

# Background

With the advent of deep learning, visual recognition research has achieved great success by leveraging end-to-end trainable deep neural networks (DNNs). However, the shift from

traditional machine learning to deep learning comes with two new grand challenges:

- The slow convergence of DNN training under the classical setup of Deep Learning from scratch
- The laborious collection of large-scale, task specific, and crowd-labelled data in DNN training.