Resources for Course project and some demos

Some related topics …

- Brain decoding: pictures, video, music, text
- AI for clinical applications:

  segmentations, diagnosis,

  Signal processing (train NN to replace some procedures),

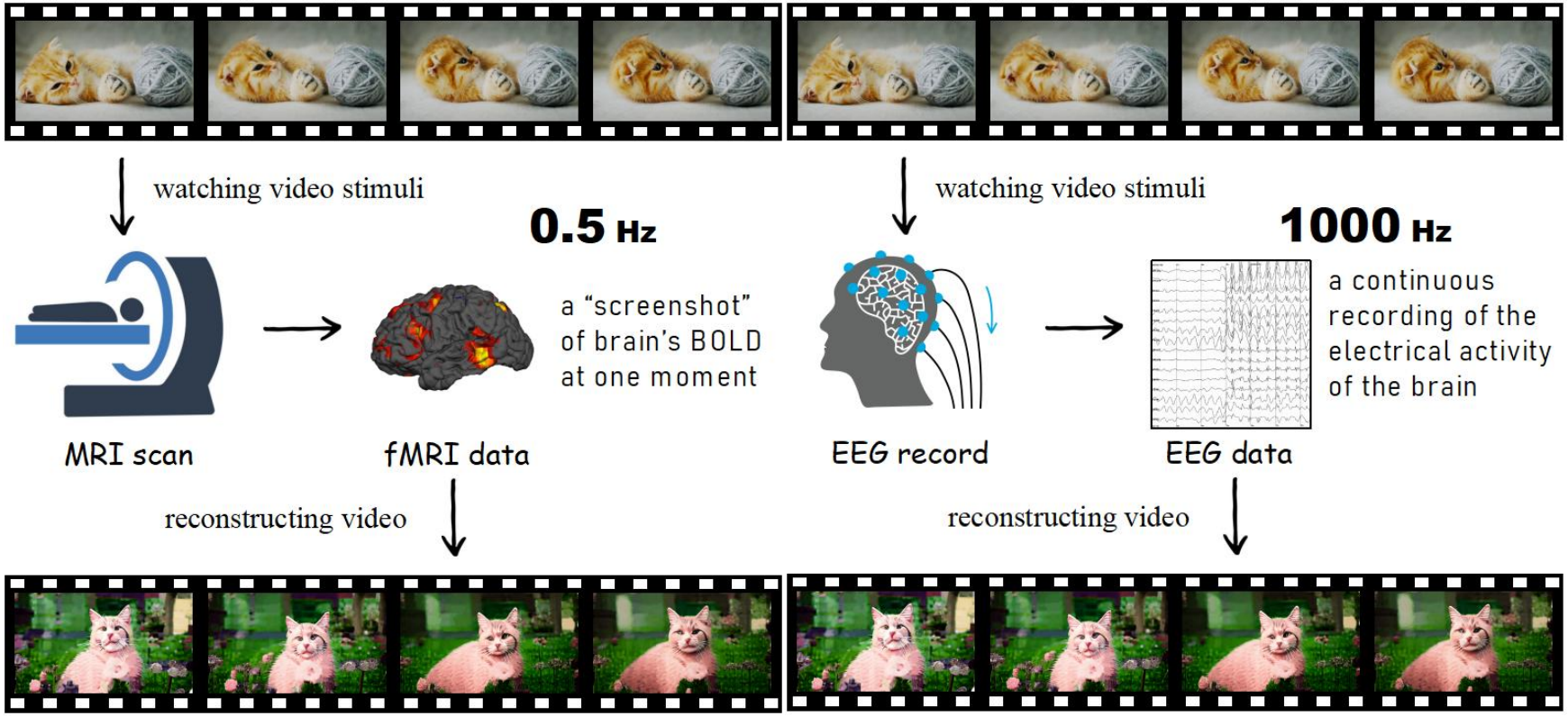
  imaging inverse problem(super resolution, source estimation,

  Neural Radiance Fields)

etc … (Foundation model for brain signal …

Brain Decoding

EEG2Video: Towards Decoding Dynamic Visual Perception from EEG Signals [Neurips 2024]
https://bcmi.sjtu.edu.cn/home/eeg2video/

