What’s most broken?
Statistical Probe of Tutoring for data-driven improvement of Intelligent Tutors

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**MOTIVATION**

Questions that we look to answer from RoboTutor’s log data [1]:

- **Reliability:** How often and under what conditions does the RoboTutor crash or hang?
- **Recognition:** How often is written input accepted by the Writing Recognizer?
- **Usability:** Can kids operate RoboTutor? Which activities do children find hard to navigate through? Where does the time go?
- **Engagement:** When are the children disengaged? What activities disengage students most?

Is there a way to automate discovery of the critical design issues therein, and characterize, prioritize and present them?

**RESULTS**

<table>
<thead>
<tr>
<th>CRITERIA &amp; METRICS</th>
<th>SPOT FINDINGS</th>
<th>DESIGN IMPLICATIONS</th>
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</thead>
<tbody>
<tr>
<td><strong>Reliability</strong></td>
<td>Crashes especially occur in CountingX and Story Reading activities</td>
<td>Implement crash logging</td>
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<td></td>
<td>Session changes for the same student on a tablet within a short time</td>
<td>Examine CountingX and Story Reading activities for bugs</td>
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<td><strong>Recognition</strong></td>
<td>Recognizer confuses between number pairs like 1 &amp; 7, 5 &amp; 3</td>
<td>Bias data sources of number copying and dictation to include frequently confused digits</td>
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<td><strong>Usability</strong></td>
<td>Children spend unusually long time in Story Reading activities</td>
<td>Add a timeout for story reading</td>
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<td><strong>Engagement</strong></td>
<td>Children tend to bail out of an activity when given the same problems to solve repeatedly</td>
<td>Children should not be given similar problems repeatedly</td>
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**SPOT Workflow**

**FUTURE WORK**

- Develop SPOT as a web application [2]
- Integrate SPOT into LearnSphere [3], a community infrastructure to support learning improvement online
- Analyze learning, especially wheel-spinning using SPOT: Identifying skills that children are unable to learn given ‘enough’ practice opportunities?

**REFERENCES**


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