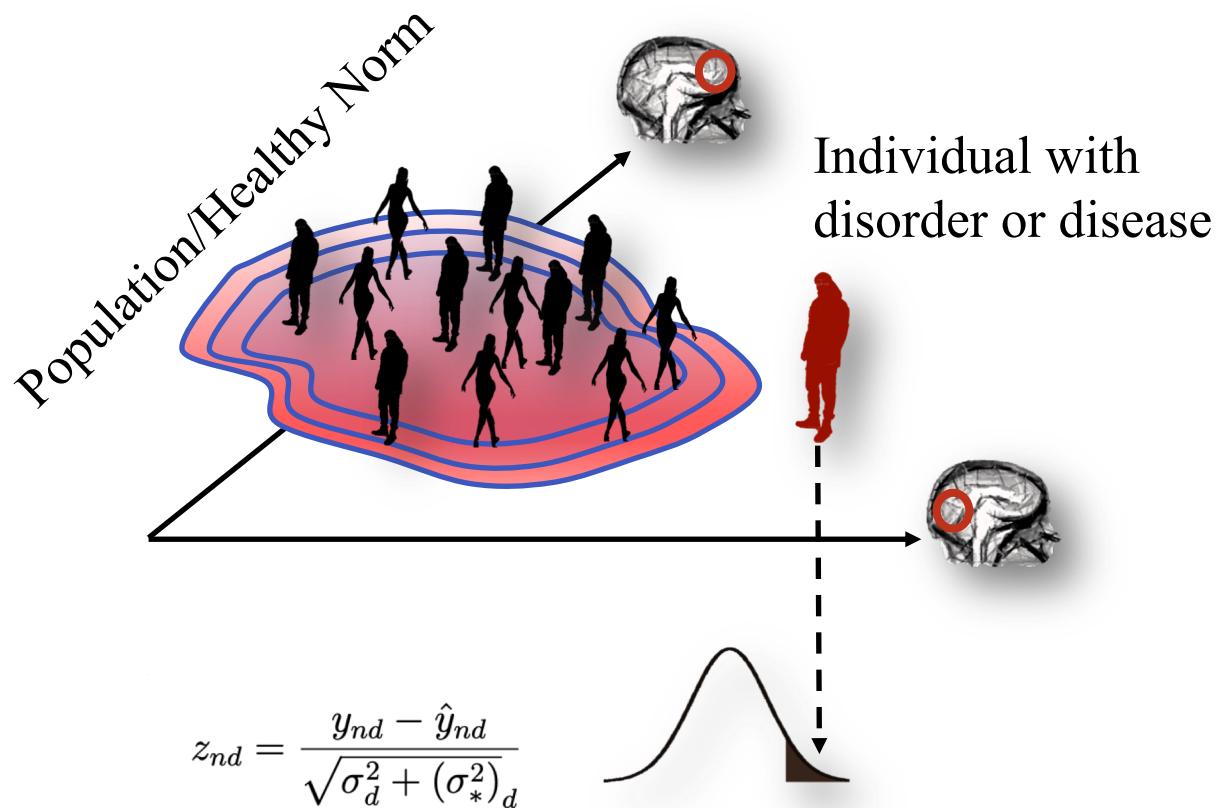


NORMATIVE MODELING





NORMATIVE MODELING





 Predictive Clinical Neuroscience Lab

Search docs

GETTING STARTED

- Installation

BACKGROUND

- PCN toolkit Background
- Intro to normative modelling

FUNCTION & CLASS DOCS

- Module Index

CURRENT EVENTS

- Updates

TUTORIALS

- Gaussian Process Regression
- Bayesian Linear Regression
- Hierarchical Bayesian Regression
- Braincharts: fit model
- Braincharts: apply (transfer to new data)

OTHER USEFUL STUFF

» Predictive Clinical Neuroscience toolkit

 Edit on GitHub

Predictive Clinical Neuroscience toolkit

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