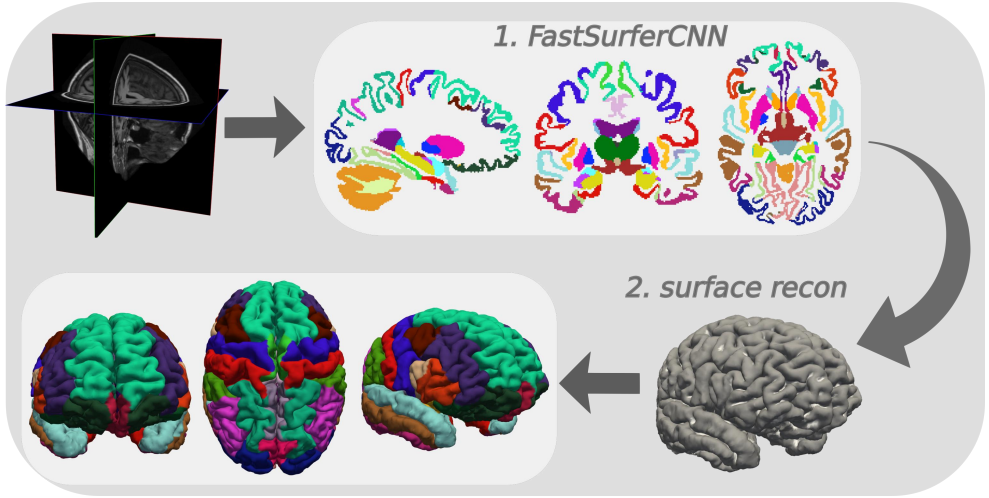


Video Stimuli

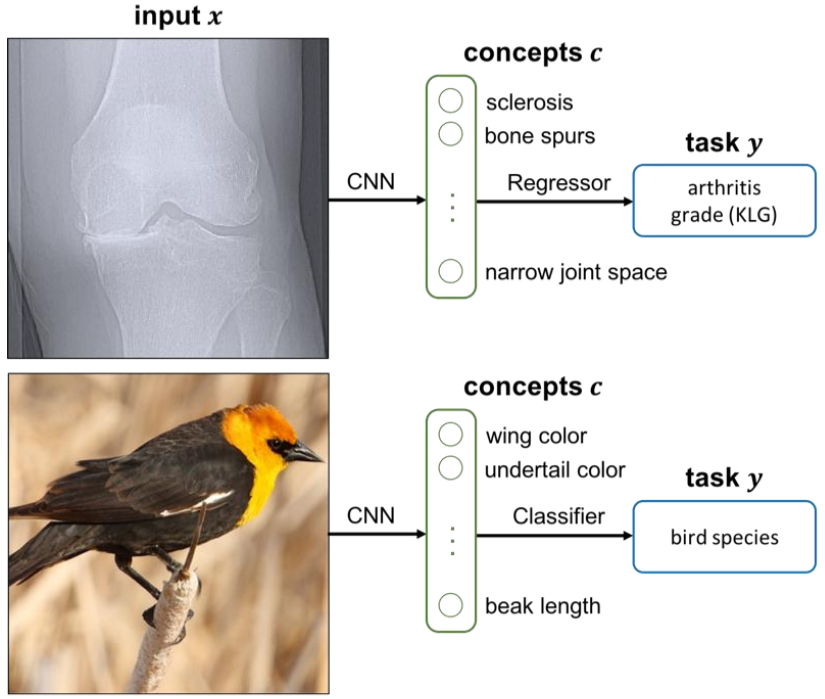
Decoding

AI for signal processing and clinical applications

