**Introduction**

Healthcare global expenditure is about 3.5 trillion dollars per year and it is raising constantly due to the world population aging and the need for elder healthcare services, the discovery of new treatment methods and technologies for more and more diseases considered until then unhealable, the rise of obesity and stress causing more diseases.

This rise of global need for healthcare services is faced to a huge pressure from insurance companies and governments to reduce the costs and at once improve the healthcare services quality. This situation is pushing healthcare organisations to optimize their processes and to be more efficient and effective.

One of the emergent approaches used to optimize healthcare processes is the process mining. The use of this relatively new set of techniques is enhanced by the rise of information systems (ERP, HIS…) and the use of machines and apparels.

Process mining was applied in healthcare, and recorded as a research experience by many researchers: A case study in a Dutch hospital aiming to study the applicability of process mining techniques to healthcare processes, an application to stroke care to identify differences in treating the same disease in two healthcare organisations, another case study in Chicago outpatient clinic to analyze and enhance healthcare processes in emergency department.

Mentioned researches and many others studied the applicability of process mining to healthcare processes and used it to model, compare, analyze and enhance those processes.

In this paper we will present process mining techniques, particularities of its application to healthcare processes, evaluate most used discovery algorithms and their suitability to healthcare processes.

**Process Mining**

Processes are producing more and more amount of events data with the increasing number of sensors aiming to provide real-time process monitoring and the integration of different information systems.

Process mining is a young research discipline aiming to exploit this huge amount of event data to discover, compare, improve and enhance real processes by building process models from the collected process event data.

There are three principle process mining techniques:

Process discovery is the most used process mining technique, its aim is to analyze events log (set of entries of activities executed by the process with different related data as timestamp, actors, machines…) to build real process model using discovery algorithms as α-algorithm, genetic algorithm, fuzzy mining algorithms…

Conformance checking is the second process mining technique, its aim is to find deviations and non-conformances within the process by comparing real executed process model to the predefined (designed) process model.

Process enhancement is the third of principle process mining techniques, its aim to improve and extend process models by identifying actual bottlenecks, wastes sources and optimization opportunities in the real process model.

In this paper, we will focus on process discovery algorithms and their suitability to healthcare processes particularities.

**Healthcare processes**