**A Context-aware Normative Structure in MAS**

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### Motivation

- Norms are not independent with each other.
- Norms are applied in a specific domain determined by the values of related situational variables.
- Norms are not formed at a single level of abstraction.

### Solution

![Diagram of norm net mapping](image)

**Abstract norm net**

<table>
<thead>
<tr>
<th>Contextual norm net</th>
<th>Operational norm net</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contextualization</td>
<td>Operationalization</td>
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</table>

**Verification: Norm net mapping to CPN**

- **Exporter**: a company in China
- **Importer**: a company in the Netherlands
- **Customs**: Dutch customs
- **NS**: Preferential Origin
- **NS’**: Preferential Origin
- **OE**: OR

### Key Concepts

- Norm $n = (role, deontic, action, condition)$.
- Norm net $NN = (c, NS)$ where
  - $context$ $c$ is an abstraction of the application domain of $NN$ determined by situational variables related to individuality, activity, time, location, relation, etc.,
  - $NS = n$, or $NS = AND(NS_1, NS_2)$, or $NS = OR(NS_1, NS_2)$, or $NS = OE(NS_1, NS_2)$.
- A norm net $NN’ = (context’, NS’)$ is a contextualization of another norm net $NN = (context, NS)$ if their ontologies are unified and $context’ \subseteq context$.

### Example

![Diagram of norm net](image)

($n_1$) [role: The certified exporter],
- [deontic: should],
- [action: offers guarantees to verify the originating status of the products],
- [condition: irrespective of the value of the products concerned].

Or Else (OE) ($n_2$) [role: The customs authorities],
- [deontic: should],
- [action: withdraw the authorization],
- [condition: when the certified exporter no longer offers the guarantees].

### Conclusions

- Captures the interrelationships between norms.
- Captures the institutional contexts of norms.
- Provides a norm net contextualization process.
- Provides a mapping of norm nets to CPNs.

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