Machine Learning in Medicine Deo et al.

Machine learning is something relatively new in medicine. As it can be seen on Pubmed, the vast majority of articles that have been published regarding this method are not older than ten years.

This article gives a brief explanation of current trends and unsolved problems in the field of machine learning applied to medicine. Firstly, it is necessary to highlight the difference between supervised machine learning and unsupervised one. The first allows the performance of predictions of a known target, as it is the case of the Framingham Risk Score, an algorythm by which it is posible to predict the probability of a Cardiovascular Heart Disease in a more or less reliably way. On the other hand, unsupervised machine learning only allows the user to identify patterns in a dataset, which might be helpful as approaches to therapy.

As it is stated in Deo et al.'s article, machine learning in medicine has been poorly studied previously in part due to the fact that, in order to obtain significant information (e.g., when predicting a disease), it is necessary to classify a set of features according to their general degree of involvement in the disorder and rejecting those who do not seem significant, but these ones might be relevant only in certain subgroups of patients. It is also necessary to find a model flexible enough to minimize these effects.

Moreover, it is important to understand that machine comprises two phases: a training one, performed via a set of examples with the aim of fit the parameters in the model, and a test, to evaluate the calibrated model. In any case, it is essential to ensure that the input information includes every single feature needed for the model.

Anyway, a complex model might not be the best option when few training samples are available (as its generalization capacities are not adequate) or when the relationship beetweeen the features studied and the expected result is simple.

One example of what has previously been explained is C-path, a very interesting approach obtained by using machine learning in the Stanford University, where this method was a key tool in the calculation of breast cancer possibilities, as this model is based on 6642 tissular predictors through image processing, which means this enabled researchers to know a patient's breast cancer possibilities from an image of this patient's interior by using computer technology to spot concrete features on affected tissues. Despite being a simple model, it had satisfactory results.

1. Deo RC. Machine Learning in Medicine. Circulation. 17 de noviembre de 2015;132(20):1920-30.