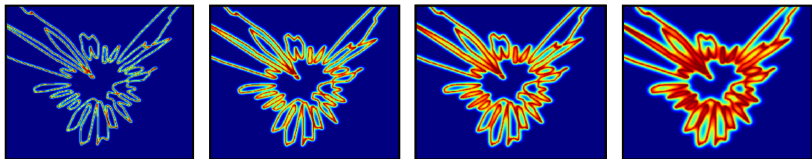


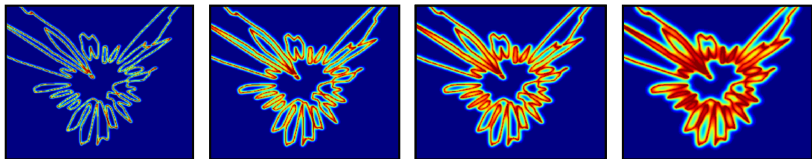
HEATING UP DECISION BOUNDARIES: ISOCAPACITORY SATURATION, ADVERSARIAL SCENARIOS AND GENERALIZATION BOUNDS

INTERNATIONAL CONFERENCE ON LEARNING REPRESENTATIONS 2021

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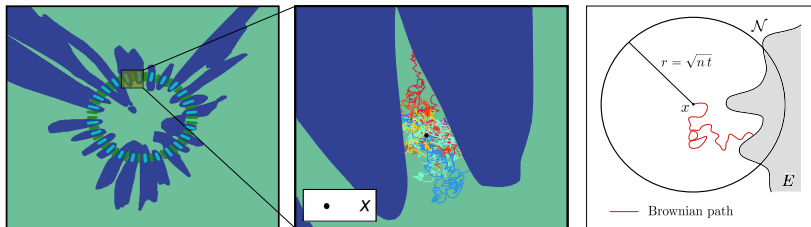




Infer geometry of decision boundary N from the amount of heat it can emit.

Feynman-Kac duality: Express heat as Brownian particles emitted from data points.

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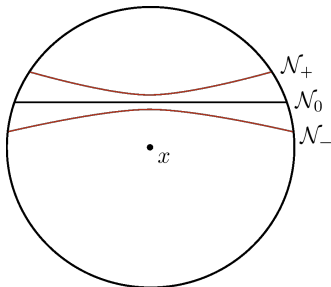
Measure isocapacitory saturation $\mathcal{I}(\cdot)$ as ratio of hitting probability and volume of the Ball $4(\cdot; P^-)$.

Isoperimetric Saturation : Measures if boundary N is sphere-like

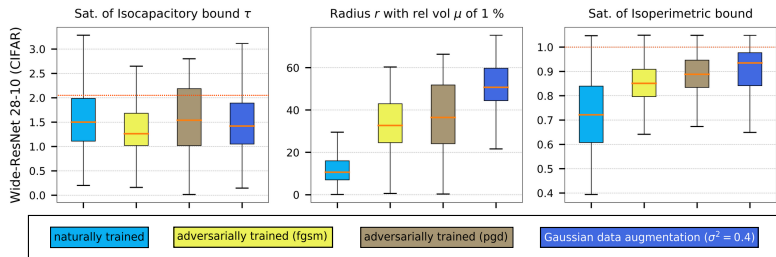
Isocapacitory Saturation : Measures hitting probability

Isoperimetric Saturation : Measures if boundary N is sphere-like

Isocapacity Saturation : Measures hitting probability



IMPLICATIONS FOR ROBUSTNESS AND COMPRESSION



Arora et al. 2018: Noise robustness yields better generalization and compression.

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We can express these results in terms of heat:

Low emitted heat: Flatter decision boundary - better generalization and robustness
and can be compressed more aggressively.

r *4* © *o* *μ* *μ* . Heating up decision boundaries: isocapacitory saturation, adversarial scenarios and generalization bounds. International Conference on Learning Representations. 2021.

Paper: <https://arxiv.org/abs/2101.06061>

Code: <https://github.com/bogeorgiev/heating-up-dbs>