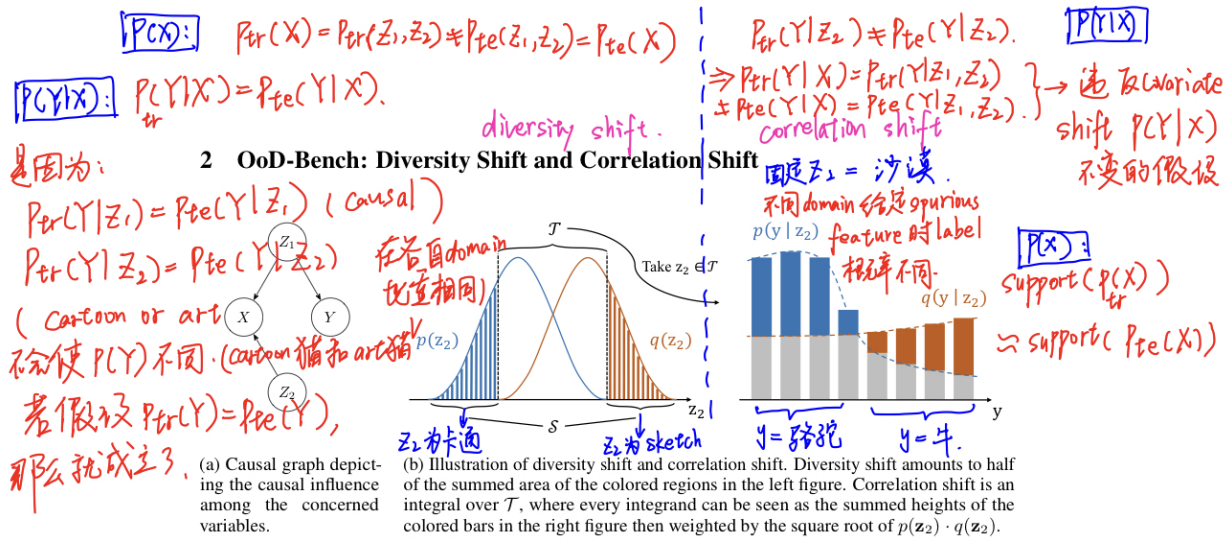
对correlation shift和diversity shift的理解

Part I: 有关correlation shift和diversity shift的定义，和所导出的条件概率不变性思考



(a) Causal graph depicting the causal influence among the concerned variables.

(b) Illustration of diversity shift and correlation shift. Diversity shift amounts to half of the summed area of the colored regions in the left figure. Correlation shift is an integral over $\mathcal{T}$, where every integrand can be seen as the summed heights of the colored bars in the right figure then weighted by the square root of $p(\mathbf{z}_2) \cdot q(\mathbf{z}_2)$.

Figure 2: Explanatory illustrations for diversity and correlation shift.

总结如下：

	$P(X)$	$P(Y\|X)$
divesity shift (PACS, VLCS):	$P_{tr}(X) \neq P_{te}(X)$	$P_{tr}(X) = P_{te}(X)$
correlation shift (CMNIST):	support($P_{tr}(X)$)=support($P_{te}(X)$) （若假设 $P_{tr}(Y) = P_{te}(Y)$, 且假设风格与label无关，则 $P_{tr}(Y\|X) = P_{te}(Y\|X)$)	$P_{tr}(Y\|X) \neq P_{te}(X)$

Part II: spurious feature Z_2在实际中如何被估计

做法：训练一个网络专门用于预测样本来自哪个domain。该网络的特征提取器提取出的特征被视为Z_2