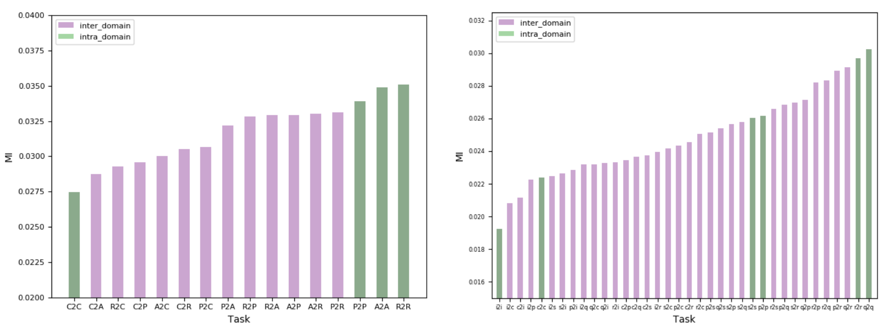
Reducing Distributional Uncertainty by Mutual Information Maximisation and Transferable Feature Learning

Anonymous ECCV submission

Paper ID 4375

1 Detailed Ablation Study

1.1 Uncertainty analysis in existing UDA datasets



(a) Office-Home (b) DomainNet

Fig. S1. Measured MI both inter and intra distributions in Office-Home and DomainNet. *Best viewed in colour.*

We compare the average uncertainty, indicated by MI both between different domains (inter-domain) and within the same domain (intra-domain) illustrated in Figure S1. For Office-Home, we observe clearly that the visually most diverse domain - Clipart yields the lowest MI even within itself. This is consistent with the adaptation results, where we see that tasks involving the Clipart domain are generally more difficult than others. Similar connections between the measured uncertainty and the task performance can be found in DomainNet too. This visualisation clearly indicates the necessity of considering the difference of distributional uncertainties in each task.

1.2 Component analysis of MIMTFL

In the ablation study in the main script, we analysed the importance of mu-

Table S1. Results on Office-Home single-to-single tasks (all with ResNet-50 backbone).

Method	P→C	A→C	C→A	P→A	R→C	C→P	C→R	A→P	R→A	A→R	R→P	P→R	mean
Source only	31.2	34.9	37.4	38.5	41.2	41.9	46.2	50.0	53.9	58.0	59.9	60.4	46.1
MIMTFL$^{*}_{src}$	48.5	51.5	57.1	53.2	52.2	65.6	67.6	67.9	66.2	74.8	78.8	74.1	63.1
TFL	48.6	52.5	57.2	54.8	51.4	66.2	68.6	**68.4**	66.5	75.0	78.2	74.0	63.4
MIM	48.8	52.1	57.1	52.8	52.6	66.0	68.5	67.5	65.9	74.2	78.1	73.5	63.1
MIMTFL	**51.1**	**54.1**	**59.1**	**55.8**	**55.4**	**66.9**	**69.4**	**68.4**	**67.8**	**75.2**	**79.1**	**74.6**	**64.7**

* Domain generalisation setting

tual information maximisation in our framework by looking at the variant **TFL**. Here we discuss another variant of MIMTFL: **MIM** - mutual information maximisation without the self-supervised transferable feature learning. In Table S1, we compare the three variants together: using either component (MI maximisation and transferable feature learning), or both. Results prove that our designed combination of the two gives the best adaptation performance.

1.3 Domain Generalisation on Office-Home single-to-single tasks

The MIMTFL$_{src}$ results in Table S1 give a detailed generalisation test of our proposed method. This is a rather challenging setting, where a model trained from a single source domain is to be tested on all the other domains. We observe that the generalisation brought by applying our method on the source samples still outperforms the source only model by a large margin. The results are even comparable with applying a single component under UDA setting, such as **MIM** and **TFL** discussed in the previous section.