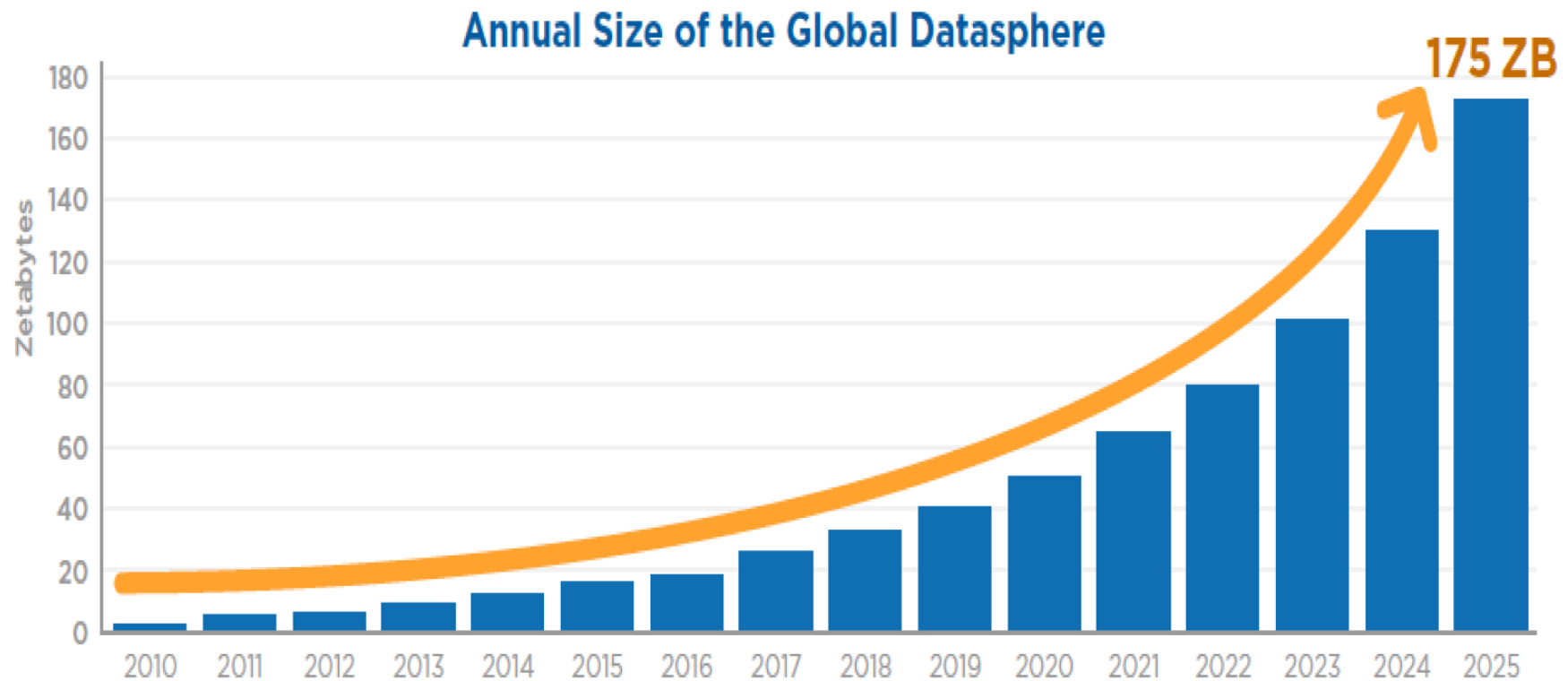


Machine Learning in Econ

Ph.D. Computational Methods

Arnav Sood (Prof. David Childers)

