Safety Aware Reinforcement Learning by Identifying Comprehensible Constraints in Expert Demonstrations

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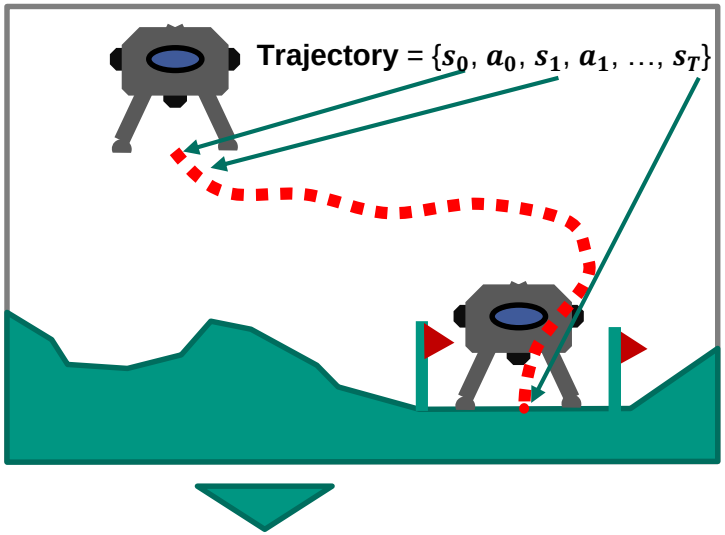
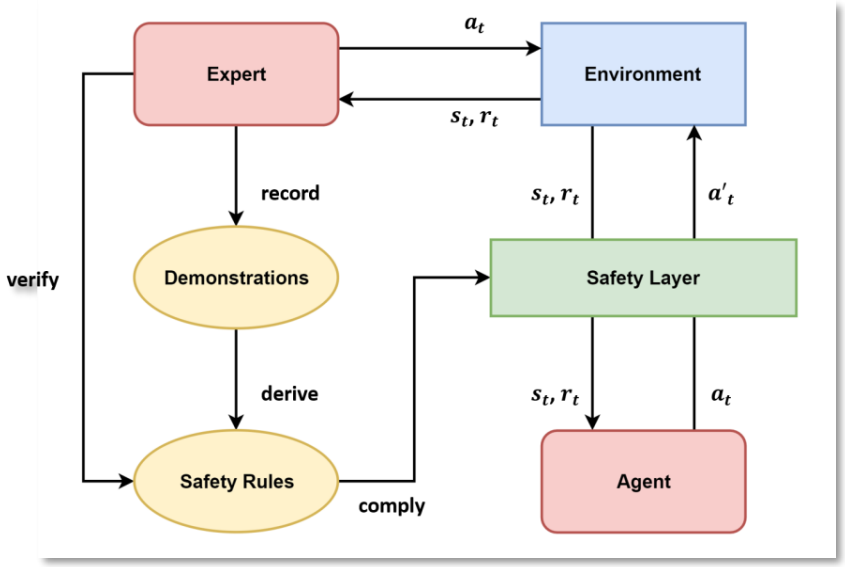
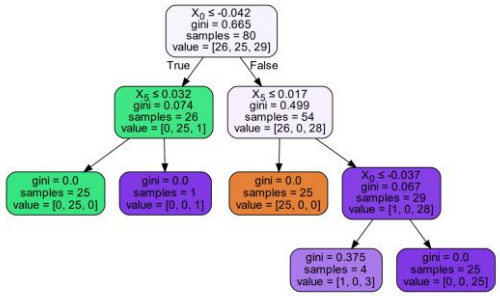
Deriving Safety Rules from Expert Demonstrations





