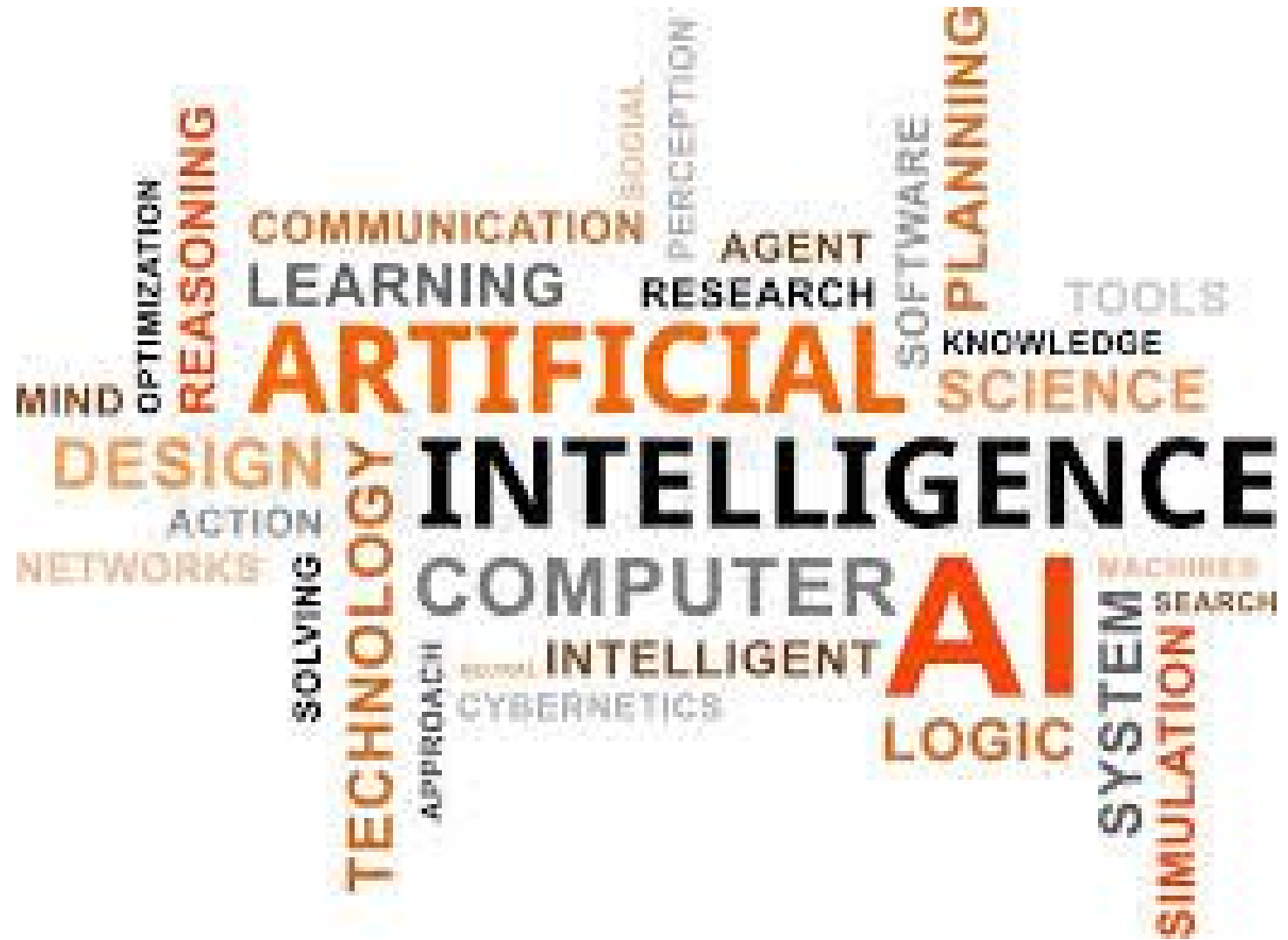


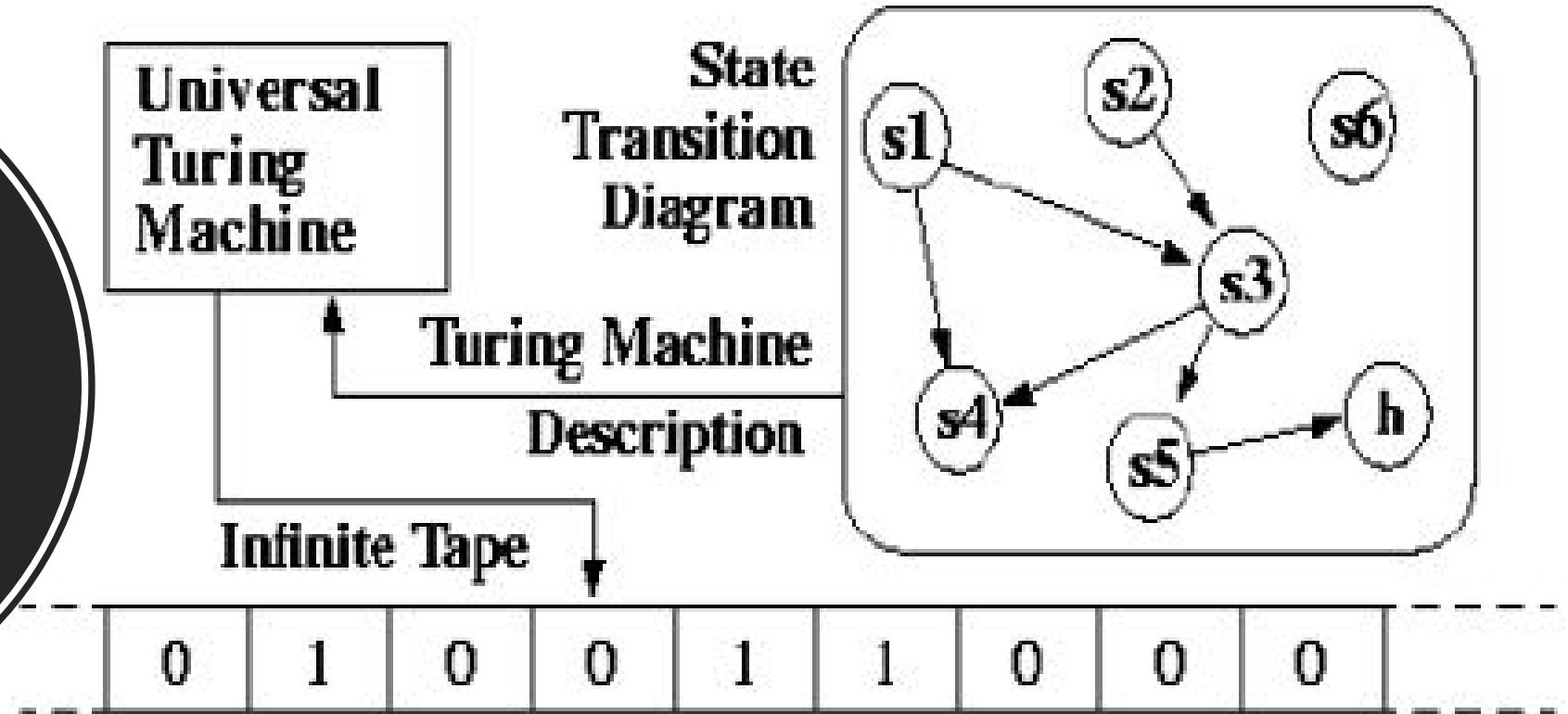
Beware of systemic risk in CyberPhysical Systems