Life is High Dimensional



Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018

Life is High Dimensional



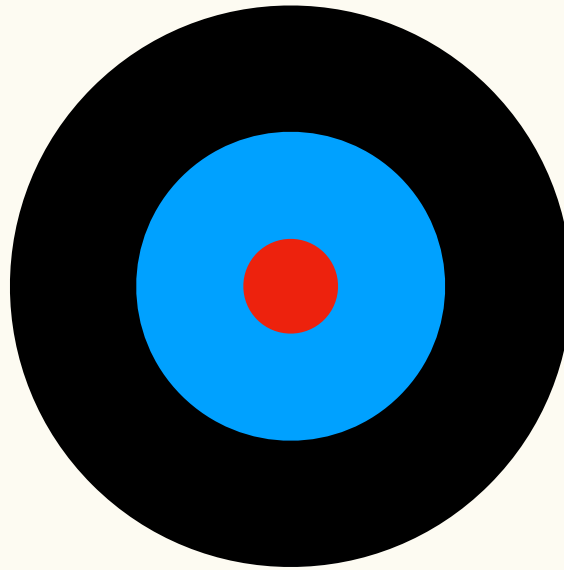
Babylonian astrological diary describing Halley's comet

Life is High Dimensional

2990	Cassidy Blonsky	2023-03-05	
2957	TM - State continuing claims	2023-02-26	
2927	Texas 1	2023-02-24	
2926	mr econ	2023-02-22	
2925	Credit score--St Louis	2023-02-22	
2924	Check	2023-02-19	
2891	Market Data	2023-02-17	
2858	UE Bilans	2023-02-14	
2829	External Indicators for Payal	2023-02-10	
2828	FRED 2019-2/9/23	2023-02-09	
2827	FRED 2019-2/9/23	2023-02-09	
2826	FRED 2019-2/9/23	2023-02-09	
2825	For Fatima	2023-02-07	This is for Fatima. Contains all the series necessary to recreate the graph ...
2792	MG - Cards (Quarterly)	2023-02-03	
2762	PeterBradH8	2023-01-27	
2761	JD weekly market data metrics	2023-01-26	
2760	CarlosAVirella	2023-01-26	List of financial data regarding wmt to CAMV. This info helps my companies an ...
2759	AO--Credit score--St Louis	2023-01-25	
2733	Housing Supply and Prices	2023-01-24	
2732	Housing Supply	2023-01-24	
2731	MG - Multiple data and periods	2023-01-19	
2730	MG - Multiple data and periods	2023-01-19	
2729	MG - Cards (Quarterly)	2023-01-19	
2728	MG - Income Expenses Savings (Monthly)	2023-01-19	
2727	MG - Wealth (Quarterly)	2023-01-19	
2726	Deposits HH Quarterly	2023-01-19	
2693	Test	2023-01-13	
2670	PR	2023-01-12	
2669	Unemployment Annual per State Sports Economics	2023-01-12	

Published Data Lists 1 - 50 of 1664 1 2 3 4 5 6 Next » [34]

