# Using *MLFlow* to monitor an *end-to-end* machine learning pipeline

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**Machine Learning performs very well in labotory settings but doesn't seem transpose well into real world setting. Following this, the objective of this project was to use the tool *MLFlow* to monitor and improve an existing machine learning model (Bayesian Netowrk) for the application Meditrinae. However, because of the immense number of parameters to track, it was impossible to use such a tool to imrpove the model's accuracy when tested with real world data. This paper is an overview of the process and a key insight into the problems we face in deploying machine learning models into production.**

## Introduction

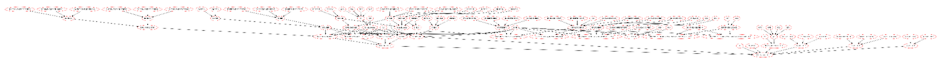
Machinee Learning has been a *hot topic* in the last decade as we've seeen its performance on specific tasks get better and better to a point of surpassing human capabilities, amoungs other, for image recognition. However, when trying to transpose these systems into real world applications and indstrial settings, regular and typical software engineering norms and principles

seem to break down.

In partnership with the *Dental Faculty of the Univeristy of Toulouse*, my tream and I created the Meditrinae application that help dentists diagnos and treeat patients suffuring from temporo-mandibular disorders (DTM). The application works by collecting data entries of a patient (betweeen 100 and 150 answers) and then sent a Basian Network. Using imperial clinic knowledge, the bayesian network proposes a diagnostic based on the answer of the patient.

# Bayesian Network

The basian network used in Medetrinae is a network with thousands of parameters that our the weights of the conditional probabilities.



Theses parameters have underlying clinic significances and it has proven to be very difficult to group into hyperparameters.

## MLFlow

MLFlow is a great tool to monitor the lifecycle of of a machine learning model by versioning important parameters and the effects they have on the accuracy of the model. However, when trying to track thousands of parameters, the tool fails because it does not show a dependency between the chosen parameters and then accuracy of the model. Briefly, in Meditrinae's model, the lack of clairity from the parameters to show an increase of decrease in accuracy was very present. Moreover, it became impossible to version the training and the associated test sets.

## Conclusion

In conclusion, the project did not succed as *MLFlow* did not allow keeping track of the parameters used and it's corresponding accuracy changes. Furthermore, security concerns of the tool was a big problem and deployement on shared servers could not be achieve easily.