Behavioural Model-Driven Validation of Software Product Lines

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Behavioural Model-Driven Validation of Software Product Lines

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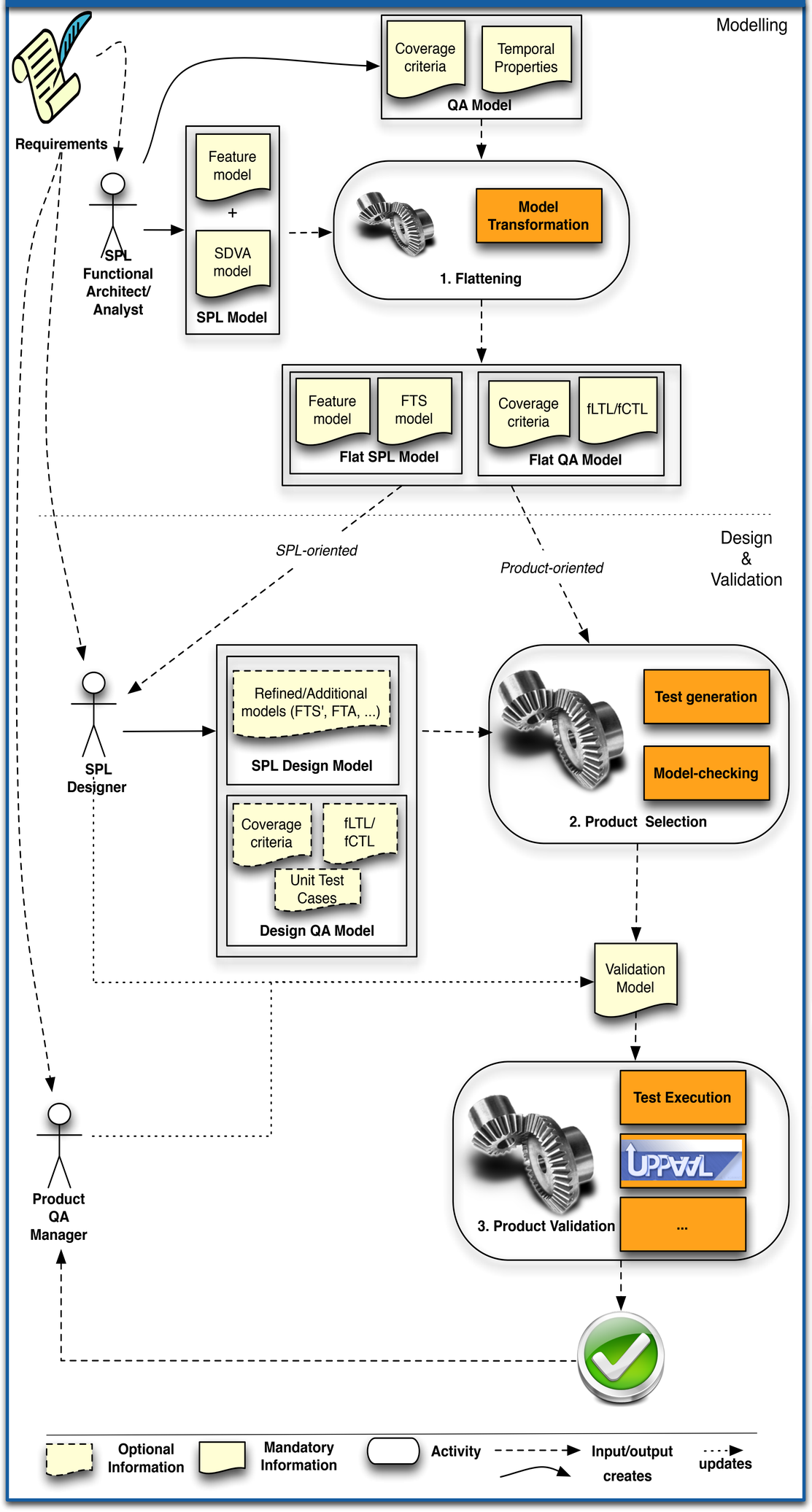
precise

Highlights

- **Combining Model-checking and Test-case Generation techniques in a Model-driven [2,4] Quality Assurance Framework**
- **Focus on Variability-aware Behavioural Models**
- **Formal Foundations (e.g. Featured Transition Systems [1]) suitable for Analysis and Checking**
- **Human-centric: Easily Understandable Input Models, Test Criteria and Results**

