Stories Learning by a Rational Agent Using CPM

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Abstract- Artificial Intelligence has the ability to represent the Highly-Autonomous Artificial Intelligence system that must be designed in such a way to return reactions and achievements which guarantee to align much similar to human values throughout their actions. In this paper, Alignment-based CPM is presented. The CPM does not impose restrictions on the process notation. This proposed method provides the closest matching path through the process model for any trace in the event log (as required for performance analysis). This method improves 99% accuracy of learning stories by a rational agent similar to human story learning according to different circumstances. Which is 56% better to previous mechanisms. This paper is based on an autonomous change in artificial intelligence's property of value alignment to enhance their relations with humans as well as other aspects of human life. This model helps a rational agent to learn/use a direct and fast method to solve a query form environment that doesn't need to follow any special rules. In this research some facts are presents to solve any situation from our environment that can be resolved by a human thinking but we achieve it by using Candidate Process Model (CPM) Artificial Intelligence.

Index Terms- Artificial Intelligence, Highly Autonomous, Candidate Process Model (CPM), circumstances, autonomous.

I. Introduction

In this Research Paper, we introduce the human story learning according to different circumstances in the process-mining task as shown in Figure 1 CPM, namely conformance checking [1]. We want to discover a process model but we would like to compare across a process model to the corresponding event log.

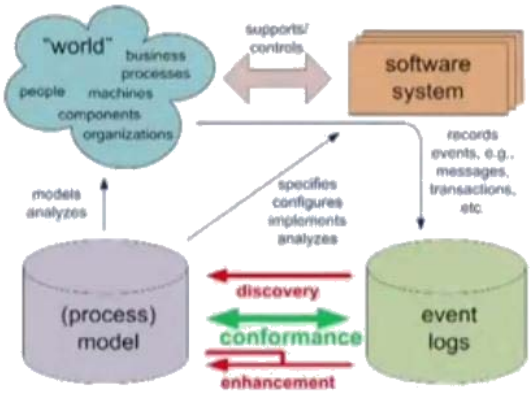

Figure 1 CPM

When doing conformance checking we need to take into the four consideration which are

- World
- Software system
- Model (process)
- Event logs

In previous research according to *** many process discovery techniques represented but the ability to reply the event log on the model was missing, which is the most important. Many researchers discussed many techniques we focused on the different dimensions. All dimensions are important *, but event logs as special value in the model. When we look at the replay fitness, we have already seen the principal before. Therefore, the basic idea is that we would like to add replay traces that if we see in the log. On top of a model we executed A and C. and now the event log access that we should do e. Nevertheless, if you look at the model though and you look at the state that we are in E is not-yet unable. Therefore, we need A to force the process forward although we see that something does not fit completely. However, while doing that yet counting how many problem cc other Riyadh also recording the types of problems that you have said. So this is what we are trying to do if we check for fitness and compare observed behavior with, model behaves so the kind of diagnostics that we show our diagnostics at the level of an event log, for example, these other traces that do not fit well into the model. We also provide diagnostics at the model level showing the path of the model. When we look at the global Matrix, For example, we often look at the fitness metric, if it have a value between zero and one best zero means that a fitness is very poor and a fitness of one means that everything was seen in the log was indeed possible according to the ball.

Use cases for conformance checking

Now, why we are using use-cases for conformance checking? The first use case is related to auditing and compliance Finks at the level of business processes. Firstly we have to understand how people deviate and why they deviate the things. According to our research, they balked at reported correctly. Another use case is that we want to use conformance checking to evaluate the quality of process discovery algorithms and its result. Finally yet importantly often, we want to check conformance to some specification based on the actual behaviour. For example, if we have a piece of software and the software has a specification describing how it should work. We cannot compete for the daily find log and see where the software is deviating from the specification. Also if we provides services, we also check whether the description of the surface is consistent with the actual behaviour. So there are many different use cases for all of these cases we need to have a model that check the event looks and these models in our case, it will typically be any set of rules on any set of the model that capture some kind of behaviour.

