A Normative Agent-based Model for Sharing Data in Secure Trustworthy Digital Market Places

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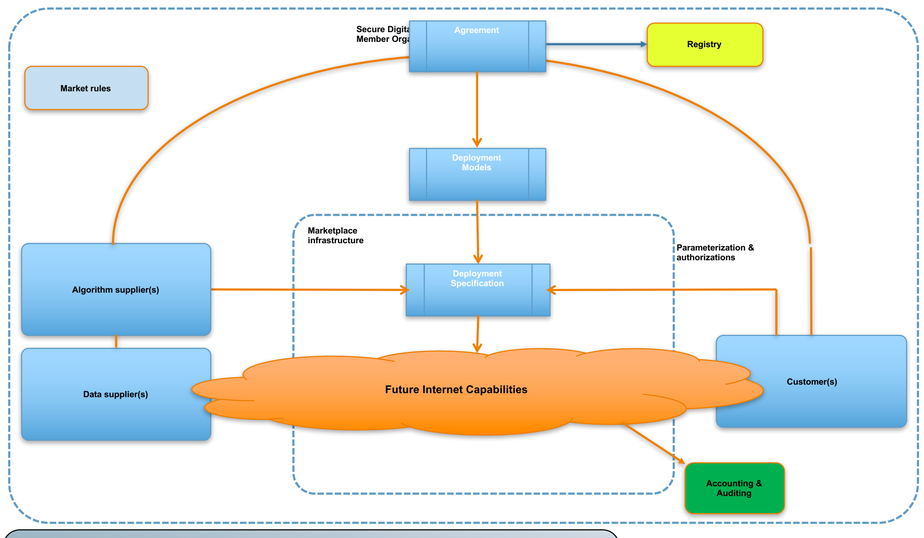
- Bring competitors together to share data to achieve a common goal.
- Use shared data for different purposes.
- Create a trusted infrastructure to process data.



Goal

- Development of an extended version of the BDI agent model (N-BDI*)
- Extension of the BDI control loop
- Enabling us to study how norms can be used to create a social systems.

Research Questions

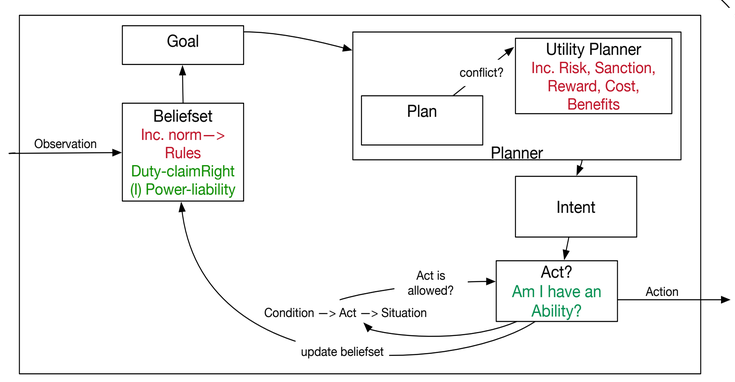
1. How do the rules that express the social system's policy impact the different members' behavior and what is the emergent behavior of the regulated systems?
2. How can agents identify non-compliant society members and respond to them by adapting their behavior?
3. What are the limits of controlling these social systems, equilibria and flipping points?

Modified Control Loop in N-BDI*

- We have divided an agent planner component in two sub-components:
  1. Planner to generate plans based on the agent preferences
  2. Select the most appropriate plan based on the plan utility
- We have developed a normative belief-set.

Algorithm 1: Modified control loop for the extended BDI agent (N-BDI*), where O= observation, B= Belief set, G= Goal set, P= Plan set, and A_p= Actions.