Kavé Salamatian, University of Savoie Mont Blanc

Any fool
consider
himself as
intelligent
Danish folklore



The Turing machine and the *Entscheidungsproblem*



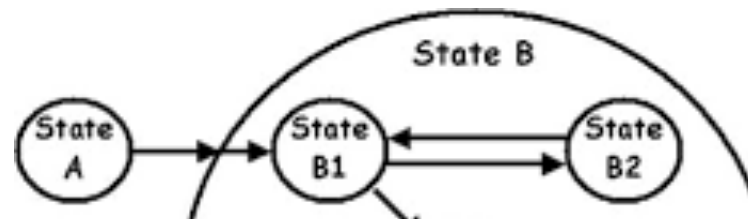
- Separation of program and hardware
 - Universal machine

```

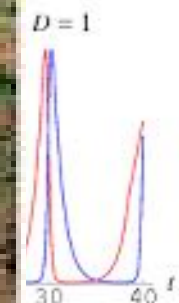
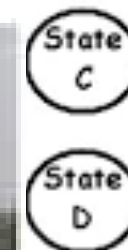
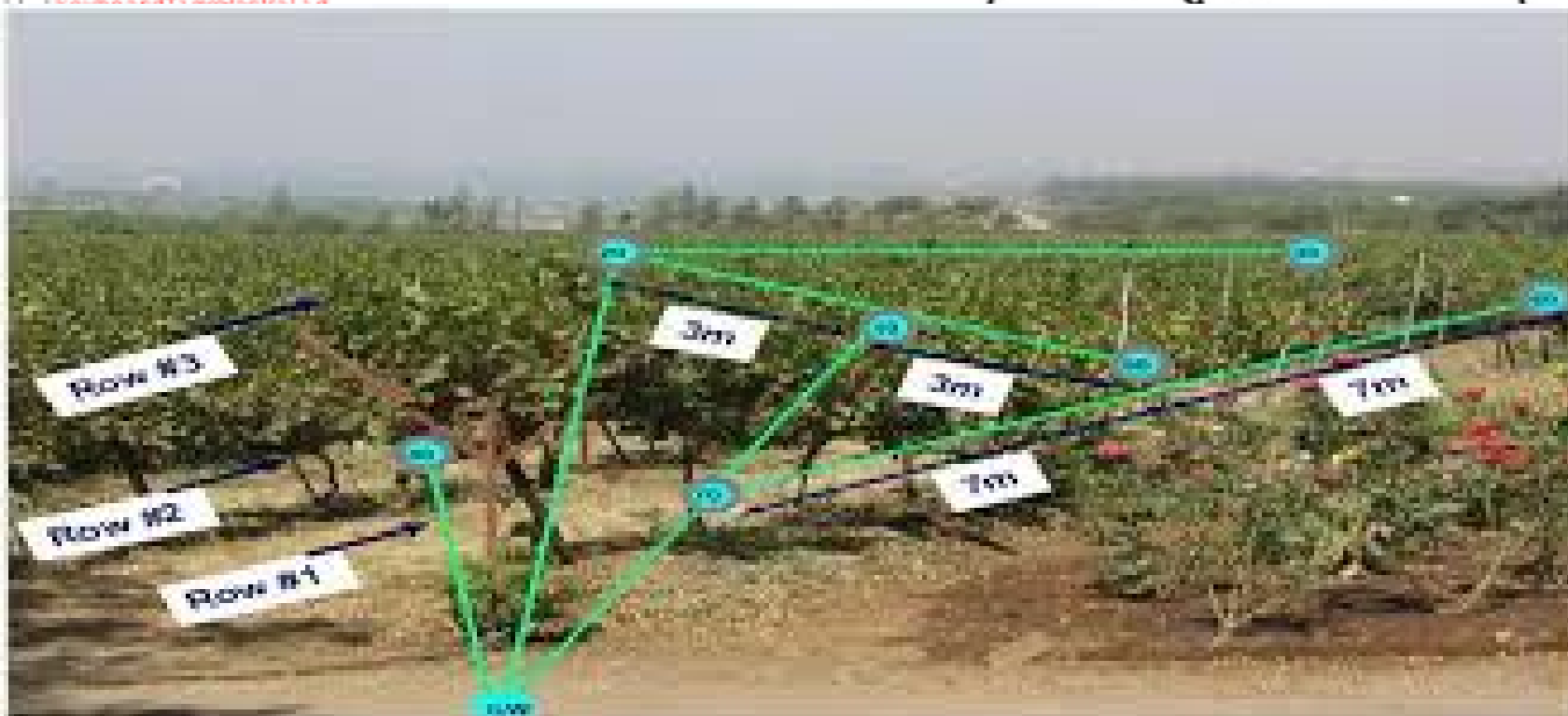
QModelIndex start;
if (currentIndex().isValid())
    start = currentIndex();
else
    start = d->model->index(0, 0, d->root);

bool skipRow = false;
bool keyboardTimeWasValid = d->keyboardInputTime.isValid();
qint64 keyboardInputTimeElapsed = d->keyboardInputTime.restart();
if (search.isEmpty())
    || keyboardInputTimeWasValid
    d->keyboardInputTimeElapsed = keyboardInputTimeElapsed;
    skipRow = true;
} else {
    d->keyboardInputTimeElapsed = keyboardInputTimeElapsed;
}

