

# **Dempster Shafer Evidence Theory and its Utility in Human Machine Interaction Modeling and Design**

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**Abstract:** Dempster Shafer evidence theory (DSET) has been advocated by Prof. Inagaki and others as a meaningful model of how humans combine evidence in their pursuit of improved decision making. A primary differentiator of DSET over more the traditional Bayesian approach is the explicit representation of ignorance about whether a state is true or not as is the case when no experiential evidence is available. The epistemic nature of humans to actively mine for knowledge in an interactive fashion elegantly aligns with DSET. This presentation provides a history of DSET and how Prof. Inagaki has advanced the field. The main focus will be placed on demonstrating how some of Prof. Inagaki's 25 year old ideas in the DSET area are still extremely relevant for modeling and designing safe human robot interaction. The dynamics of trust as it develops in human and in robot through their situated interaction can elegantly be captured within the framework of DSET. An exposition of insights surrounding these issues will be presented in the context of Prof. Inagaki's work on automation and the role humans should play in that.