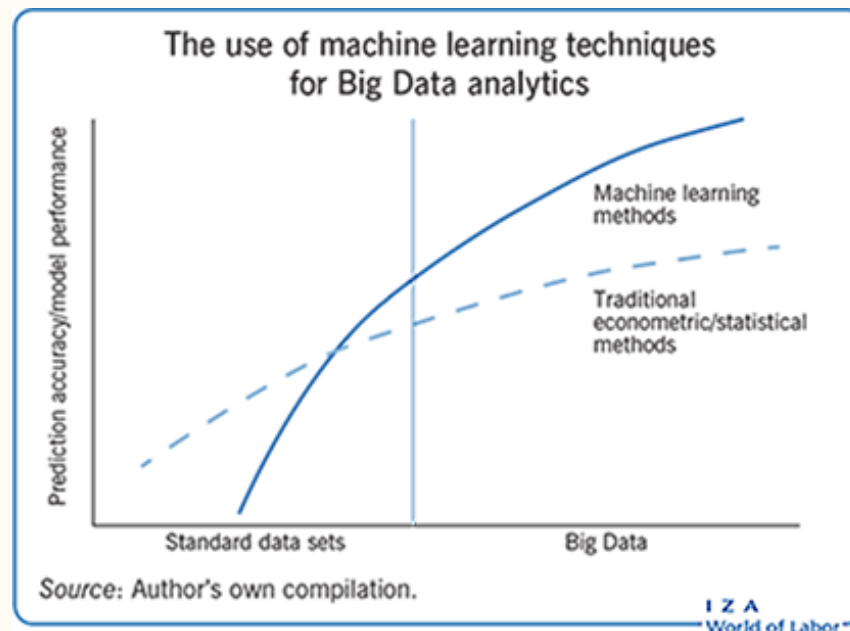
Analytical Econometrics is Not



Unrestricted Hypothesis Class
Nonparametric with Limited Data
Analytical with Limited Data

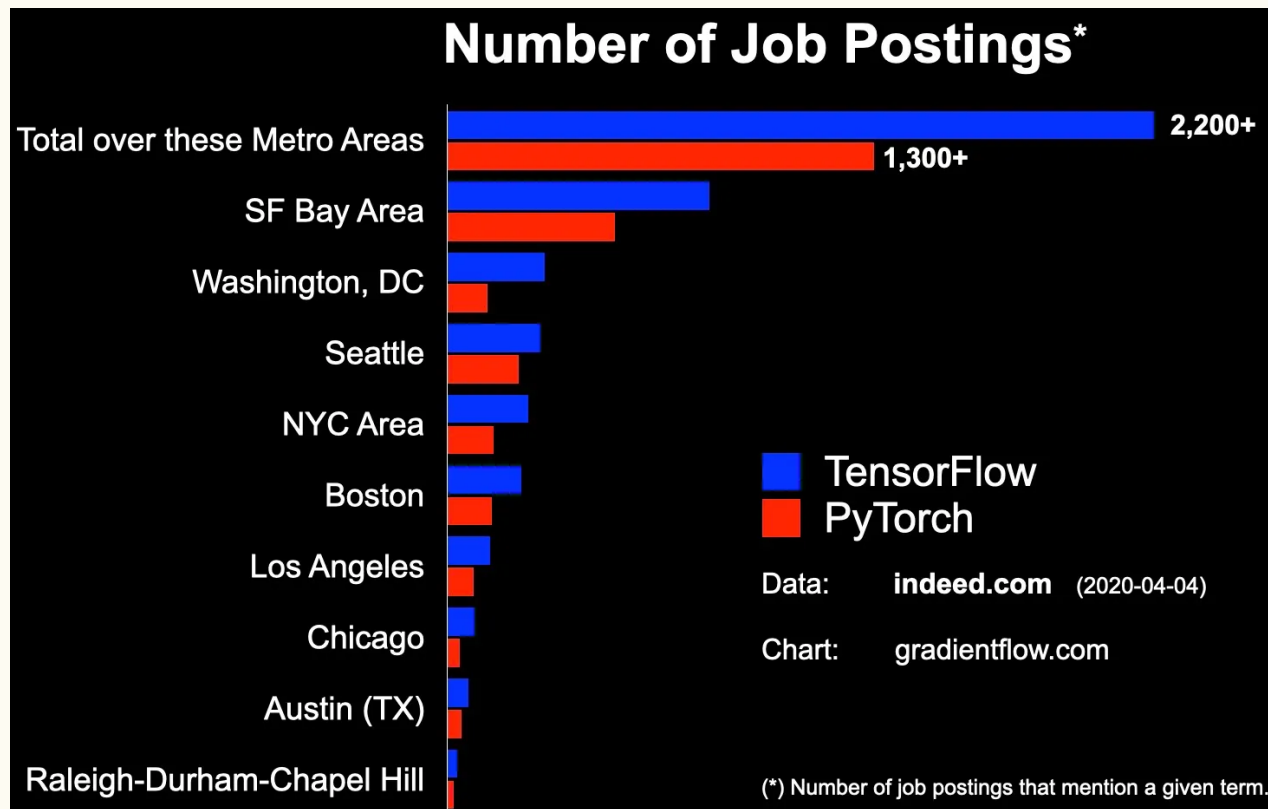
Tractability is an **extreme** form of model reduction

