Robot Autonomy and Malfunction Affects on Trust During Human Robot Interaction

Theresa Kessler
University of Central Florida, theresakessler@knights.ucf.edu

Multiple factors affect the amount of trust someone places in a robotic counterpart. Specifically, a robot's reliability is currently the most reliable predictor of trust levels during Human Robot Interaction (HRI) (Hancock, et al., 2011). Since robots succumb to errors, malfunctions, and can otherwise perform inconsistently on occasion it is important to know what other factors can boost trust levels in the face of inevitable malfunctions. Currently, we are investigating transparency as it affects trust during HRI. Because improved transparency is likely to lead to better understanding of a system, we are investigating what role a robot's autonomy level (decision making allowances) and amount of information (projected end state and status) it gives affect trust levels in an operator in the face of malfunctions. A prior study looked into modality of information in combination with level of information provided to an operator (Sanders et al., 2014). A further experiment examined these same constructs in scenarios where the robot suffered some specified level of malfunction (Sanders et al., 2014). However, these studies did not incorporate the three factors of malfunctions, status and end state projections, and robot autonomy level. In addition, Chen et al., 2014 have proposed a Situation Awareness-based Agent Transparency model. This model focuses on the transparency needed in order for an operator to understand the system's status and goals, logic, and projected outcome. In order to support the SAT model (Chen et al., 2014), and further explore the constructs of the previously mentioned studies, this study proposes to investigate trust ratings in the face of malfunction based on the level of autonomy of the robot as well as its level of information. Findings from this study will be most applicable to people who operate robots in teaming situations such as the military. Specifically, the findings of this research may help programmers narrow down the level of autonomy necessary, as well as the amount of information a robot should provide to its teammates for proper trust calibration. We will discuss the study methods and design as well as potential findings from pilot data.