LTL_f-based Trace Alignment

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Declarative Trace Alignment

Problem:

- given a trace
- transform τ into a trace τ' s.t. τ' satisfies desired property φ
- *minimum* number of repairs (additions/deletions)

Example:

- $\tau = a\ b\ e\ e\ b\ e\ f$
- $\varphi =$ if you see b, must see a in the future
- Some solutions (which is the best one?)
  - $\tau_1 = a\ b\ e\ e\ \underline{a}\ b\ \underline{a}\ f$
  - $\tau_2 = a\ b\ e\ e\ b\ \underline{a}\ f$
  - $\tau_3 = a\ \cancel{b}\ e\ e\ \cancel{b}\ e\ f$
  - ...

What shall we do

We will:

- Introduce an automata-based solution approach
  - We specify properties in LTL_f
  - LTL_f formulas can be represented as finite-state automata
- Describe a solution technique based on cost-optimal planning

You will:

- Study the paper
- Actually implement the technique
- Test your solution
- Or propose a project of your own (if you wish)

References

De Giacomo, G., Maggi, F.M., Marrella, A., Patrizi, F.:
On the Disruptive Effectiveness of Automated Planning for LTLf-Based Trace Alignment.
AAAI 2017: 3555-3561