Distributed Imprecise Design Knowledge on the Semantic Web

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**Solution Selling:**
offer **customized** products and services, which meet customer's **individual** business needs

**Projection:**
*Which good/service bundles may serve as a solution?*

FBS Bayesian Network (FBS-BN)

DESIGN OBJECT ATTRIBUTES

**Function Concepts**
- $F_{1j}^{Vi}$
  - Being Flexible wrt.
  - *Floor 10*

**Behavior Concepts**
- $Be_{1j}^{Vi}$
- $Bs_{1j}^{Vi}$
  - Adjustability of *Floor 10*

**Structure Concepts**
- $S_{1j}^{Vi}$
  - Layout of *Floor 10*

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FBS Bayesian Network (FBS-BN)

**Design Object Attributes**

**Function Concepts**
- Being Flexible wrt. Floor 10

**Behavior Concepts**
- Adjustability of Floor 10

| $Be_{1}^{v_{i}}$ | $F_{1}^{v_{i}}$ | $P(Be_{1}^{v_{i}} | F_{1}^{v_{i}})$ |
|------------------|----------------|----------------------------------|
| low              | yes            | 1.0                              |
| high             | yes            | 1.0                              |
| low              | no             | 0.0                              |
| high             | no             | 0.5                              |

<table>
<thead>
<tr>
<th>$Be_{1}^{v_{i}}$</th>
<th>$P(Be_{1}^{v_{i}})$</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>0.0</td>
</tr>
<tr>
<td>high</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Structure Concepts**
- Layout of Floor 10

**Project Mgmt. User Group**
- Is Being Flexible important for your customer?
  - yes
  - no

**Software Eng. User Group**
- $F_{1}^{v_{i}}$
  - yes
  - no

Answer concepts implicitly
FBS Bayesian Network (FBS-BN)

**Design Object Attributes**

**Function Concepts**
- Being Flexible wrt. Floor 10

**Behavior Concepts**
- Adjustability of Floor 10
  - Table:
    | $Be_{1^{vi}}$ | $P(Be_{1^{vi}})$ |
    |-------------|------------------|
    | low        | 0.5              |
    | high       | 0.5              |

**Structure Concepts**
- Layout of Floor 10

**Softw. Eng. User Group**
- Is Being Flexible important for your customer?
  - Options: yes, no
  - yes: 1.0
  - no: 0.0

**Project Mgmt. User Group**
- $F_{1^{vi}}$, $P(F_{1^{vi}})$
  - yes: 0.0
  - no: 1.0

**Search for uncertain concepts**
- Answer concepts implicitly
**Evidence Propagation**

**Match of \( Be_{1i}^{vi} \) and \( Bs_{1i}^{vi} \)? (\( P(Be_{1i}^{vi}) \))**

**Function Concepts**

**Behavior Concepts**

**Structure Concepts**

**Adjustability of Floor 10**

**Floor 10 Office \( V_1 \)**

**Being Flexible wrt. Floor 10**

### Adjustability Table

| \( Bc_{1i}^{vi} \) | \( Be_{1i}^{vi} \) | \( Bs_{1i}^{vi} \) | \( P(Bc_{1i}^{vi} | Be_{1i}^{vi}, Bs_{1i}^{vi}) \) |
|------------------|------------------|------------------|------------------|
| mismatch         | low              | low              | 0.0              |
| mismatch         | low              | high             | 1.0              |
| mismatch         | high             | low              | 1.0              |
| mismatch         | high             | high             | 0.0              |
| match            | low              | low              | 1.0              |
| match            | low              | high             | 0.0              |
| match            | high             | low              | 0.0              |
| match            | high             | high             | 1.0              |

**Evaluate different solutions**

**Assess problem/solution space**

**Layout of Floor 10**

\( S_{1i}^{vi} \)
FBS Bayesian Network (FBS-BN)

DESIGN OBJECT ATTRIBUTES

Function Concepts

Floor 10 Office

Being Flexible wrt. Floor 10

Project Mgmt.

Being Efficient wrt. Project Mgmt.

Softw. Eng.


Behavior Concepts

Adjustability of Floor 10

Enclosure of Floor 10

Distractions of Project Mgmt.

Quiet Work of Project Mgmt.

Distractions of Softw. Eng.

Quiet Work of Softw. Eng.

Structure Concepts

Layout of Floor 10

Partitions on Floor 10
Distributed Use of FBS-BN-Representations

Component Class
- canBeRelatedTo
- instanceof
- isRelatedTo

Component Individual
- hasSelection

Function
- implicates
- expects

Behavior
- implicates
- exhibits

Structure
- implicates

Distribution
- reflectsInfluence Of/On
- parameterOf

Conceptualization
- definedAs

Description
- describedBy
- categorizedBy

State
- expressesBeliefIn

Value
- hasValue
Future Work

- Evaluate prototypes empirically
- Test large scale network inference
- Apply model in different sales settings
- Integrate machine-learning
- Conceptualize and implement module for explanation of inference results
Questions?

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