Army researchers provide insights on offering feedback

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A team comprised of members from the U.S. Army Research Laboratory and Rensselaer Polytechnic Institute proposed an award-winning cognitively-inspired adaptive leadership framework that can provide intelligent decision making support for a commander delivering cost-effective feedback to followers with different levels of mission readiness. Credit: U.S. Army

A collaborative research project between Army researchers and academia has led to a best paper award at the 2018 Institute of Electrical

and Electronics Engineers, or IEEE, Conference on Cognitive and Computational Aspects of Situation Management, a multi-disciplinary conference on situation management in complex dynamic systems.

A team comprised of members from the U.S. Army Research Laboratory and Rensselaer Polytechnic Institute, including Drs. Noam Ben-Asher, Jin-Hee Cho, and Sibel Adali, proposed a cognitively-inspired adaptive leadership framework that can provide intelligent decision making support for a commander aiming to provide cost-effective feedback to followers with different levels of mission readiness.

Specifically, this study addresses how a commander can make effective decisions on whether to provide feedback, how much feedback should be provided to optimally influence follower's task performance and what the impact of feedback provision on commander's utility is.

"This research aims to improve the commander-Soldier interaction, especially when operating in the field where resources are limited," said the lead author Ben-Asher, researcher in ARL's Computational and Information Sciences Directorate. "The proposed leadership framework can help the commander decide how much feedback (i.e., resources) to invest in promoting the Soldier's mission readiness, given the specific Soldier need and without harming the commander's performance."

The research leverages the two-dimensional concept of trust (willingness to act and the competence to act appropriately) to capture the dynamics of commander-follower feedback provision interactions in a resource constraint situations (time, bandwidth, energy).

Main findings indicate the use of trust improves the commander's utility, especially when having stringent resources.

"Lifting load from the commander and optimizing feedback provision based on the Soldier's needs and availability of resources can improve Soldier readiness and overall mission performance," Ben-Asher said. "As the battlefield becomes more dynamic and the speed of operation becomes extremely fast, the commander needs advanced adaptive tools to support decision making."

Compared to heuristics, a cognitive-inspired framework shows adaptivity and ability to accommodate the needs of different followers. Meaning, if resources are limited, directing more support to high performers and when having abundance of resources to favor supporting poor performers.

This study also examined the impact of commanders' willingness to provide support, indicating the use of a cognitively-inspired framework can improve the commander's utility, especially when the commander has low willingness to provide feedback to followers.

Researchers were also able use the framework to identify when too much support can overwhelm the follower and impede performance.

According to Ben-Asher, this award is both exciting and motivating for the team.

"In this study, we developed the fundamentals of a cognitive-inspired leadership framework," he said. "For us, receiving this prize reinforces the belief that, in the age of machine learning and artificial intelligence, computational modeling of human decision-making processes is extremely valuable for human-AI collaboration."

More information: Noam Ben-Asher et al. Adaptive Situational Leadership Framework, *2018 IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA)* (2018). DOI:

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