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Functional multivariate discriminant analysis in a non-structured measurable space Application to AI

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Abstract :

Let T be a set with a total order relation equipped with a σ -algebra \mathfrak{S} and a measure μ . Let also $(\Omega, \mathcal{A}, \mathbb{P})$ be a measured space such that

$$\begin{aligned} X : (\Omega \times T, \mathcal{A} \otimes \mathfrak{S}, \mathbb{P} \otimes \mu) &\longrightarrow (\mathbb{E}, \mathcal{E}) \\ (w, t) &\longrightarrow X(w, t) \end{aligned}$$

where E is a non-structured space *a priori*. By attaching several algebraic structures to the phenomenon studied by a multivalued function, we can exploit the Hahn-Banach theorem to perform classification using functional discriminant analysis. The developed tool can be used as an AI classifier.

An application is developed to illustrate the results of this approach.

Keywords : AI, Functional discriminant analysis, Hahn-Banach theorem, Hilbert space, Multivalued function, Symbolic stochastic process

Mathematics Subject Classification : 06A06, 28A35, 46A22, 62H30, 68T05.

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