Auditing

The basic idea is to check whether a report that was reported correctly and this is done to check whether to business processes are executed within the boundary set by mine just governments that all the stakeholders and these boundaries are expressed in terms of a process model or a set of rules and one difficult rules as model profits model.

Increase emphasis on compliance

In the last couple of years, that has been lots of emphasis on compliance and auditing related issues. To ensure that organizations are doing what they say they are doing. A completely different use case is the evaluation of process discovery algorithms. In our research we study many algorithms. By using these algorithm we got four process models. And according to these algorithms we get a new process model CPM.

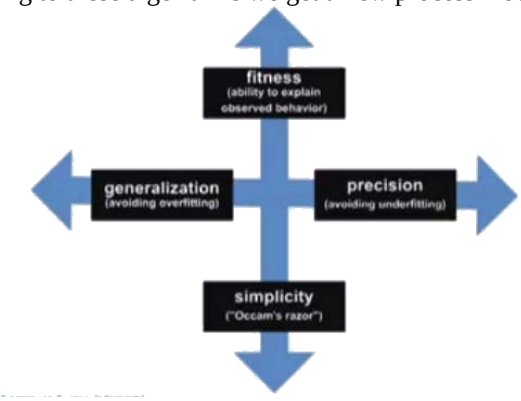

Figure 2 Parts of CPM

Typically looking at the four dimensions.

1. Fitness
2. Simplicity.
3. Generalization
4. Precision

In this paper, we tried to compare the results of different processes. Discovery algorithms and process has many parameters in which you can also create many discovered models. What are the best models that we can look at? In this diagram, every red bolt corresponds to discovered process model [6]. Moreover, the two dementias indicate how will the fitness of the model is and how will the precision of the model is working? At this stage their a question arise which one is good model to consider? There is not a single model because you can clearly see Figure 3Candidate Process Model that is apparently a tradeoff between the precision of fitness?

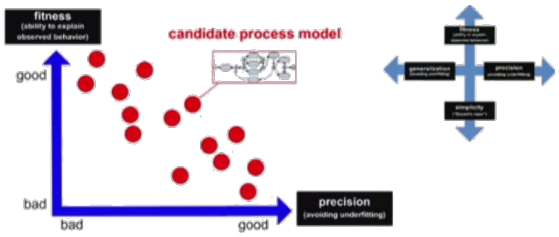

Figure 3Candidate Process Model

If we pick a model Pareto front [2] [3] and start to analyses the model there is no other models that are better in all dimensions. We can look at that although a mole on the Pareto front and again you can see that a couple of models are discarded because they are dominated by the models on the plate of what we can do that for all model on the Pareto front and then be got that red dots as well as if we are just interested in these two dimensions.

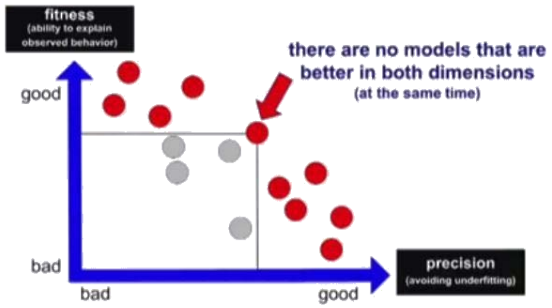

Figure 4 Relationship between Fitness and Precision

These are all the models that we should inspect because they are interesting. The other models are not interesting because there is always a model that is better than or at least as good in all dimensions. So far, we consider two dimensions one is Fitness and the second is precision. In this diagram Figure 5 Difference between Precision and Simplicity, you concede that model five is being dominated by model two because model two is better in terms of fitness and is better in terms of precision. However, if we include the third dimension. It may be that model five is on the Pareto front. For example, plots fitness again simplicity. One can see that if we look up model five it is no longer dominated by model two on any of all the models. Therefore, there is no model but at the same time has a better fitness precision and simplicity model five so, it is not dominated on the Pareto front. We are interested in the models that are out on the potato frogs and compelling disco fourth bottles is not very easy,

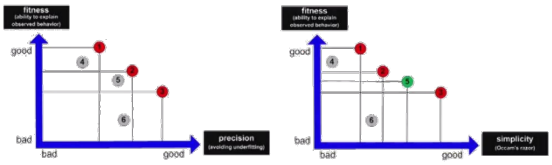

Figure 5 Difference between Precision and Simplicity

Because one model can be better in terms of fitness. About to us in terms of simple simplicity or the other way around.

