LABEX MS2T

Laboratory of Excellence
« Control of Technological Systems-of-Systems »

Meeting of the Labex MS2T International Advisory Commitee

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Exploratory Challenge

RUNESK: Risk modeling and UNcertainty analysis using Evidential networks and Semantic Knowledge representations

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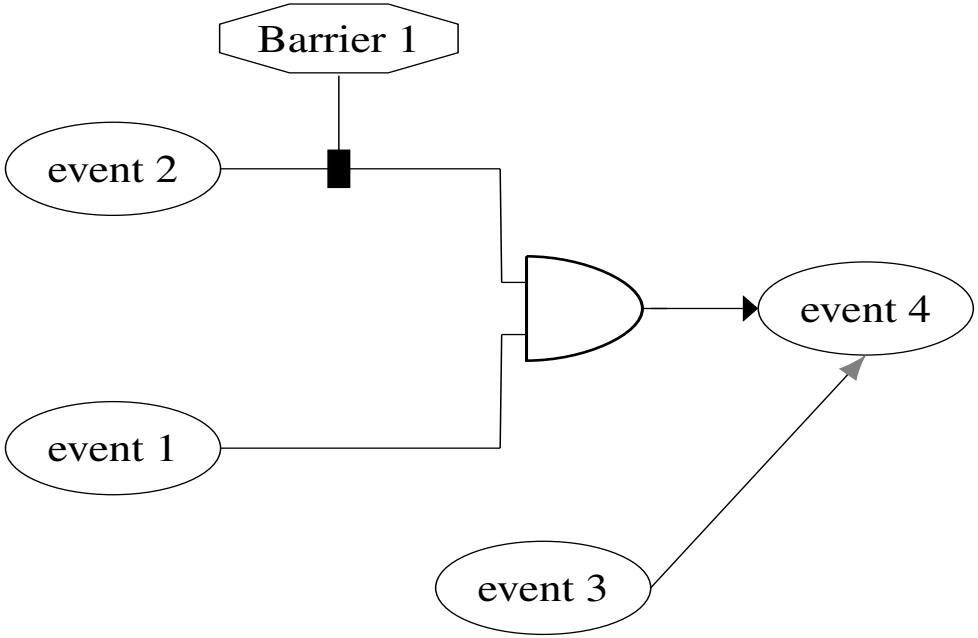
Introduction

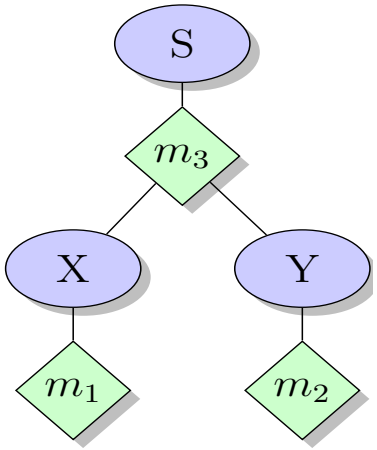
- Risk assessment methods depend mainly on the risk related information : experts' opinions, likelihood of dangerous events, etc.
- Meaning of words used in risk information data plays a major role in the risk studies.
- Main disadvantage of quantitative risk analysis methods : lacking a universal vocabulary.
- Definition of a semantic model for a risk assessment analysis will contribute to a more realistic risk models.

Proposition : 1st Objective
A semantic model: Causality-DL



- Additional information: Generalized events, barriers.

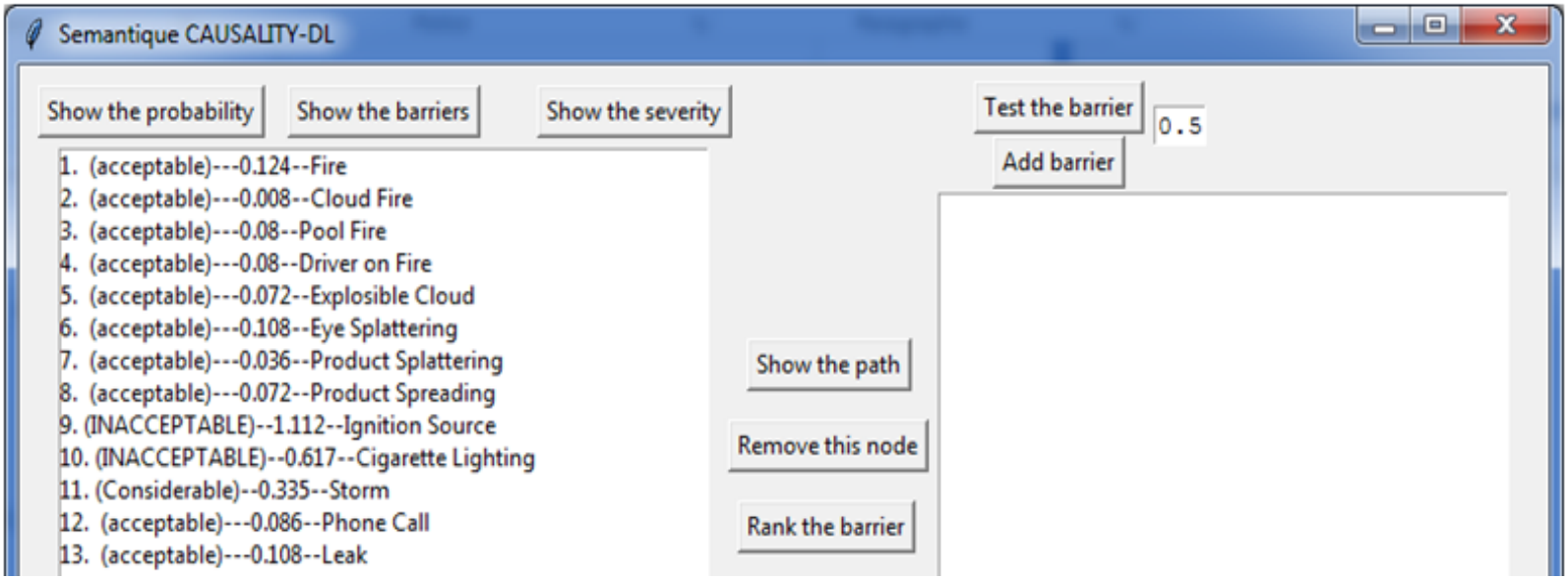
Proposition : 2nd Objective
Traduction to an evidential network



