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"Fusing Multiple Conflicting Opinions and Hidden Source Behavior Change"

by

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Abstract

Consider that we have multiple sources (e.g., experts) providing information (or even knowledge models) on some situation. Furthermore, we wish to aggregate this information in order to assist in decision-making. The immediate problem we run into is that the sources likely disagree on even simple things like the probability (uncertainty) of a target event. Even worse, they disagree on the direction of causality between two events (e.g., one thinks A causes B while another thinks B causes A); the experts may even disagree on the entire structure of dependencies among a set of variables in a (probabilistic) network. The challenge here is to develop a semantically sound and computationally effective methodology that explicitly accounts for the uncertainty and conflicts. In addition, our solution must also preserve the original source knowledge and allow for easy aggregation and de-aggregation. Ultimately, it must be fully analyzable in order to provide a sound explanation for any decisions made with respect to the fused knowledge. The problem of fusing multiple conflicting sources occurs in many domains from sensor/information fusion to intelligence analyses. An important task of modeling complex social behaviors is to observe and understand individual/group beliefs and attitudes. These beliefs, however, are not stable and may change multiple times as people gain additional information/perceptions from various external sources, which in turn, may affect their subsequent behavior. Using fusion, we present a novel approach that models the belief change over time caused by hidden sources, taking into consideration the evolution of their impact patterns. This model allows for detection and tracking of hidden source opinion changes.

Biography

Dr. Eugene Santos, Jr. received his B.S. ('85) in Mathematics and Computer Science from Youngstown State University, a M.S. ('86) in Mathematics (specializing in Numerical Analysis) from Youngstown State University, as well as Sc.M. ('88) and Ph.D. ('92) degrees in Computer Science from Brown University. He is currently Professor of Engineering in the Thayer School of Engineering at Dartmouth College, Hanover, NH. His areas of research interest include artificial intelligence, intent inferencing, social and cultural modeling, computational social science, automated reasoning, decision science, adversarial reasoning, medical modeling and simulation, user modeling, natural language processing, probabilistic reasoning, and knowledge engineering, and active user

interfaces. Dr. Santos is a Fellow of the IEEE and also currently Editor-in-Chief for the IEEE Transactions on Systems, Man, and Cybernetics: Part B, and an associate editor for the International Journal of Image and Graphics. Dr. Santos serves on the editorial advisor board for System and Information Sciences Notes, and he is on the editorial boards for Journal of Intelligent Information Systems and Journal of Experimental and Theoretical Artificial Intelligence.

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