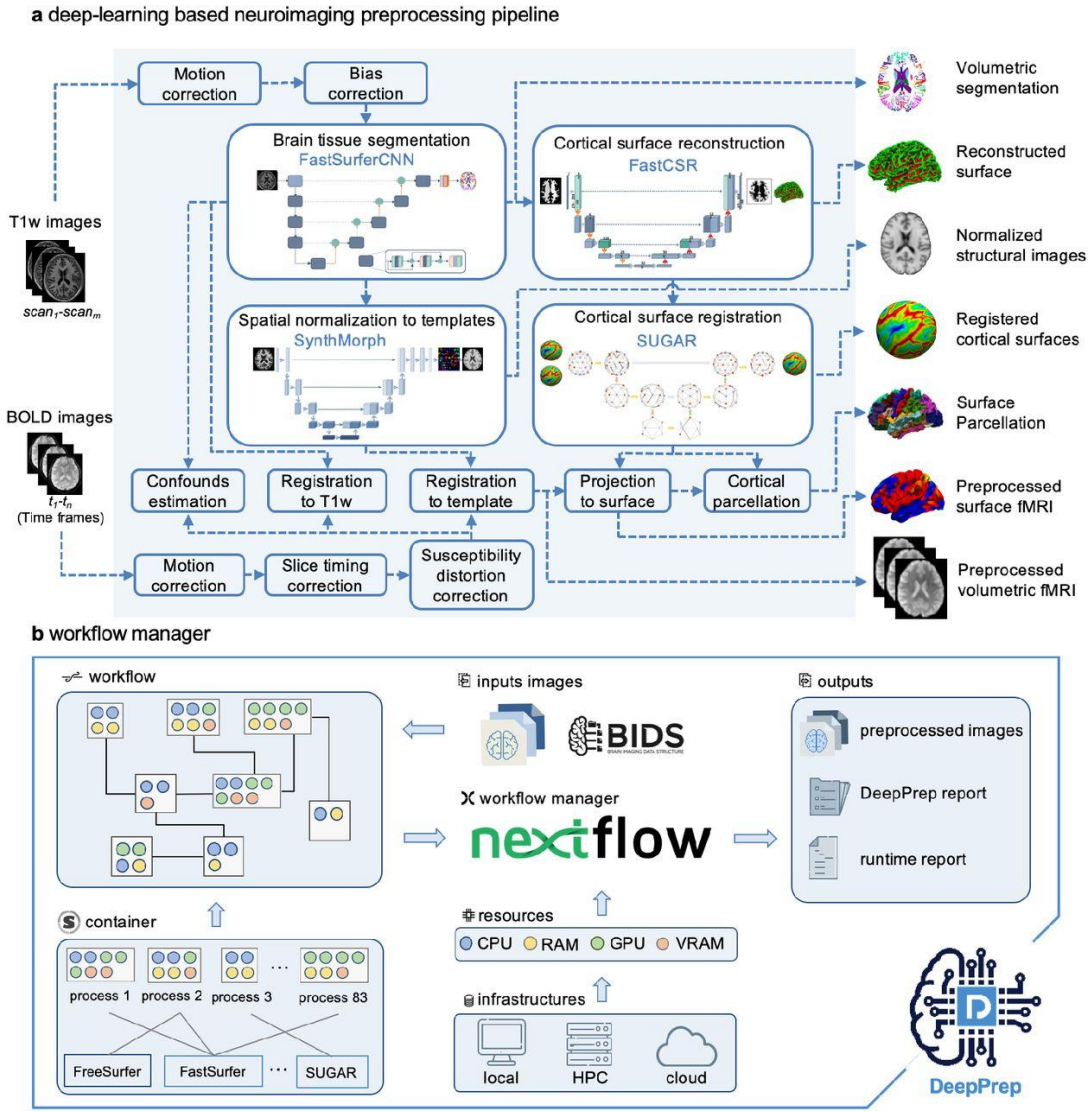
Image Segmentation - Fastsurfer



Learning Bottleneck Concepts in **Image Classification**
https://github.com/yewsiang/ConceptBottleneck