- To Computation of probability of variable of interest using combination and marginalization.

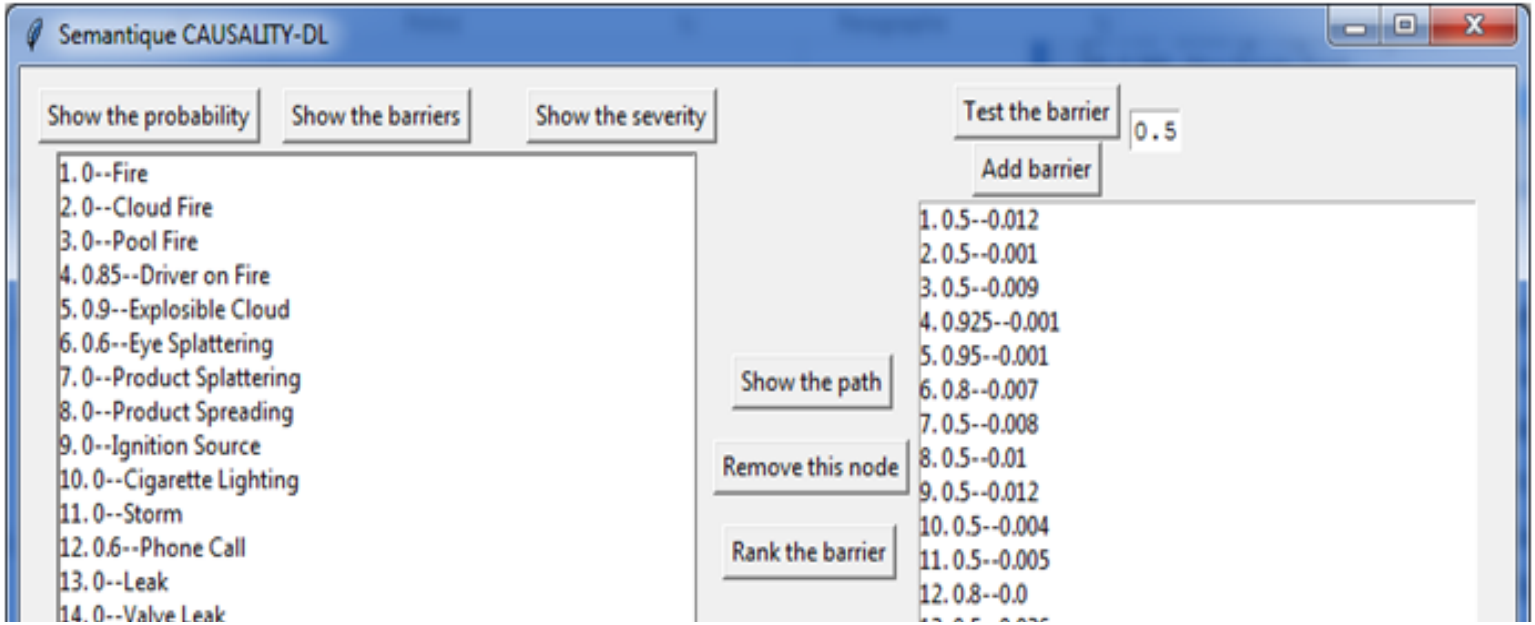
Case study: an oil depot supervision

- Step 1: Preliminary risk anaysis
- Step 2: Representing information using Causality-DL
- Step 3: Computing probabilities of dangerous events : Leak, Eye Splatering, Fire.



Case study: an oil depot supervisor

- Step 3: Testing bariers
- Step 4: Decision making



Preliminary Results & Futur work

- Two Master thesis (Edwadr Gregorius and Francesco Inamoreti): Definition and development of the traduction tool.
- E. Gregorius, F. Inamoreti, M. Sallak, D. Lourdeaux, A combined semantic and quantitative risk analysis approach, European Safety and Reliability Conference, Glasgow, 2016.
- Formalization of the combined approach.

Preliminary Results & Future work

- Validation of combined approach in virtual environment (improvement of the risk analysis model).

- PhD thesis (Rémi Lacaze) : Combining planning methods and graphical probabilistic models (such as Bayesian networks and VBS) for identifying critical situations in virtual environments under uncertainty.

- More details : https://www.hds.utc.fr/~sallakmo/