Learning and Reasoning in Logic Tensor Networks

Hackaton Proposal

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Objective

- LTN 101
- Explain how it works on a simple scenario;
- Discusso some idea of further application (simple) scenario;
- Get more accountant with LTN;
- Start some development of the new scenario in LTN.

LTN 101

- install `python 2.7/3.5` or later;
- install `tensorflow` instructions at `https://www.tensorflow.org/install`;
- get `logictensornetwork.py` and the code of the first example by cloning the git repository

```
git clone http://gitlab.fbk.eu/serafini/dagstuhl_hackaton_on_LTN.git
```

Simple example

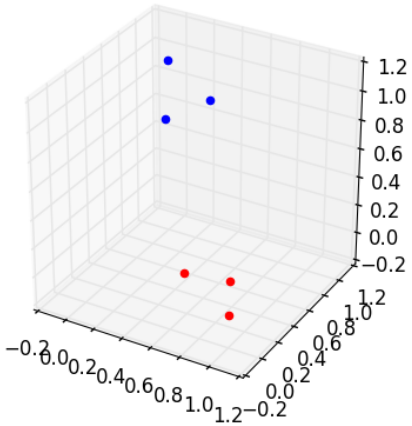
Knowledge

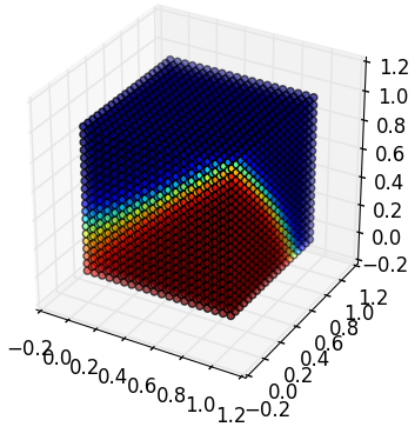
$domain = [0,1]^3$
$A(a_1), A(a_2), A(a_3)$
$B(b_1), B(b_2), B(b_3)$
$A(c) \vee B(c)$
$\forall x A(x) \rightarrow \neg B(x)$
$\forall xy.(R(x,y) \rightarrow A(x))$
$\forall xy.(R(x,y) \rightarrow B(y))$
$R(a_1, d)$
$f(a_1) = [1.0, 0.0, 0.0]$
$f(a_2) = [0.7, 0.0, 0.2]$
$f(a_3) = [0.9, 0.2, 0.1]$
$f(b_1) = [0.0, 1.0, 1.0]$
$f(b_2) = [0.1, 0.8, 0.7]$
$f(b_3) = [0.3, 1.0, 0.8]$
$\forall xy(|f(y) - f(x)| < \frac{1}{2} \rightarrow R(x,y))$

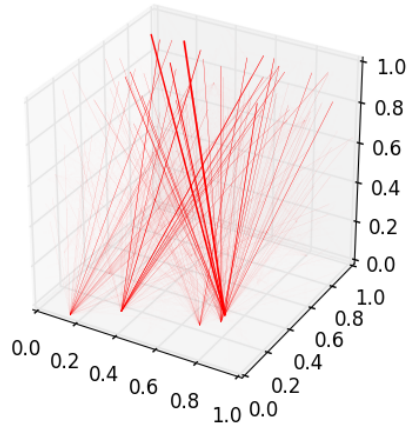
Queries

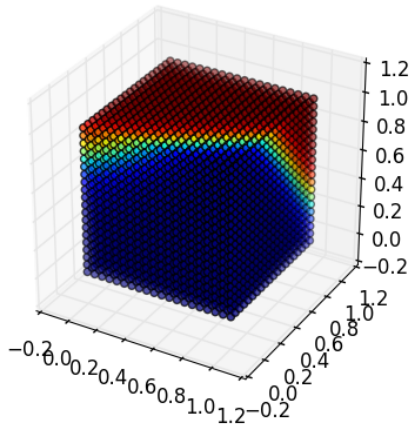
$?A(c)$
$?B(c)$
$?A(d)$
$?B(d)$
$?A(x)|x \in [0,1]^3$
$?B(x)|x \in [0,1]^3$
$?R(x,y)|x,y \in [0,1]^3$
$?f(c)$
$?f(d)$

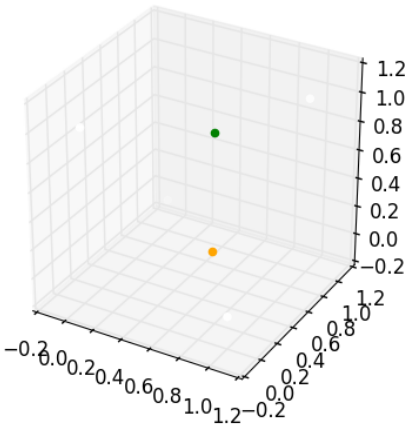
Simple example











. . . please join us .... it will be fun !!!!