Comparing positive and negative deviants in any event log with the process model

If there are deviations, an obvious question to ask is the model wrong or is the log and both can be the case? THEREFORE, deviations considered good or bad. In many processes, People deliberately deviate from the process and in that way do something good. So for example, in hospitals, doctors will deviate and by these deviations, they are saving the lives of patients. We can also look for positive deviance things that deviate but in a positive manner. THEREFORE, deviations

are not always negative and it is not always the case that the process mobility rights and the event log are wrong. So far we have been discussing conformance checking mostly an offline but of course, you cannot done this at runtime. Online conformance checking means that the moment that the deviation Acer ups you immediately generate on the left.

Conformance checking techniques and control flow

There are many situations where we would like to compare modeled and observed behavior. In this section, we discuss a particular technique to check conformance called causal footprints [4] and the idea based on one of the ingredients of the alpha algorithm [5]. In the introduction of Alpha algorithm, we used made recess like that is called the footprint of particular log. We are using notions such as causality parallel and choice, they are based on the direct succession relationship. For example. If you look at this particular causal footprints, you will see that this arrow is indicating, that is followed by d at least once in the log. However, it is never the case that B. is followed by a. This parallel symbol is indicating that b a sometimes followed by c and c a sample is followed by d. Therefore, they happen in both directions, and then there is # symbol, which is the choice symbol. It is indicating that never followed by e and E is never followed by d. Therefore, these are the ingredients of creating a footprint. Nevertheless, it is very important to realize that you can create a foot but it based on the log. Butterfield can also create the footman place on a model because a model general authorized and by static analysis of these types of models, we can already derive this matrix with all the causalities. In this case, who opposes all discovered by Alpha algorithm both have the same cause of footprint, also there are no differences. Weather is disagreement between log on model and that leads to a foot print-based conformance of zero point seven five. Let us look at another model known as the flower model, which allows for lots of behavior, and Again try to estimates would you feeling is the foot print based conformance between the original flick and this flower model. We do the same as what we did before we take the original footprints and compared it with the footprints of the process model. This process model allows for much more behavior than what we have seen in the log. So if we visualize the differences you concede that in total there are forty-five different cell model and that leads to very low conformance of 0.29 and this is the verse conformance out of other three models that we have seen before because of the emissive amount of additional behavior allowed by this flower model and the footprints are incredibly flexible because the sense we can compare logs to logs you can compare models to models and you can compare models to event logs.

Limitations

1. Frequencies are not used
2. Behavior is only considered indirectly
3. Aims to capture fitness, precision, and generalization in a single metric

Approach to check on conformance

This approach is based on replaying the event log to diagnose differences between models and observed behavior. This figure shows a desire line this desire line is clearly indicating that the behavior of people is very different from the expected or model behavior, one can think of the gates. One can think of the desired line as the event log and that is clearly deviating behavior. Nevertheless, this approach has all kind of problems, for example, it does not take into account the frequency of traces. However, it does not actually look at the behavior. Now we look at a much more refined method that based on token based replied. So let us look at an example.