```



Cyber-physical system



Carbon concentration



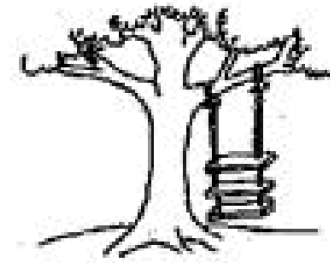


Where can
things go
wrong !

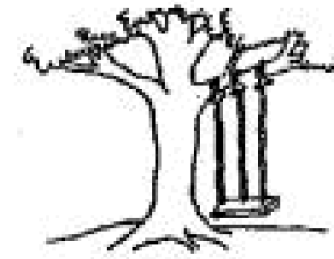
- At each stage !
 - Some are easy to detect, some are much more difficult
 - Model checking : easy
 - Detecting model change : hard

Epistemic steps

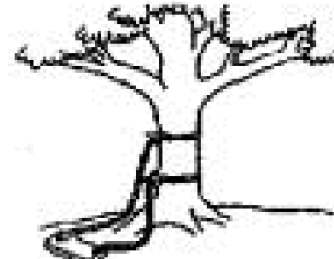
- Going from reality to model and back
 - how to not get lost in translation
- Building model steps
 - Separate what is « *in* » from « *out* »
 - Characterize the model
 - Simplify it
 - Evaluate the model
- Issues
 - Separation
 - Characterization
 - Evaluation



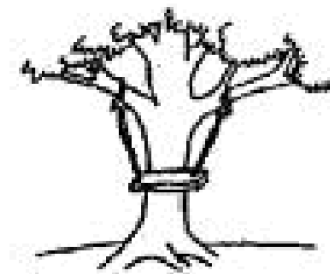
**As proposed
by the project
sponsor.**



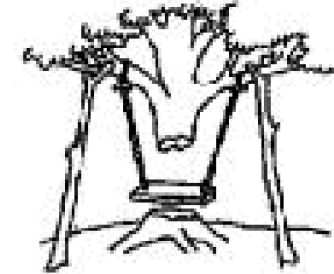
**As specified
in the project
request.**



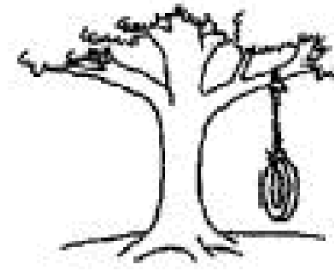
**As designed
by the senior
architect.**