MRI processing - DeepPrep



EEG source estimation- DeepSIF

https://github.com/bfinl/DeepSIF

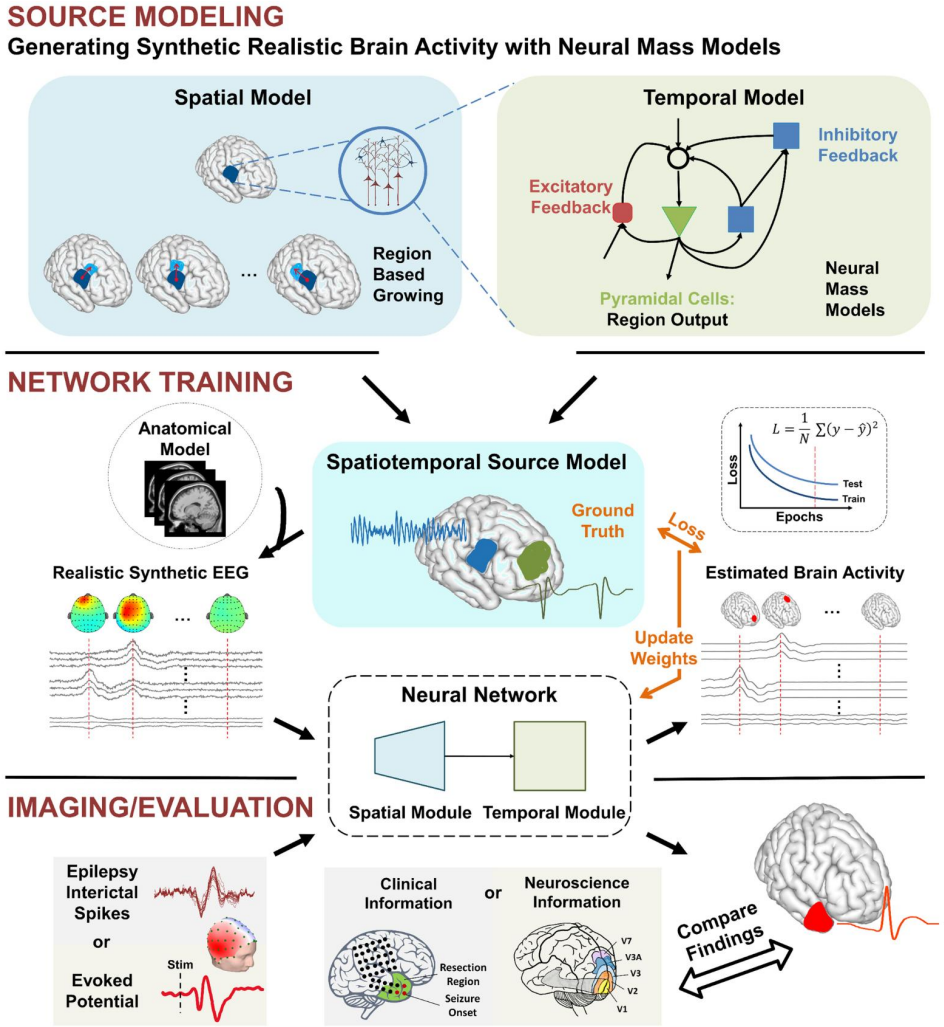
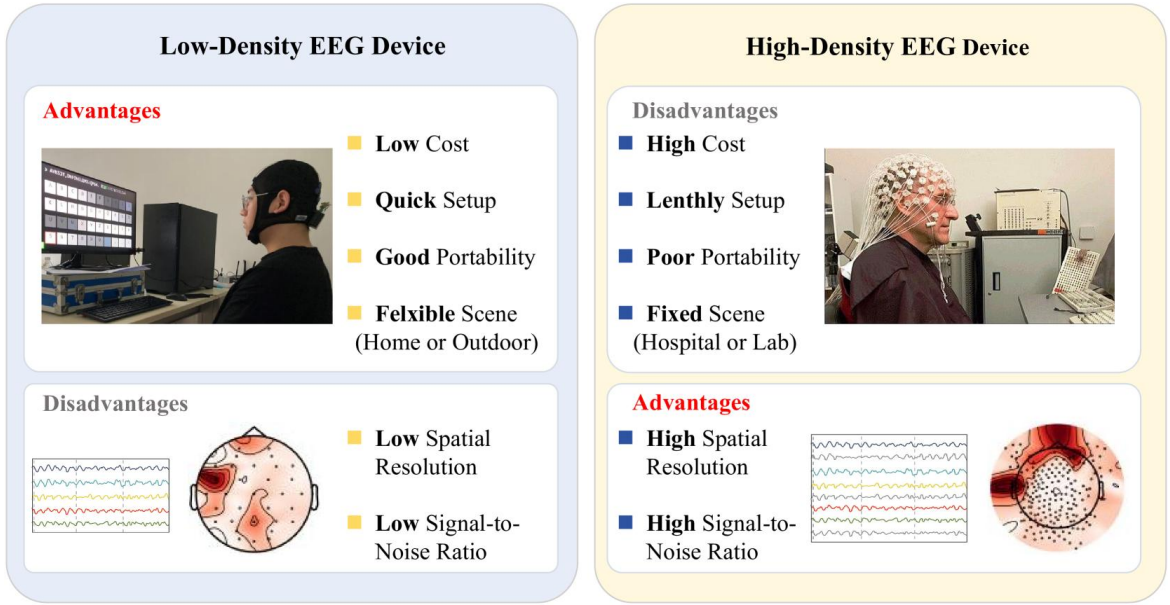
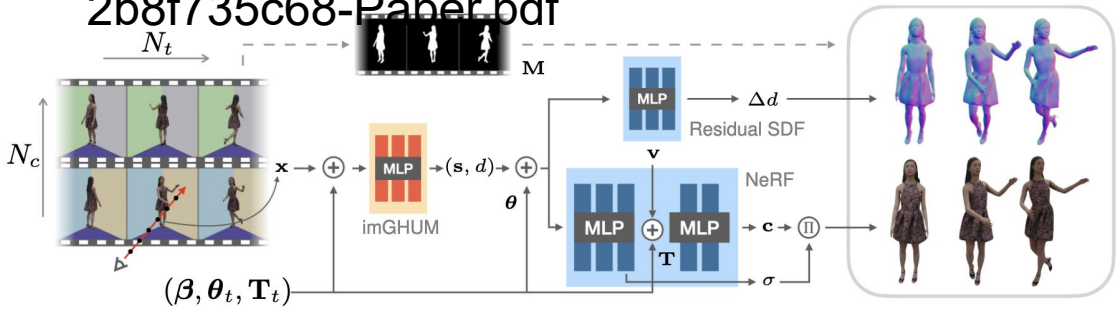