Given an agent $\{O,B,G,P,A_p,Norms\}$
repeat
  $O := Observe(O+Norms)$;
  $B := Revise(B,O)$;
  $G := Generate\ G\ (B)$;
  $P := \forall g \in G \rightarrow generate\ P(B,G)$;
  $P := Calculte\ U_P\ \forall\ p \in P(B,G,P)$;
  $PrefP := Update\ P\ to\ PrefP(B,G,A_p,P)$;
  $B := revise(B,Pref)$;
  $A_p := (norms(Power),Allowed?)$;
  $take\ (A_p)$;
until *forever*;



Normative BDI*

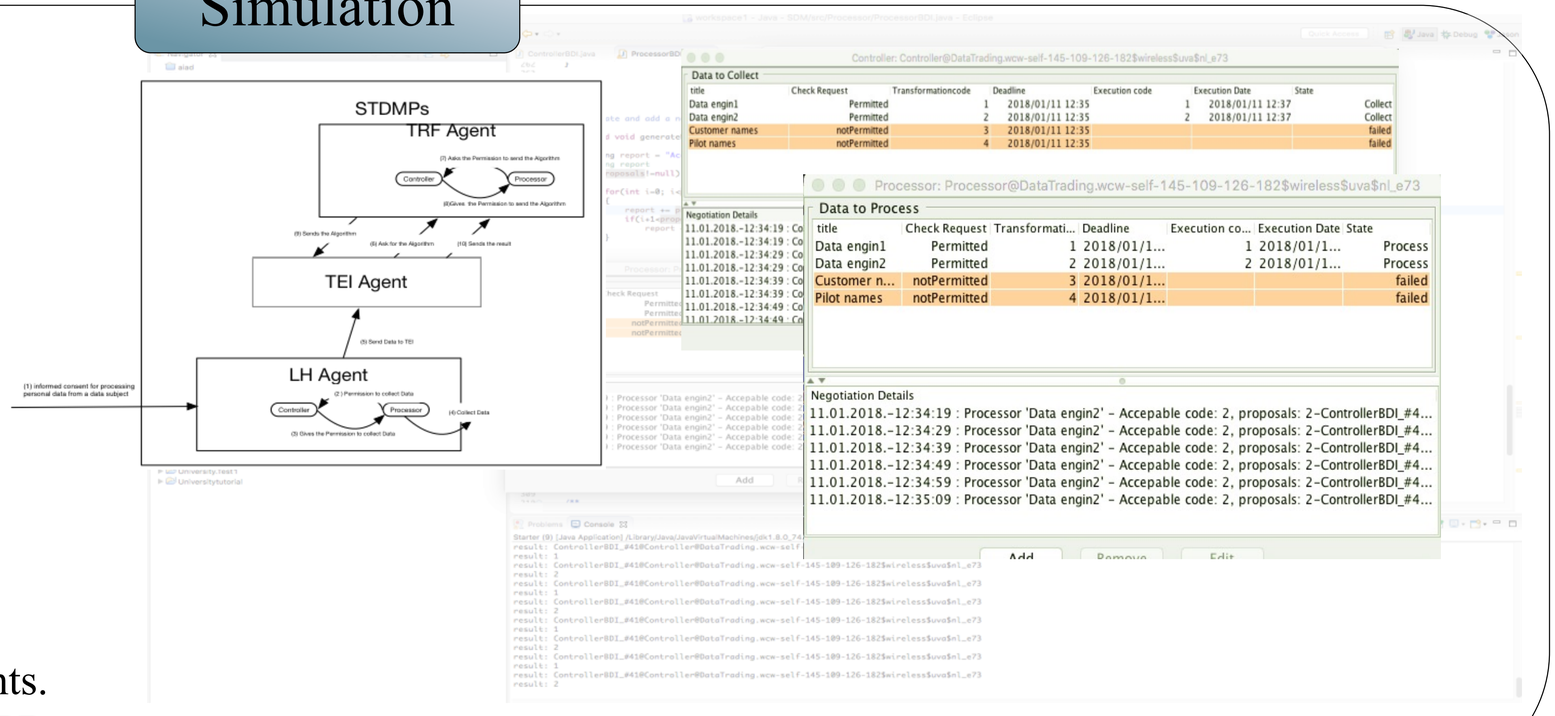
Simulation

Setup

- Implement the STDMP's agent with BDI agent in Jadex.
- Two BDI agents as the Controller and Processor.
- Norm engine has been implemented as a part of the belief-set.
- STDMP formed by different airlines companies.

Aim

- Monitor the negotiation process between the agents.
- Check each requested transaction against the GDPR.



Secure Digital Market Place Schema (Jadex)

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Research Area: Computational Trust model, Normative Agent Based Model, Cyber Security Alliance

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