Decision Tree CART-Algorithmus



Consider Paths as Association Rules and use Metrics as Hyperparameters

$$Support(s \Rightarrow a) = \frac{f(s \Longrightarrow a)}{|s|}$$

$$Confidence(s \Rightarrow a) = \frac{f(s \Longrightarrow a)}{f(s)}$$

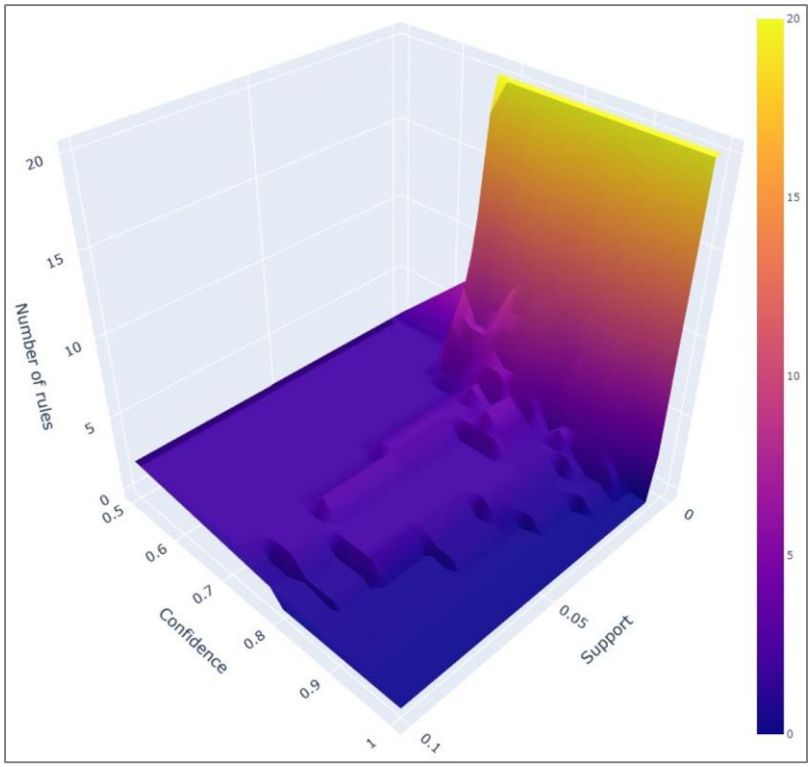
Convert filtered Path into Set of Safety Rules

IF $x_0 \leq -0.042$ & $x_5 \leq 0.032$
THEN a = 1

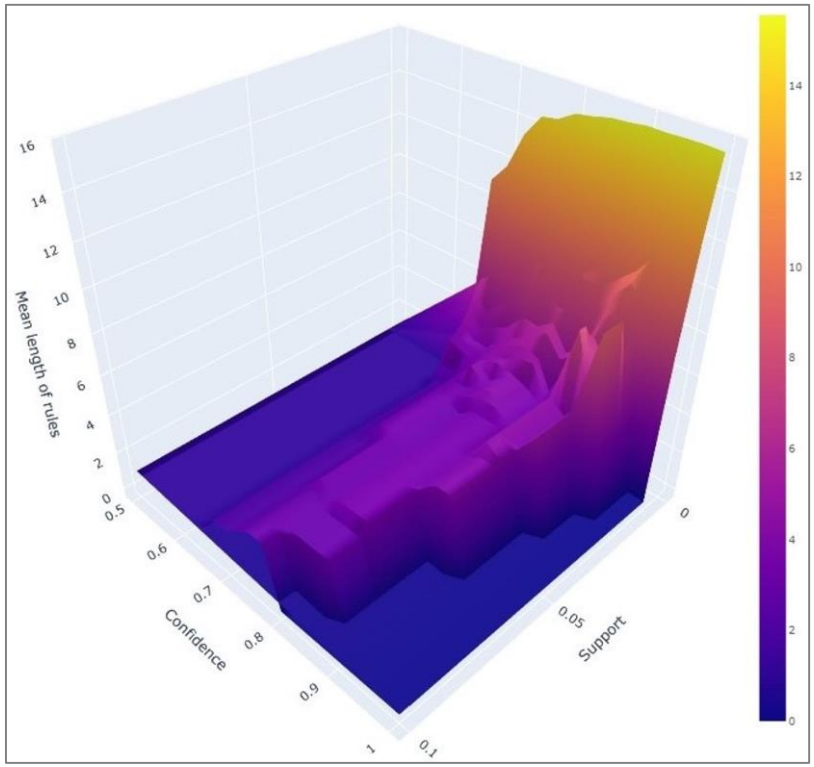
Influence of the hyperparameters on the rule set

Influence of the minimum values of support and confidence on:

(a) number of safety rules



(b) average length of safety rules



Evaluation of Safety Layer