Image inverse problem

Generative AI Enables EEG **Super-Resolution** via Spatio-Temporal Adaptive Diffusion Learning
https://arxiv.org/html/2407.03089v4



Neural Radiance Fields for Rendering and
Temporal Reconstruction of **Humans in Motion**
https://proceedings.neurips.cc/paper_files/paper/2021/file/7d62a275027741d98073d42b8f735c68-Paper.pdf



Guided Training of NeRFs for Medical Volume Rendering
https://dl.acm.org/doi/abs/10.1145/3588028.3603657

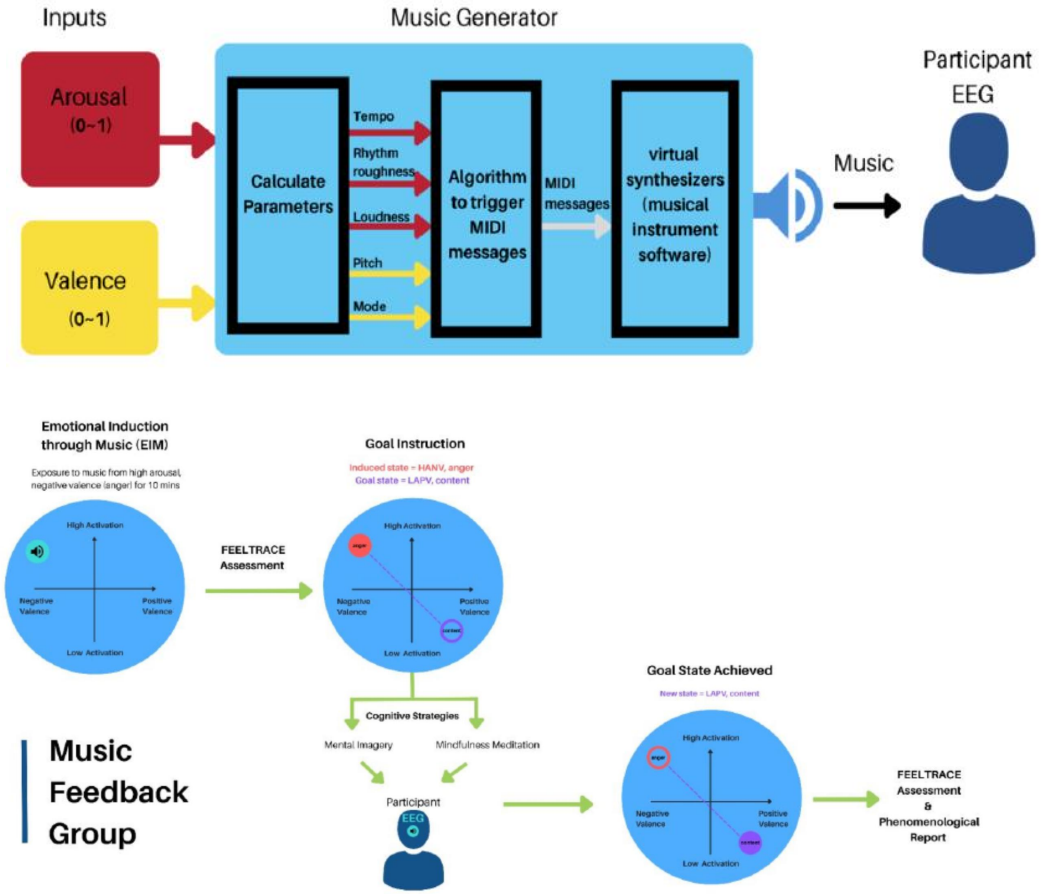
(a) Interactive view synthesis from a trained neural radiance field

(b) Subset of the training data

Brain modulation

Make Me Happier: Evoking Emotions Through Image Diffusion Models
https://arxiv.org/pdf/2403.08255
https://github.com/ZhangLab-DeepNeuroCogLab/EmoEditor

Affective Brain-Computer Music Interface in Emotion Regulation and Neurofeedback: A Research Protocol
https://www.urncst.com/index.php/urncst/article/view/345



Simple demo

- Using fMRI to decode picture label:

https://main-educational.github.io/brain_encoding_decoding/intro.html#

Using eeg for motion decoding:

https://github.com/JGalego/eeg-bci-tutorial

Using eeg for emotion decoding:

https://github.com/ahmed-alllam/Brain-EEG-Emotion-Classifier/tree/main