A Appendix

Algorithm 1: Algorithm for EAP

Input:

- $\mathbf{N}$: Number of iterations
- α, γ: Model coefficients of the trained SVM
- $[\mathbf{x}_1, \mathbf{x}_2, ..., \mathbf{x}_\mathbf{s}]$: Support vectors of the trained SVM
- $[\mathbf{x}_1, \mathbf{x}_2, ..., \mathbf{x}_\mathbf{n}]$: Training data
- $\mathbf{cth}$: The minimum changes

Output:

- $\mathbf{x}^*$: Explanation vector

`// Estimate pattern in kernel space`

Calculate centre matrix $\mathbf{H} = \mathbf{I}_n - \frac{1}{n}\mathbf{1}_n$;
for *i = 1: n* **do**
    for *j = 1: s* **do**
        Calculate the element $\mathbf{FS}^T = \mathbf{k}(\mathbf{x}_i, \mathbf{x}_j)$ at row $\mathbf{i}$ and column $\mathbf{j}$ using the kernel function with γ used by the model.;
        j++ ;
    end
    i++ ;
end
Calculate the coefficient of estimated pattern $\mathbf{P} = \frac{1}{n}\mathbf{HFS}^T\alpha$. The estimated pattern in kernel space is $\sum_{i=1}^{n} \mathbf{p}_i \phi(x_i)$.

`// Mapping the estimated pattern into kernel space`

$\mathbf{t} \leftarrow 0$;
$\mathbf{x}_0^* \leftarrow$ initialised from standard normal distribution;
$\mathbf{diff} \leftarrow 1$;
while *($\mathbf{t} \leq \mathbf{N}$) AND ($|\mathbf{diff}| < \mathbf{cth}$)* **do**
    $numerator \leftarrow 0$;
    $denominator \leftarrow 0$;
    for *i = 1: n* **do**
        numerator = numerator + $\mathbf{p}_i \mathbf{k}(\mathbf{x}_i, \mathbf{x}_{t-1}^*) \mathbf{x}_i$;
        denominator = denominator + $\mathbf{p}_i \mathbf{k}(\mathbf{x}_i, \mathbf{x}_{t-1}^*)$;
        $\mathbf{i}++$;
    end
    $\mathbf{x}_t^* = \frac{numerator}{denominator}$;
    $\mathbf{L}_t = \text{MSE}(\mathbf{x}_t^*)$;
    if $\mathbf{t} > 1$ **then**
        $\mathbf{diff} = \frac{\text{MSE}\,(\mathbf{x}_{t-1}^*) - \text{MSE}\,(\mathbf{x}_t^*)}{\text{MSE}\,(\mathbf{x}_{t-1}^*)}$
    end
    $\mathbf{t}++$;
    `// Log 3 different solutions with the smallest loss`
    $\mathbf{x}_{l1}^*, \mathbf{x}_{l2}^*, \mathbf{x}_{l3}^* \leftarrow$ log three solutions with the most minor loss score during the iteration. ;
end
$\mathbf{x}_{l1}^*, \mathbf{x}_{l2}^*, \mathbf{x}_{l3}^* \leftarrow$ calculate the absolute value and normalised. ;
$\mathbf{x}^* = (\mathbf{x}_{l1}^* + \mathbf{x}_{l2}^* + \mathbf{x}_{l3}^*)/3$