- Machine learning and the «data life cycle»
- Validation and classification metrics
- Feature extraction
- Feature selection
- ML classifiers

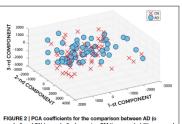


FIGURE 2 | PCA coefficients for the comparison between AD (o symbol) and CN (x symbol) when using GM tissue probability map and an isotropic Gaussian kernel with 10 mm<sup>3</sup> FWHM for smoothing. 1st, 2nd, and 3rd components are shown.

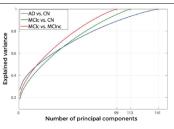


FIGURE 3 | Explained Variance as a function of the number of considered Principal Components, when using GM tissue probability map and no smoothing, for the following comparisons: AD vs. CN, MClc vs. CN, MClc vs. MClnc.

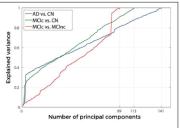


FIGURE 4 | Explained Variance as a function of the number of considered principal components sorted in accordance to their FDR, when using GM tissue probability map and no smoothing, for the following comparisons: AD vs. CN, MClo vs. CN, MClo vs. MClnc.

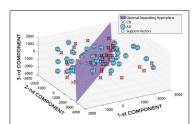
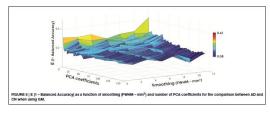
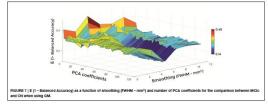
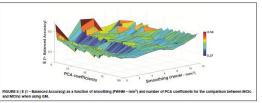


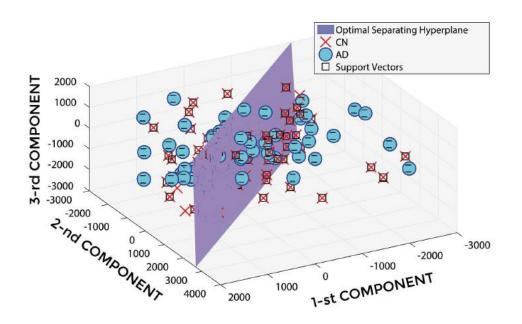
FIGURE 5 | Hyper-plane plane separating AD (o symbol) from CN (x symbol) PCA coefficients (3 PCA coefficients), and defined Support Vectors (I symbol), when using GM tissue probability map and an isotropic Gaussian kernel with 10 mm<sup>3</sup> FWHM for smoothing, 1st, 2nd, and 3rd components are shown.



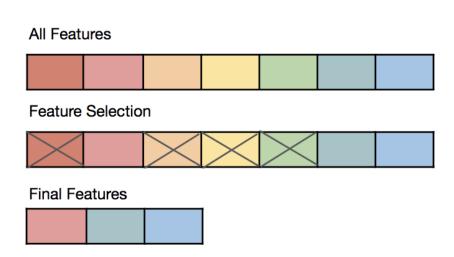




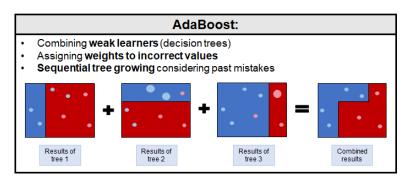
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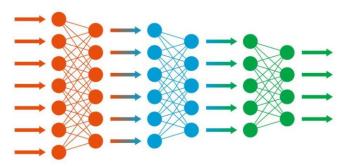


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- Machine learning and the «data life cycle»
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### Requirements

- Basic skills of coding (Matlab -> Python)
- Updates @ https://christiansalvatore.github.io/machinelearning-iusspavia







#### Evaluation

- (Group) ML-model competition:

  First place -> 3 points

  Second place -> 2 points

  Third place -> 1 point
- (Group) Project Presentation up to 20,5 points
- (Individual) Oral examination up to 10,5 points

(Laude with > 30 points)



#### Calendar

```
16 March 2023, h 18-20
                        ML in healthcare
20 March 2023, h 18-20 XRays - CT - PET - MRI - US </>>
                        Validation-Evaluation - Under-Overfitting - Al application to medical imaging </>
23 March 2023, h 18-20
27 March 2023, h 18-20
                        Segmentation - Feature Extraction </>
                        Radiomics </>
31 March 2023, h 16-19
                        Feature Selection </>
03 April 2023, h 18-20
14 April 2023, h 16-19
                        Class Imbalance - Decision Trees
17 April 2023, h 18-20
                        SVM </>
20 April 2023, h 18-20
                        Ensemble of Classifiers </>
                        NN e Deep Learning </>
28 April 2023, h 16-19
12 May 2023, h 16-18
                        Esposizione progetti
```



18 May 2023 h 11-13

8 June 2023 h 11-13

29 June 2023 h 11-13