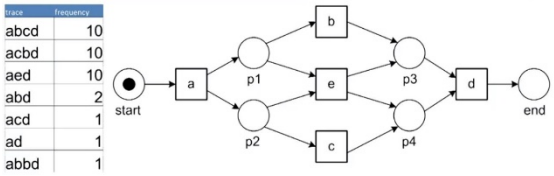

Figure 6 Approach to check in conformance by graph

We can see a trace A B. E. G., if we just consider a fitness at the level of complete traces one would say. This strays as a fitness or zero because it does not fit. We would like to look at fitness and conformance at the level of events because we have a long traces. However, we may have logged well known of the traces actually fitting we would get the conformance of zero but this would be very misleading them. This is done through counting called missing out remaining tokens to illustrate this. Let's a reply add this trace on this model. So first we execute an after executing a, we executed b we still do not see any problem. Nevertheless, while doing this we are producing and consuming tokens then, A the event log says that we need to execute E. that's why, we count the missing token. We continue, Then we execute E After executing E. we need to execute a G and we do not encounter any additional problems. Except for the fact that when we reach the end of the trace that is still a token left behind. Therefore, this example we have one remaining token of one missing token. It totaled over six produced tokens never six consume tokens that are one missing token and won the remaining tokens. Therefore, we can put this into a formula but looks like this but computes fitness as a number between zero and one zero means the fitness is as bad as is possible. The fitness of one means perfect fitness the trace could be applied without encountering any problems, as shown in Figure 7 Resulted Fitness Ratio.

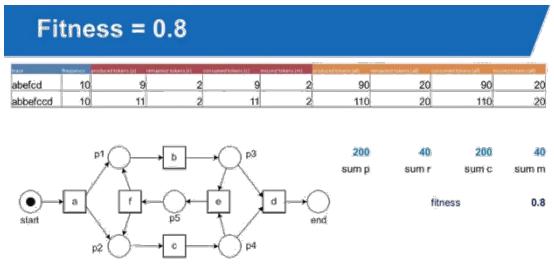

Figure 7 Resulted Fitness Ratio

Therefore, this case p and c is equal to six. M and R is equal to one, so if we find that formula, we get the conformance over 0.83. For this particular tries this approach based on simply counting the number of produced consumed missing out a mating token. Missing tokens are taken, that are consumed. While they are not, there so we need to add a token. The counter r country

first to the tokens that are left behind at the end. That was not consumed while replaying a trace. At any point, in time the place complaints p + m - C tokens, and this number should be positive because it cannot be a negative number of logs and applies at the end. Therefore, this leads to a couple of invariants. If you done this, we play P+M will always be bigger or equal to c. Because we cannot have a negative number of tokens in a place, C will also be at least M, because we are never going to add missing tokens if they are not needed for consumption and at the end r is the number of tokens remaining in the place, so r is equal to B + and -c. All numbers they hold out the level of an individual place but they all also held at the level of all places in the process model and at the end the environment needs to produce a token for the soft place. Moreover, at the end, the environment needs to consumer token from the same place. In the latter case, that is no the token of remaining on the final place at the end of the trace you still need to consume it so this bill out extra missing token. In this way we really check whether the trace exterminated in the desired final study.

Alignment-Based conformance checking

In this Section, we discuss the most advanced approach relating event logs to process models. We only compare the syntactical structure using directly follows relation. Then we looked at a more advanced approach using token-based reply then we will look at alignment-based conformance checking. What are the requirements for conformance checking overcoming the limitations of the approaches that you have seen before first conformance checking should not impose any restrictions on the process model notation? We should not be restricted to work flow nets. We should not be restricted to models where can't be two transitions having the same label or whether are silent steps. For example, the model when all split or join. If we see something, in reality, we want to relate it to a valid path through the process model. It is necessary for performance analysis where replay a reality on top of the model, also if we look at more of a sophisticated notion of conformance involving. Precision generalization or more advanced forms of diagnostics, we first need to relate reality to a path to the model. It's a kind of an enabler for all types of analysis.

II. CONCLUSION

CPM is the best illustration of Stories learning by a rational agent using logs. The research paper discusses the behavior of CPM in real life as well as the explanation of how CPM works with their different type. We discuss Compare positive and negative deviants in any event log with the process model. Conformance checking techniques and control flow is briefly explained in this research paper. We use an approach to check on conformance. I hope my suggested CPM should effective to learning story for a rational agent. In Future enhancements may be possible form the modern techniques in conformance checking approach that may be more efficient as well as more effective.

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