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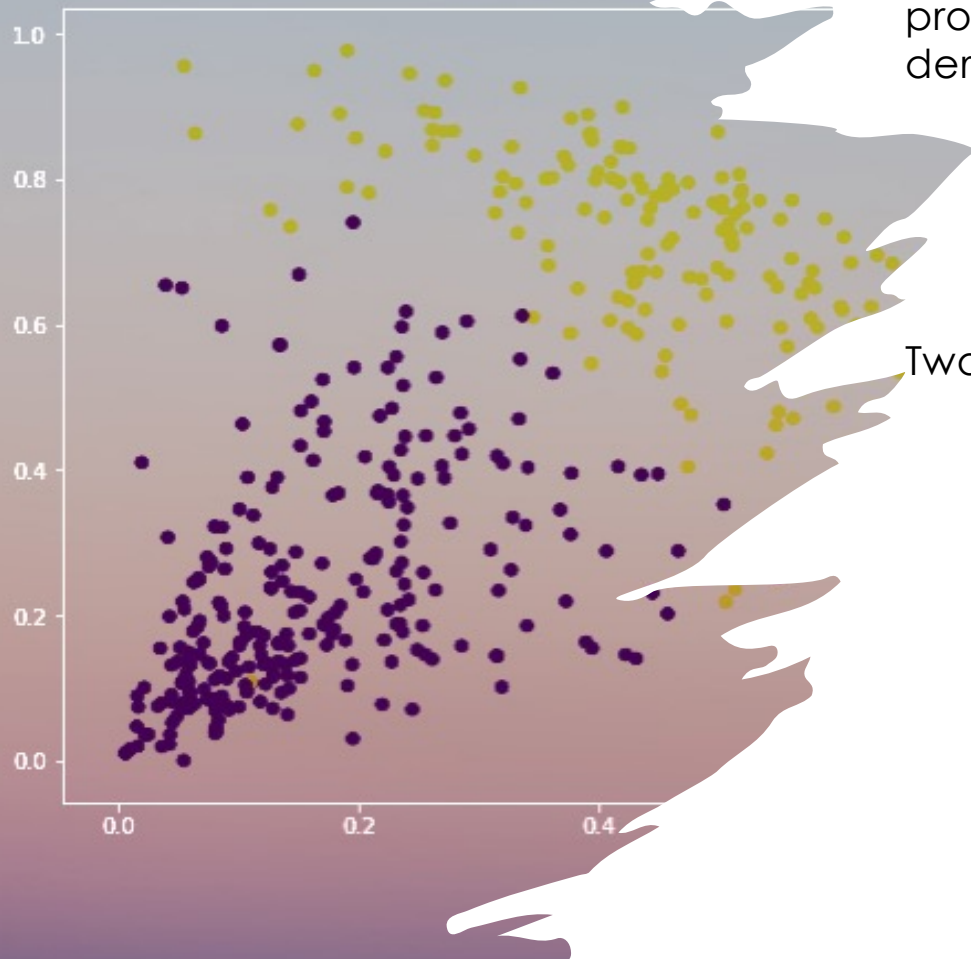
Padova 4-8 Settembre 2023

Panel

Scholars & Big Models: How Can Academics
Adapt?

Alberto Del Bimbo
Università di Firenze

Two clusters of opinions about Large Scale Models



Big Models as an emerging paradigm of models providing a base from which task-specific models are derived through adaptation.

Two dominant clusters of opinions:

- Researchers who follow the *scaling hypothesis towards Artificial General Intelligence*.
- Researchers who believe the achieved results as a mere reflection of the scale of data and parameters: lacking reasoning capabilities according to causality.

CVPR23 Workshop: *Scholars & Big Models: How Can Academics Adapt?*

From A. Efros' presentation

The Great Decoupling



*Data is crucial
it grounds us in the world, but alone
is just for mimicry and pastiche.*

Engineering AI

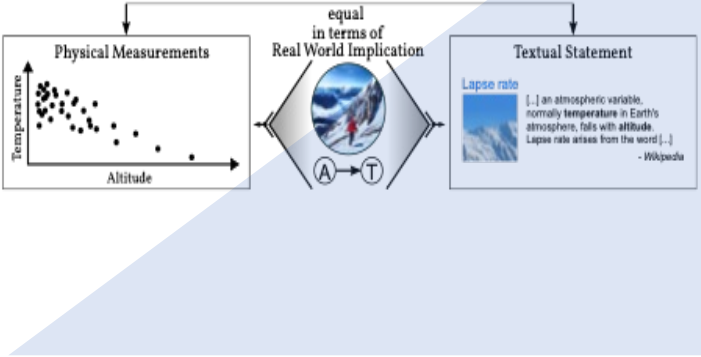
Cool uses of machine learning
*robo-receptionists, robo-lawyers,
self-driving cars, self-building houses...*
Will be mostly done in Industry.

Science AI

Drift closer to natural sciences
*evolutionary biology, cognitive science,
dev. psychology, anthropology, philosophy*
Too long-horizon for Industry.

LLMs and Plato's cave allegory

LLMs may observe some causality in the form of correct answers (the shadows).
Would it be actual *causality* (the real world)?



Correlation does not imply causation

J. Pearl (2009)

LLMs perform well *occasionally* on causal inference tasks. It is only because:

- the fact was observed in the training data
- the correlation with the query is optimal for the training objective.

LLMs are like parrots in that they simply recite the causal knowledge embedded in the data.....

[M. Zečević et al. IEEE TMLR 2023](#)



Academia adaptation

Big Models with downstream training

Suited for processing numerical data in Euclidean space:
classification, image segmentation, machine translation,

- compatible learning in lifelong scenarios
- computational efficiency
- ...

Struggling with causal inference as required in
system identification, robotics, recommender systems....

- more principled, robust architectures: Neural Causal Models
- GNNs and Structural Causal Models
-

Industry is equipped to train the massive models that produce advances in Big Models capabilities. Academia is not.

Credit J. Barron, Google Research, 2023

