Measuring the Intrinsic Dimension of Objective Landscapes Chunyuan Li*, Heerad Farkhoor, Rosanne Liu, and Jason Yosinski

- **Direct Training**: Optimization in the naive parameter space







* Work performed as an intern at Uber AI Labs



- 750 is less than the number of input pixels (784) (A lot of image pixels are always black)
- High compression rate: 0.4%. Storage only requires 750 parameters + 1 seed
- Highly redundant solution: S > 199,210 - 750 = 198,460



Occam's Razor

Intrinsic dim.	#Para./label
$t_{t} = 90,000$	18
$_{\rm t} = 190,000$	3.8

Wider or Taller FC on MNIST Width = $\{50, 100, 200, 400\}$ and Depth= $\{1, 2, 3, 4, 5\}$ laver widt 1300 -• 50 5 1200 -• 100 • 200 ≝ 1000 -400 900 -800 -Number of parameters D a factor of 24.1 • A stable metric across a family of models



- increasing the redundancy of the solution set







Blog, video, code: bit.ly/intdim



• Every extra parameter added to the native space just goes directly toward