



LUNDS  
UNIVERSITET

# Past, Present, and Future

What has Frida been doing?

Frida Heskebeck | Friday seminar | 2021-02-05



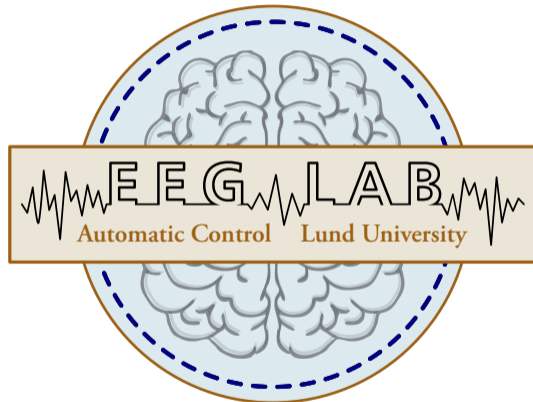


# Outline

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- 1 BCI
- 2 EEG Lab @ Automatic Control
- 3 Fridas activities
- 4 Master's Theses





# BCI systems

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- BCI - Brain-Computer Interface
  - EEG-based
  - Help disabled persons
  - Future - everyday life
- Calibration
  - Every session
  - Transfer learning
  - Interactive calibration
  - Tiny amount of data



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# Who are we?

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**Bo**



**Johan**



**Carolina**



**Frida**



**Olle**



**Martin**

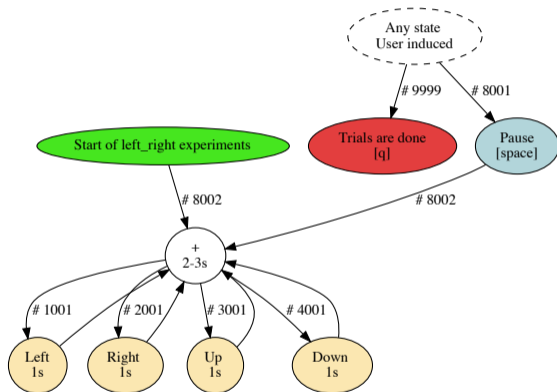


**Pex**





# Pipeline



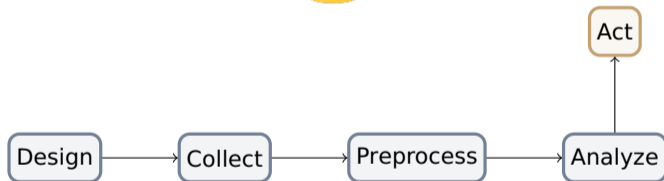
- Design experiment
- Data collection
- Preprocess
  - MNE
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  - Tensorflow / Scikit-learn



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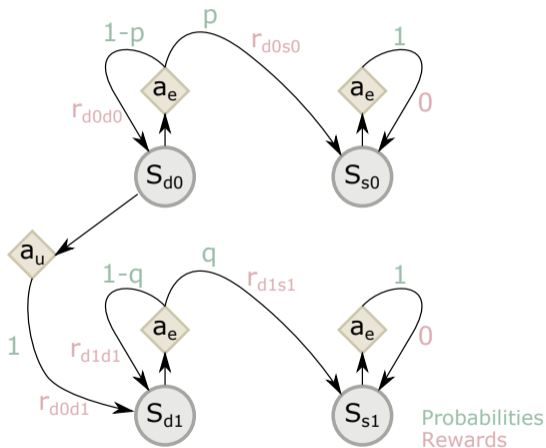


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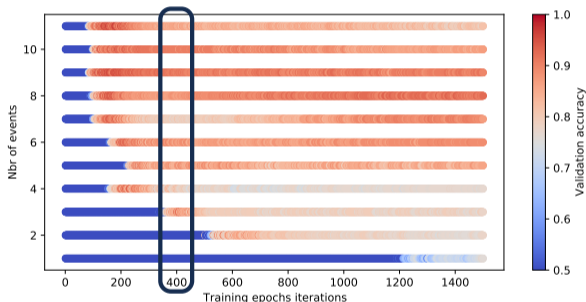




- Solve task while calibrating
- States
  - $s_d$  - Dissatisfied user
  - $s_s$  - Satisfied user
  - $s_{xi}$  - number of model updates
- Actions
  - $a_e$  - Listen to EEG signal
  - $a_u$  - Update model
- What action is best to take?



# Accuracy improvement with more data



- *y-axis*: How many sets of labeled data
- *x-axis*: Training epochs for ML-algorithm
- *color*: Validation accuracy



# Master's Theses

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- Johanna Wilroth (Vt 2020) - *Domain Adaptation for Attention Steering*
  - LTHs jubileumsstipendium 2020
- Tom Andersen (Now) - *Towards Real-Time BCI Control*



**Thank You for Listening!**

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**Thank You!**