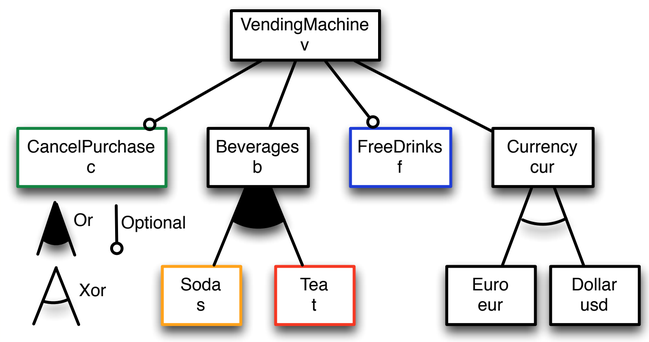
Approach Overview



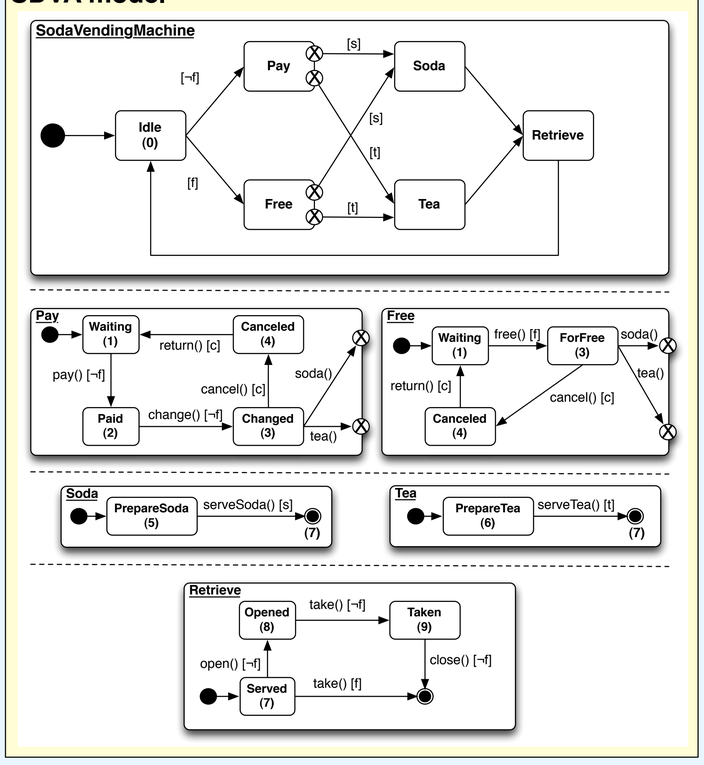
Modelling

SPL Model

Feature model

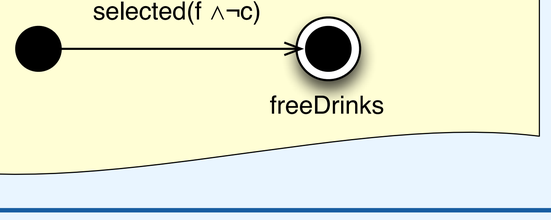


SDVA model



QA Model

Coverage Criteria

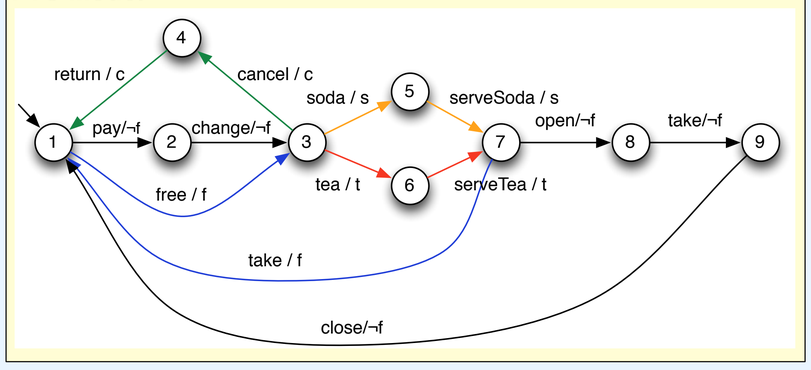


1. Flattening

Feature Model (TVL) [3]

```
root VendingMachine
 group allOf {
   opt CancelPurchase,
   Beverage group SomeOf{Soda,Tea},
   opt FreeDrinks,
   Currency group oneOf{Euro,Dollar}
}
```

FTS Model



Design & Validation

2. Product Selection:

Selection of relevant test-cases and/or products using:

- **Test Coverage algorithms**
- **Model Checking techniques [1]**

3. Product Validation:

- **↗ SPL-oriented: seeks exhaustiveness at SPL level using refined FTS**
- **↘ Product-oriented: relies on the QA product manager's knowledge for in-depth validation**

Ongoing and future work

- **Define State Diagram Variability Analysis (SDVA)**
- **Define coverage criteria language**
- **Define and implement appropriate flattening algorithm**
- **Propose test reduction and generation techniques**
- **Validate the human focus through specific case studies**

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