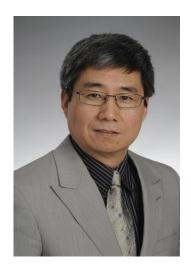**Set-theoretic Models of Three-Way Decisions**

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Three-way decisions are thinking in threes. In contrast to dichotomous thinking in terms of two options, three-way decisions introduce a third option. We move from true/false, black/white, yes/no etc. into true/unsure/false, black/grey/white, yes/maybe/no etc. The third option provides the necessary flexibility and universality of thinking in threes.

A theory of three-way decisions (3WD) may be interpreted within a trisecting-and-acting framework. With respect to trisecting, we divide a whole into three parts. With respect to acting, we design most effective strategies for processing the three parts. In a set-theoretic model of three-way decisions, we divide a universal set into three pair-wise disjoint regions known as a trisection or a weak tri-partition. This talk will cover set-theoretic models of three-way decisions, including rough sets, interval sets, three-way approximations of fuzzy sets, and shadowed sets. We will examine different semantics interpretations of these models and their interrelationships.

Yiyu Yao is a Professor with the Department of Computer Science, University of Regina, Canada. His research interests include Three-way Decisions, Granular Computing, Rough Sets, Artificial Intelligence, Web Intelligence, Information Retrieval, Data Analysis, Machine Learning, and Data Mining. He proposed a theory of three-way decisions, a triarchic theory of granular computing, interval sets, and decision-theoretic rough set models. He published over 300 papers. In 2015 and 2016, he was selected as a Highly Cited Researcher. In 2014, he received the University of Regina Alumni Association Faculty Award for Research Excellence. In 2013, a co-authored paper was included in Frontrunner 5000 (Top Articles in Outstanding Science and Technology Journals of China). In 2010, he received the Overseas Friendship Award from Chinese Rough Set and Soft Computing Society. In 2008, he received PAKDD Most Influential Paper Award (1999-2008). He is an Area Editor of International Journal of Approximate Reasoning, an Associate Editor of Information Sciences, an Advisory Board Member of Knowledge-based Systems, and a Track Editor of Web Intelligence. He is also an Editorial Board Member of Granular Computing, LNCS Transactions on Rough Sets, International Journal of Intelligent Information Systems, and several others. He is the elected President of International Rough Set Society (IRSS).

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