Analytical Econometrics is Not

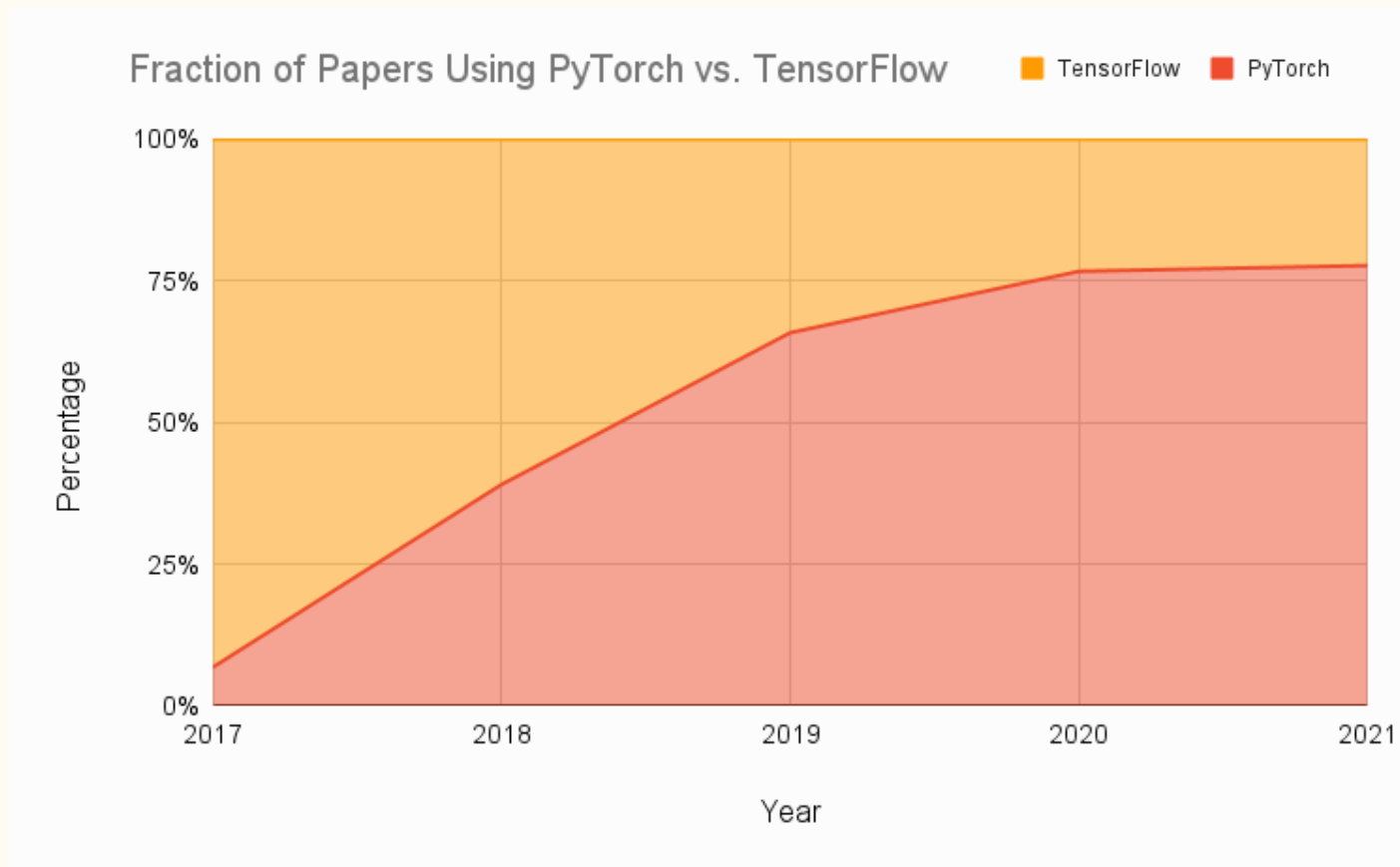


And is not without cost

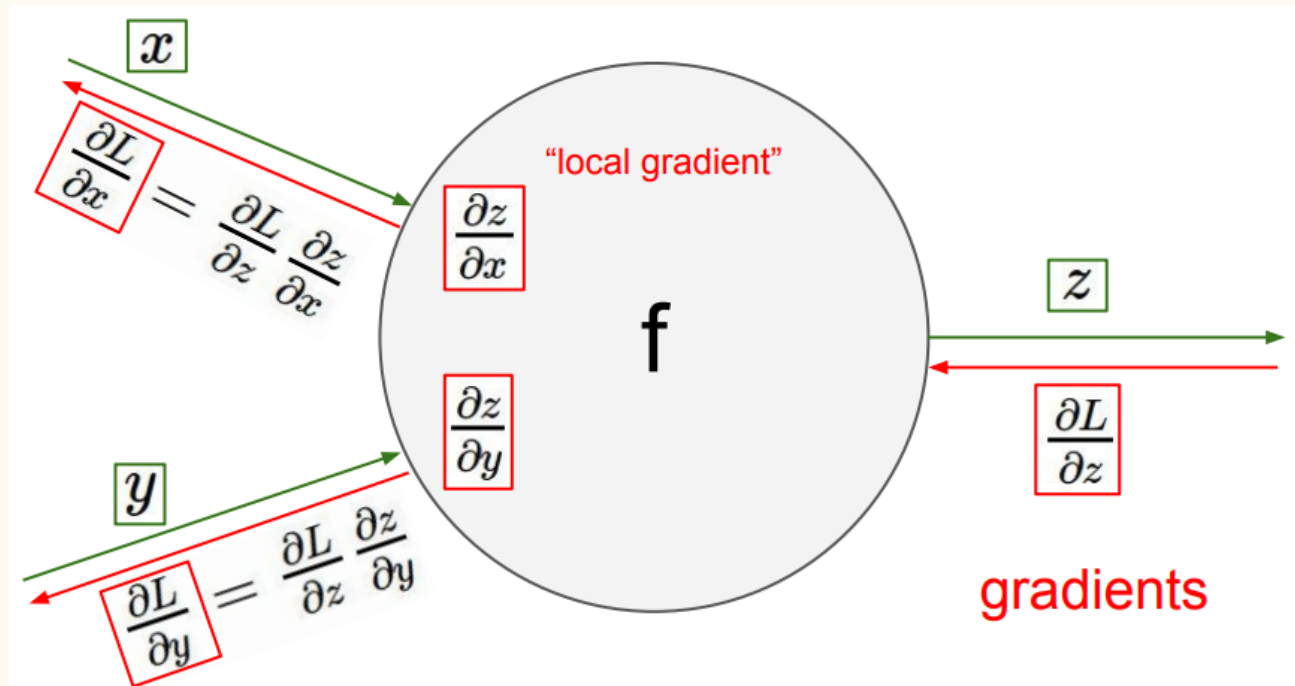
PyTorch and TensorFlow Dominate Tooling



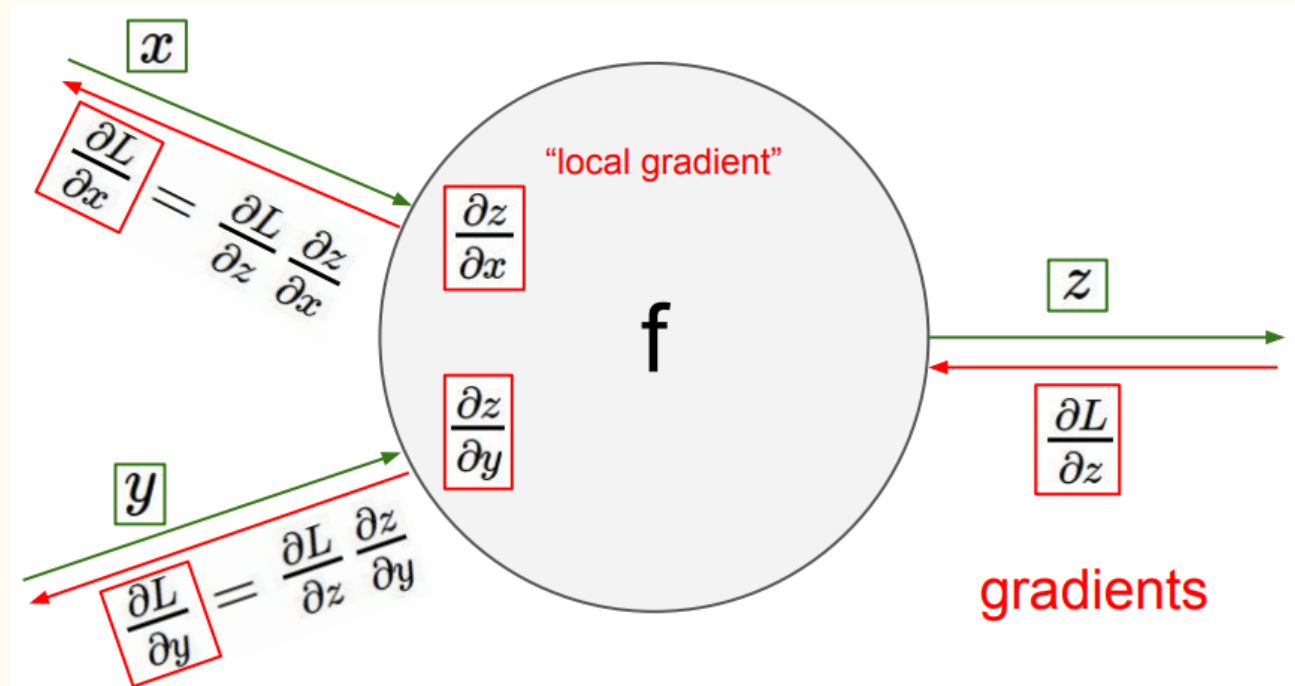
But PyTorch Has the Lead in Research



Chain Rule is the Key to ML



Chain Rule is the Key to ML



And Differentiating Arithmetic Key to Chain Rule

ML Methods Composed of Modular Pieces

Data

ML Methods Composed of Modular Pieces

Data

Observed

Simulated

Loss Function

Equilibrium Conditions

Optimality Conditions

Agent Rewards

Neural Model

Network Architecture

Feature Selection

Training Machinery

Trainer

Loss Function

Hyperparameters (Learning Rate, Scheduler, etc.)

ML Methods in Economics

Neural ODEs ([link](#))

ML Methods in Economics

Neural ODEs ([link](#))

Deep Sets ([link](#))

ML Methods in Economics

Neural ODEs ([link](#))

Deep Sets ([link](#))

Equilibrium Nets ([link](#))

ML Methods in Economics

Neural ODEs ([link](#))

Deep Sets ([link](#))

Equilibrium Nets ([link](#))

Regression and Inference ([link](#))

ML Methods in Economics

Neural ODEs ([link](#))

Deep Sets ([link](#))

Equilibrium Nets ([link](#))

Regression and Inference ([link](#))

Model Reduction ([link](#), compare to [link](#))

Symmetry in High-Dimensional Dynamic Programming