**As produced
by the
engineers.**



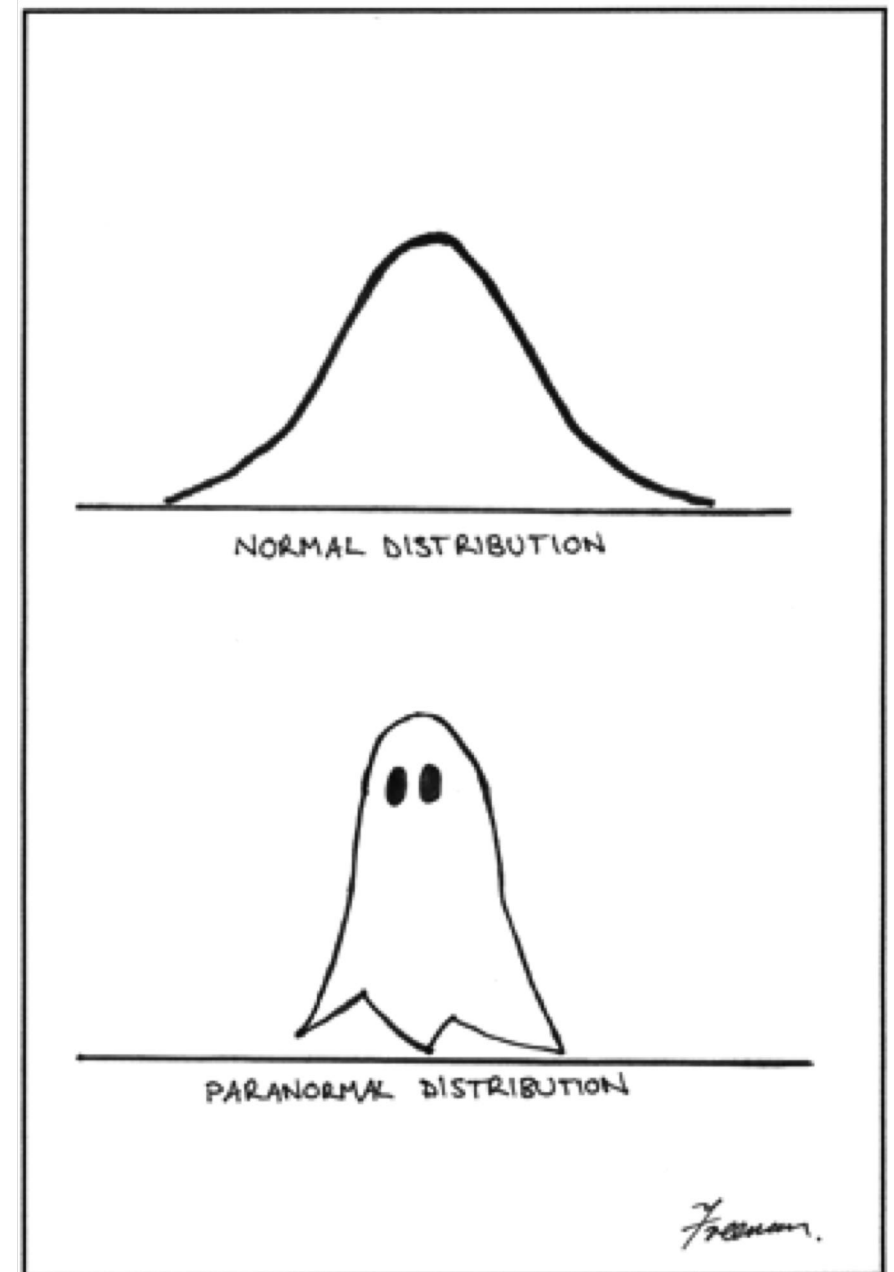
**As installed at
the user's
site.**



**What the
customer
really wanted.**

On statistics

- There is no probability but probabilistic models
 - Some are useful, all are wrong
- At beginning there is a concrete reality
 - We move from the reality to realm of the probability model
 - We need to come back to the real world
 - Statistics defines how to not get lost in translation
- No free lunch !
 - How much I pay ?



Conflict of
rationality ...



"Sorry, bub. You're not in the database."

Should we regress when we do regression ?

- Rationality conflict
 - Is the model logic dominating or the problem (real world) logic
- Oprah event
 - Discrimination
- Boiling Frog
 - Model divergence detection



Conflict of
rationality ...



"Sorry, bub. You're not in the database."