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**HORIZON-CL4-2024-HUMAN-03-02: Explainable and Robust AI**

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- Machine Learning of understandable rules via Hamming Clustering
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## **Integrating eXplainable AI in the form of understandable rules Machine Learning**

One can gain knowledge [1] from data in the predicative logic form **if ... then ... else...**, immediately integrable to the theoretical priors, summing pros of both inference and deduction.

When problems are simpler, like discriminating Myeloid from Lymphoid Leukemias from multivariable microarrays genes expression, the above piece-wise affine hyperplanes orthogonal to the salient intervals of the salient variables becomes a simple hyperplane in the orthonormalized PCA space, thus allowing the (possibly iterated) cascade of **k-means and PCA** [2] to outperform [3], also evidencing a few discriminating salient genes among which one not yet known in this respect. The same approach have been more recently instrumental in confirming a path in a rare form of leukemia [4], whose few cases available needed our enhancement of their statistical power in order to really got evidence of the suspected and hypothesized said path.

When not just one shot of data is available, but a movie of signals in time, a **piecewise affine AutoRegression** [5] could, *feed-forward*, identify hybrid dynamic-logical nonlinear processes with hysteresis without the need of ill-conditioned inversions and Tikonow regularization [6] as for instance in blood hormone concentration deconvolution [7] in order to resort to the nanometric inaccessible dynamics of pituitary secretion

## **Bibliography**

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