Algorithm 1 randQueryEmbedding(\mathcal{D} , k)

1: **Input:** a set of instances $\mathcal{D} = \{\mathbf{x}^i\}_{i=1}^m$ over r.v.s

$$\mathbf{X} = \{X_1, \dots, X_n\}, k \text{ as the number of features to generate}$$

2: **Output:** a set of embeddings $\mathcal{E} = \{\mathbf{e}^i\}_{i=1}^m, \mathbf{e}^i \in \mathbb{R}^k$

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$$\mathcal{E} = \{\mathbf{e}^i\}_{i=1}^m, \mathbf{e}^i \in \mathbb{R}^n$$

3: $\theta \leftarrow \text{learnDensityEstimator}(\mathcal{D})$

4: $\mathcal{E} \leftarrow \{\}$

5: **for**
$$j = 1, ..., k$$
 do

6: $\mathbf{Q}_i \leftarrow \text{selectRandomRVs}(\mathbf{X})$

b:
$$\mathbf{Q}_j \leftarrow \text{selectRandor}$$

7: $\mathbf{for} \ i = 1 \qquad m \ \mathbf{dor}$

7: **for** i = 1, ..., m **do**

7: **for**
$$i = 1, ..., m$$
 d

8:
$$e_j^i = p_{\theta}(\mathbf{x}_{\mathbf{Q}_j}^i)$$

9:
$$\mathcal{E} \leftarrow \mathcal{E} \cup \{\mathbf{e}^i\}$$

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