Learning new categories from a different domain is always an interesting and challenging task for algorithms. Previous domain adaptation approaches are limited to either similar categories or requiring an ample amount of labeled examples. It would be ideal to adapting new categories with just a few labeled examples.

In this paper, we propose a new method that can solve this problem. Inspired by the idea of warm start, we design an algorithm that can incrementally adapt new categories. Benefitting from the deep representation, our method can learn efficient classifiers with less labeled examples and experiment results show that warm start can achieve better accuracy than cold start with fewer training iteration for new categories. Our method has great potential to be deployed on mobile devices.