Title of the Paper

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***Abstract*—Bla**

I. Introduction

TODO: MR: Understand clinical problem, technical requirements (e.g. allow randomisation), Anatomy

kNN is a popular classification method for MR data and has successfully been applied in MR brain segmentation [1]–[3]

II. Methods

A. Dataset

TODO: Describe dataset

B. Training

TODO: Describe training of machine learning algorithms

C. Performance Evaluation

TODO: Describe metric (dice score)

D. Infrastructure

TODO: Describe UBELIX, libraries

III. Results

TODO: JR: DF hyperparameter optimization, 3DPlot The decision forest algorithm was enhanced with normalized features, a higher number of ventricle voxels in the training set and the optimization of the hyperparameters (see Fig. III). With this settings, the max dice coefficient was lifted from 0.703 to 0.754. This result was achieved with 80 trees and 3000 max nodes.

TODO: JR: kNN optimization

TODO: JR: overall result table

TABLE I
BEST DICE SCORE OF EACH ALGORITHM AFTER OPTIMIZATION AND SCORE OF ENSEMBLE.

algorithm	dice			
	white matter	grey matter	ventricles	overall
DF				
SVM				
kNN				
SGD				
GMM				
ensemble				

DF: Decision Forest, SVM: Support Vector Machine, kNN: k Nearest Neighbor, SGD: Stochastic Gradient Descent, GMM: Gaussian Mixture Model.

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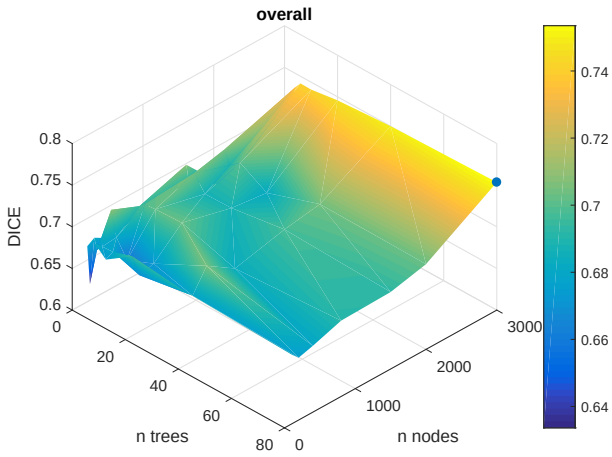

Fig. 1. Mean dice of white/grey matter and ventricles based on the hyperparameters number of trees and maximum nodes.

IV. Discussion

TODO: challenge with quality of ground truth

TODO: feature importance

V. Conclusion

Acknowledgment

References

[1] P. Anbeek, K. L. Vincken, M. J. van Osch, R. H. Bisschops, and J. van der Grond, "Probabilistic segmentation of white matter lesions in MR imaging," *NeuroImage*, vol. 21, no. 3, pp. 1037–1044, mar 2004.

[2] C. A. Cocosco, A. P. Zijdenbos, and A. C. Evans, "A fully automatic and robust brain MRI tissue classification method," *Medical Image Analysis*, vol. 7, no. 4, pp. 513–527, dec 2003.

[3] S. Warfield, M. Kaus, F. A. Jolesz, and R. Kikinis, "Adaptive, template moderated, spatially varying statistical classification," *Medical Image Analysis*, vol. 4, no. 1, pp. 43–55, mar 2000.