

“Modelling Inflammatory Bowel Diseases trajectories combining dynamic, multifactorial, Artificial Intelligence-based approaches.”

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Background and aims

The aim of this project is to model Inflammatory Bowel Diseases (IBD) progression using an innovative approach that considers the manifestation of the disease from a dynamic and multifactorial point of view, with a focus on model explainability.

Methods

With the aim of modelling the course of IBD in the study population of the UR-CARE registry, an innovative approach will be applied consisting of the combined use of two different data-driven Artificial Intelligence techniques, namely dynamic Bayesian networks and Process Mining. Specifically, these two approaches will be jointly used to model IBD progression trajectories, providing a broader overview of the disease through the description of its patterns of progression (including clinical events, treatments and/or outcomes) and the interactions between clinical variables. The potential of the proposed methodology to address the predictive needs of chronic IBD progression, such as the forecasting of the next relapse, the effect of a therapy, or the impact of a risk factor, will also be explored.

Anticipated impact

On the one side, IBD patients experience constant uncertainty regarding disease progression, while clinicians, on the other hand, need tools that can support them in understanding the multidimensionality of disease progression. In this scenario, AI can be the key to successfully satisfy these needs, effectively investigating the disease processes, allowing to describe pathological evolution over time, handling and capturing patients' inter-variability, and providing tools to forecast disease evolution. By adopting an *ad-hoc* developed analytic approach, this project can help in better understanding IBD mechanisms and best care strategies, defining the relationships among the patient characteristics and the sequence of experienced clinical events, evaluating the impact of key elements on disease's prognosis. These results would be useful not only to better manage the disease from a clinical and care point of view, but also in economic terms.