Deep Learning reached superior performance in many fields:

1. Lots of **data** (e.g. images, text)
2. High **capacity** neural networks (e.g. ResNets)

**Problem:**

1. **Obtaining/Labeling** data at large scales
   a. time-consuming
   b. difficult
   c. expensive

Popular approaches still rely on large source datasets:

1. Transfer/few-shot learning (labeled dataset)
2. Self-supervised learning (unlabeled dataset)

Focus on problems where \( \mathcal{D} \) is balanced and relatively small (constraining number of samples per class \( N \)):

\[ N \in \{10, 20, 40, 80, 160, 320, 640, 1280\} \]

Some previous works:

1. *Do we need hundreds of classifiers to solve real world classification problems?* [Fernandez et al. 2014]