A Framework for Rebuilding Trust in Social Automation Across Health-Care Domains
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Abstract
This poster reviews current human-automation trust and trust repair literature related to health-care systems. In addition, we examine the increased use of social agents, such as robots, within the medical field and consider the importance of using social agents in this particular domain. Furthermore, we examine strategies for trust repair following errors in health care settings, and provide a conceptual framework for trust repair by social automation. Most current literature comes from a human-human perspective, and we hope to reapply this work to the field of social automation. If these strategies are effective, human-automation systems in health care can maintain appropriate levels of trust, ensuring effective and efficient long-term collaborations in critical work areas.

Methods & Procedure
Our proposed trust repair framework combines Reason's error taxonomy (1990) with the work of Kim et al. (2013) to create recommendations for specific repair methods that automation can undertake based on specific types of errors. Using the results from our literature review, we have created a taxonomy of the strategies that will be most effective for autonomous robots in health care (Table 1).

This poster seeks to propose a trust repair framework to apply those methods to the human-automation relationship. Establishing this framework will act as a starting point for confirmatory research.

<table>
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<th>Error Types</th>
<th>Examples</th>
<th>Violation Type</th>
<th>Effective Repair</th>
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<tbody>
<tr>
<td>Slips</td>
<td>Example 1 Flip on wrong switch on IV pump</td>
<td>Integrity-based Denial</td>
<td></td>
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<tr>
<td>Lapses</td>
<td>Example 2 Forgot to administer medication</td>
<td>Both</td>
<td>Context-dependent</td>
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<td>Mistakes</td>
<td>Example 3 Prescribing an incorrect dosage</td>
<td>Competence-based</td>
<td>Apology</td>
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<td>Violations</td>
<td>Example 4 Prescribing a patient an inappropriate medication because of sponsor loyalty</td>
<td>Integrity-based Denial</td>
<td></td>
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</table>

Table 1. Based on Reason's Taxonomy, this chart illustrates our proposed trust repair framework.

Introduction
- Much like humans, automation will inevitably make errors, which may erode trust in these systems.
- It is crucial for the automation to rebuild this trust to an appropriate level of compliance—reducing issues of misuse or disuse.
- Research suggests that in matters of competence, trust is repaired more readily when trustees offer an apology rather than a denial while the opposite is true for matters of integrity (Kim et al., 2013).

Discussion
- Figure 4. Autonomous robots may soon take direct roles in surgery or diagnosing.
  - What type of automation engenders an ideal level of trust for patients? What about for physicians?
  - Which is easier to accept, human errors or automation errors?
  - What prevents patients from having an autonomous robot perform their surgery?
  - Now consider a scenario that involves highly infectious disease. Would your response to the above questions change?

Future Work
We intend to continue this research, testing the proposed repair framework within health care settings as well as other dynamic, high risk environments. We hope that our findings will provide designers with strategies to increase trust calibration and appropriate compliance with automation.

References
Riken (2011).