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Humans Trust Building in Robots with the Help of Explanations

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Abstract : The field of robotics is advancing rapidly to the point where robots have become an integral part of the modern society. These robots collaborate and contribute productively with humans and compensate some shortcomings from human abilities and complement them with their skills. Effective teamwork of humans and robots demands to investigate the critical issue of trust. The field of human-computer interaction (HCI) has already examined trust humans place in technical systems mostly on issues like reliability and accuracy of performance. Early work in the area of expert systems suggested that automatic generation of explanations improved trust and acceptability of these systems. In this work, we augmented a robot with the user-invoked explanation generation proficiency. To measure explanations effect on human's level of trust, we collected subjective survey measures and behavioral data in a human-robot team task into an interactive, adversarial and partial information environment. The results showed that with the explanation capability humans not only understand and recognize robot as an expert team partner. But, it was also observed that human's learning and human-robot team performance also significantly improved because of the meaningful interaction with the robot in the human-robot team. Moreover, by observing distinctive outcomes, we expect our research outcomes will also provide insights into further improvement of human-robot trustworthy relationships.

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