EEG-based image classification via a region-level stacked bi-directional deep learning framework

Patter recognition and machine learning methods:

* Artificial neural networks
* Naïve Bayes
* Support vector machines (SVM)

“Spampinato et al. [18], used LSTM network to learn an EEG data representation based on image stimuli and constructed a mapping relationship from natural image features to EEG representation.

Finally, they used the new representation of EEG signals for classification of natural images. Compared

with traditional methods, these deep learning-based approaches have achieved outstanding classification

results.”

Possible to reconstruct multimedia content information by mingin EEG data.  
Kavasidi et al. 🡪 method for reconstructing visual stimuli content information through EEG.

Variable-valued autoencoder (VAE) and generative adversarial networks (GANs).

EEG data contain patterns related to visual content, can be used to generate images that are semantically consistent with the input visual stimuli.

3 phases:

* Region-level information extraction
* Feature encoding
* Classification

Region-level:

3 regions, left, right and middle. Difference between left and right (each left channel as a corresponding right channel) is combined with middle hemisphere into one variable X.

Passed to the feature encoding.

Feature encoding:

Stacked bi-directional LSTM network.

Classification:

Independent component analysis (ICA) module and a classifier layer.

Two classifiers:

* SoftMax
* Multiclass support vector machine (SVM)

ImageNet-EEG dataset.