Software Engineering Decision Assistant (SEDA)

Barry Boehm, USC
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Outline

- General SEDA Concept
- Previous SEDA Examples
- USC-CSE SEDA Initiatives
- Future SEDA Opportunities
- Critical SEDA Success Factors
General SEDA Concept

- Develop normative software product, process, property, and success models
  - MBASE; initially in digital library domain
- Develop agents to detect, suggest potential model clashes and violations
- Experimentally apply, refine, and generalize agents

Previous SEDA Examples

- Static analyzers
  - specifications, code
  - consistency, traceability, standards compliance
  - constraint satisfaction (set-use analysis)
- Defect-prone module detection
  - complexity; design/code defect correlations
- Test case coverage advisors
- GUI design critics
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**USC-CSE SEDA Initiatives**

- Model Clash aids
  - Process Model Decision Advisor
- Risk Advisors
  - Management, technical, COTS integration
- Specification Critics
  - Style clashes: Architects' Automated Assistant
- Cost/Quality conflict detection and advice
  - QARCC, S-COST

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### Process Model Decision Advisor

<table>
<thead>
<tr>
<th>Objectives/Constraints</th>
<th>Alternatives</th>
<th>Model Advice</th>
<th>Example</th>
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</thead>
<tbody>
<tr>
<td>Growth &amp; Emission</td>
<td>Understanding of Risks, Robustness, Architecture Understanding</td>
<td>COTS, Baseline COTS, Transforms, Transforms or Ext. Dev.</td>
<td>Simple Inventory Control, Small Business - Offshore Application</td>
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<tr>
<td>Limited to Medium</td>
<td>Medium to High, Low Medium</td>
<td>Medium to High</td>
<td>Evolutionary Development, Data Exploitation</td>
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<td>Limited to Large</td>
<td>Large, Reusable Components, Large to Medium, High</td>
<td>High to High</td>
<td>Rational to High, Electronic Publishing</td>
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<td>Very Large</td>
<td>High</td>
<td>High</td>
<td>Risk Reduction &amp; Rebuild, Air Traffic Control</td>
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<td>Medium to Large</td>
<td>Medium, Medium</td>
<td>Medium, Medium</td>
<td>Spiral, Software Support Environment</td>
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### Management Risk Advisor: Expert COCOMO

![Management Risk Advisor: Expert COCOMO](image)

### Software Technical Risk Advisor (STRA)

![Software Technical Risk Advisor (STRA)](image)
Implementation of S-COST

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Future SEDA Opportunities

- MBASE: Common Pitfall advice
- Win Win: Prioritization aids
- Rechtin Heuristics: Rubber schedule, KISS
- Architecture critics: UML view reconciliation

Critical Success Factors

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<tr>
<th>Critical Success Factor</th>
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