

# Supplementary Material: Learning to Generate Novel Domains for Domain Generalization

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## 1 Full Training Algorithm

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**Algorithm 1** Full training algorithm.

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- 1: **Require:** Source domain  $D_s = \{1, 2, \dots, K_s\}$ , novel domain  $D_n = \{1, 2, \dots, K_n\}$ , task model  $F$ , generator  $G$ , max iteration  $T$ , pre-trained classifier  $\hat{Y}$ .
  - 2: **for**  $t = 1$  **to**  $T$  **do**
  - 3:   Sample a mini-batch  $X_k$  from *each* source domain  $k \in D_s$ .
  - 4:   Generate  $X_{\tilde{k}} = G(X_k, \tilde{k})$  with  $\tilde{k} \sim D_n$  for *each* source  $k$ .
  - 5:   Compute  $L_G$ .
  - 6:   Perform one step gradient update for  $G$  using  $\nabla_G L_G$ .
  - 7:   Compute  $L_F$ .
  - 8:   Perform one step gradient update for  $F$  using  $\nabla_F L_F$ .
  - 9: **end for**
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