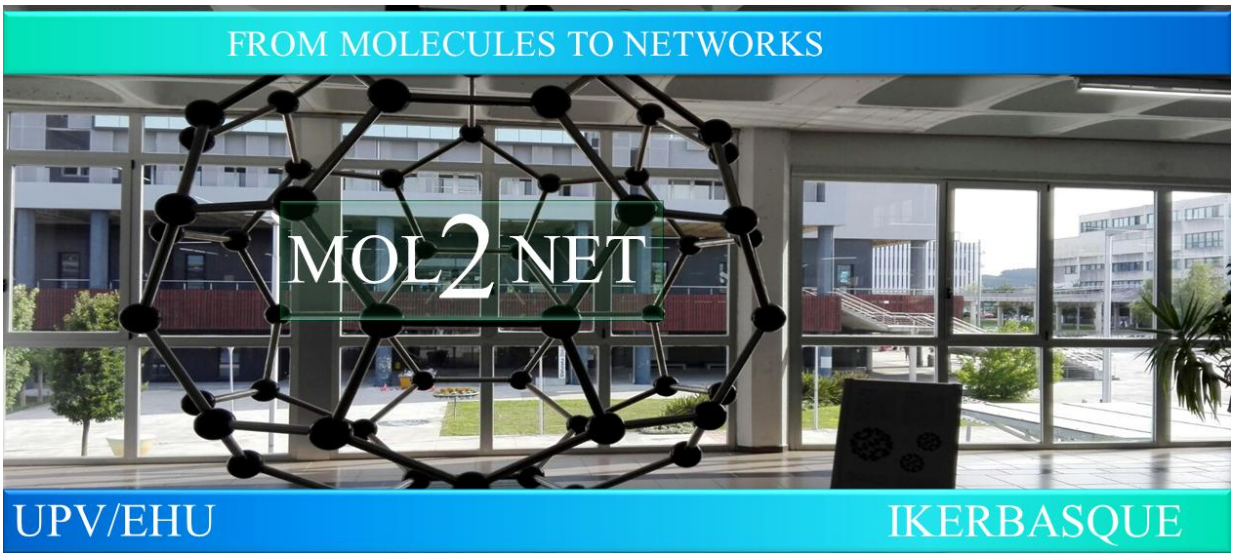

This paper explained the development of an algorithmic ``AutoPrognosis´´ that used Machine Learning (ML) to automate the process of constructing clinical prognostic model for the Cystic Fibrosis (CF) (but can be applied for any other disease), as well as the risk factors of this disease. For this construction it has been taken into account some rules associated to risk factors, for example that the main predictor of mortality in CF patients is having the Forced Expiratory Volume (FEV_1) [1] biomarker higher than 30%.

This model needs to be updated and re-calibrated annually. Also they conducted an extensive analysis of the performance of AutoPrognosis, and compared to those achieved by the existing guidelines, competing clinical models and other ML algorithms.

The method of how this model works is provided in the next figure (**Figure 1.**). AutoPrognosis uses Bayesian optimization technique in order to improve ML. With this is predefined an accurate diagnostic. This consists of an imputation algorithm, a feature processing algorithm, a classification algorithm and a calibration method where all of these are combined in a single. The final stage of AutoPrognosis is an interpreter module, which uses an associative classifier to explain the learned predictions.

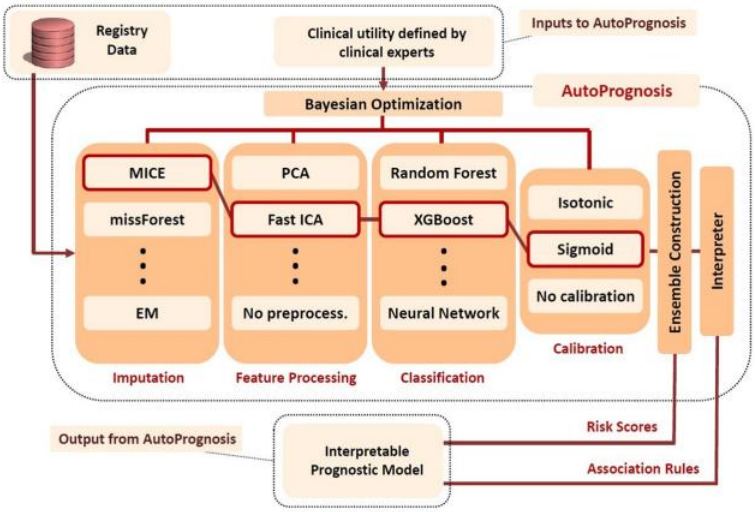

Figure 1. Schematic explanation of the AutoPrognosis framework.

Although nowadays the practice and deployment of this type of model in healthcare research has been limited, using it is a good way to have a previous idea of what is going to happen to a patient that suffers from CF. This is known because after doing this study AutoPrognosis achieves significant gains in terms of the positive predictive values (for example implies a remarkable improvement in terms of the precision of lung transplant referral decisions). Nevertheless, it has some limitations: the need to be extremely validated, need to be valuated by considering post-transplant survival data, and as they did not have access for data on patients who went through a transplant evaluation process or were enrolled in wait list but did not get a transplant within the 3-year analysis horizon, it is rendered direct comparisons with the actually realized clinical policy impossible.

[1] Alaa AM, van der Schaar M. Prognostication and risk factors for cystic fibrosis via automated machine learning. Sci Rep-UK 2018;8(1):11242