Context-Aware Drift Detection

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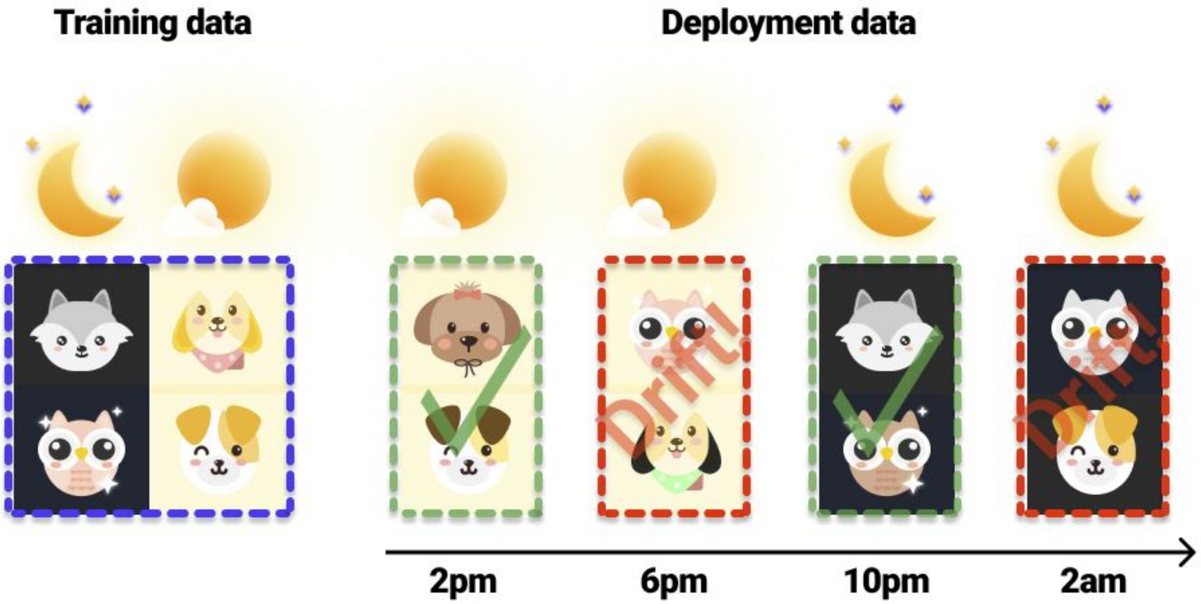
SELDON

ALIBI DETECT

Motivation



Contextualised Samples

- Contextualised sample:

$$\{(\underbrace{s_i}_{\text{data}}, \overbrace{c_i}^{\text{context}}, \underbrace{z_i}_{\text{set membership (ref=0, dep=1)}})\}_{i=1}^{n}$$

- Generative process:

$$\begin{gathered} Z \sim P_Z, \\ C \sim P_{C|Z}, \\ S^0 \sim P_{S^0|C}, \quad S^1 \sim P_{S^1|C} \\ S = S^0(1 - Z) + S^1 Z. \end{gathered}$$

The Framework

- Null hypothesis:

$$h_0 : \quad P_{S^0|C=c}(\cdot) = P_{S^1|C=c}(\cdot) \;\; P_{C_1}\text{-a.e.}$$

- Test statistic:

ADiTT

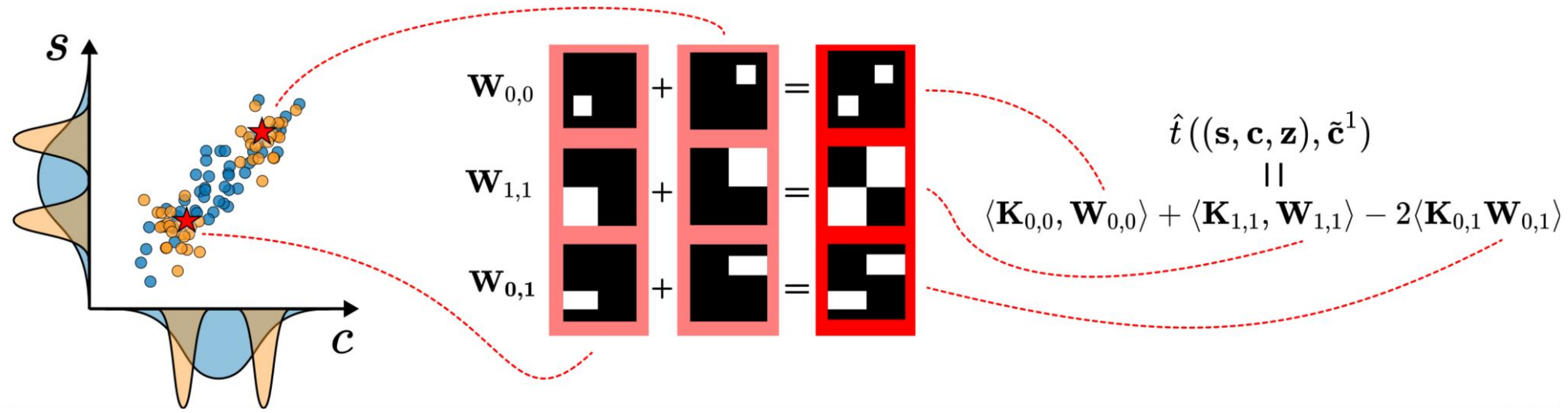
$$E[U_D(C)|Z=1] \qquad \text{where} \qquad U_D(c) = D(P_{S^0|C=c}, P_{S^1|C=c})$$

CoDiTE

- p-value: conditional permutation test

MMD-ADiTT

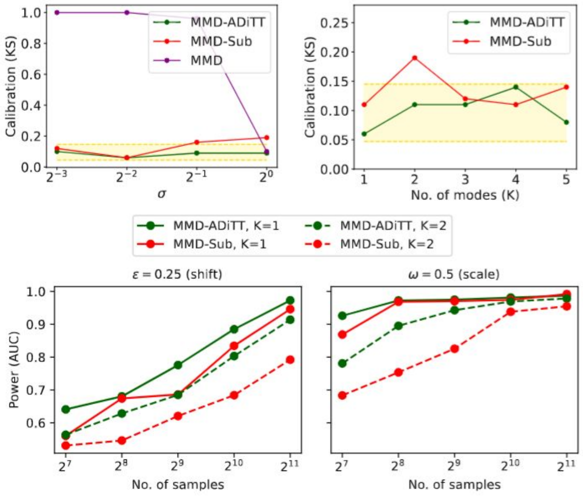
- MMD-based CoDiTE developed by Park et al. (ICML 2021)[1].
- We introduce a corresponding ADiTT estimator

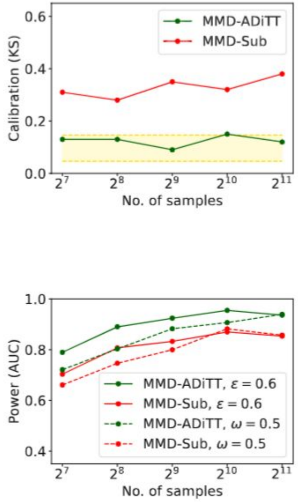


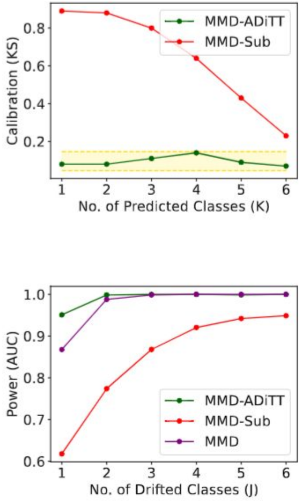
[1] Conditional distributional treatment effect with kernel conditional mean embeddings and u-statistic regression

Further Applications and Results

- May alternatively wish to allow variation in:
  - Subpopulation prevalences
  - Model predictions
  - Model uncertainty







Thanks for watching!

github.com/SeldonIO/alibi-detect