

Topological Data Analysis based classification: preliminary results¹

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MaxInt(D) = argmax(life(d)), RandInt(D) = random(D),AvgInt(D) = argmin(avg(life(d))), with D the persistent interval set, and $d \in D$ $life(d) = d[death] - d[birth]; d \in D.$

label function $\Psi(\sigma) = \bigcup_{\tau \in Lk(\sigma)} \Psi(\tau)$. Finally σ gets the most voted label from its co-faces: $f(\sigma) = argmax_{l \in L}(\frac{1}{|L|}\sum_{\tau \in Lk(\sigma)} \mathcal{I}(\Psi(\tau) == l))$ with L the label set and \mathcal{I} the indicator function which returns 0 or 1.

RESULTS





Comparison Results

Method	Acc	Ρ	R	FPR	MSE	F1
k-NN	0.97	0.92	0.89	0.04	0.10	0.91
TDABC-R	0.96	0.93	0.90	0.06	0.14	0.92
TDABC-A	0.95	0.91	0.88	0.05	0.29	0.90
TDABC-M	0.93	0.88	0.83	0.10	0.57	0.85
	Acc: P: Pr	Accuracy ecision	FPR: False Positive Rate MSE: Mean Squared Error)r









REFERENCES	ACKNOWLE

DGEMENTS

(d) k-NN.

We create functions to label simplicial complexes and show how to use them in practice. Our method was better tan k-NN to classify non easily separated classes. Persistent Homology was determinant to reduce the complexity of	 Herbert Edelsbrunner and John Harer. Computational Topology - an Introduction. Michigan, USA: AMS, 2010. ISBN: 978-0-8218-4925-5. Gunnar Carlson. "Topology and Data". In: Bulletin of the AMS 46.2 (Jap. 2009), pp. 255-308 	The authors thank to the National Research and Development of Chile (ANID) ANID 2018/BECA DOCTORADO NACIONAL-21171978.	
searching space, giving us a robust framework to understand data shapes and use it for classification. We use TDA directly for classification with a 96% accuracy.	 Michael W Browne. "Cross-Validation Methods". In: Journal of Mathematical Psychology 44.1 (2000), pp. 108-132. 		

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CONCLUSIONS







