



HAL
open science

Towards GAS?

Dominique Bontemps

► **To cite this version:**

| Dominique Bontemps. Towards GAS?. 2024. hal-04437395

HAL Id: hal-04437395

<https://hal.science/hal-04437395>

Submitted on 4 Feb 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Copyright

Towards GAS?

Dominique Bontemps*

February 4, 2024

Abstract

The author asks whether “Deep Learning” is really such a good idea.

Could other statistical methods do better than networks?

For instance, why not look at other Generative Adversarial Statistics?

On a statistical point of view, neural networks are a method used to perform regressions. For instance, one may want to compute a clustering, or to estimate a density: both are regression tasks.

In fact, neural networks approximate a target using a sieve, *i.e.* a class of functions. With a ReLU activation, the sieve is a complex class of piecewise affine functions (broken lines). The deeper the network, the less probable identifiability is.

The training phase of a network is usually expensive, sometimes prohibitively so.

Other statistical methods may indeed be more efficient to perform this regression task!

Consider for instance GANs. Is their efficiency really due to the “Network” part? Other GAS (Generative Adversarial Statistics) might end up being more affordable.

*Institut de Mathématiques de Toulouse, UMR5219; Université de Toulouse; UPS, F-31062 Toulouse Cedex 9, France.