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FUZZY VALUED EVIDENCE THEORY

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ABSTRACT

In Dempster Shafer (DS) Theory, basic probability assignment plays a key role. All other measures can be defined in the terms of BPA. This assignment, as originally defined, can take only one value in the interval [0,1]. However in actual practice the BPA is usually provided by experts subjectivity. Experts cannot precisely give the value. We have to assign a number on their linguistic expression and there is some round off which can cause the error. To avoid this error, one can make use of fuzzy sets. The original theory does not provide any means to handle fuzzy valued based assignment. The purpose of this paper is to extend definitions of all basic measures in DS theory so that the theory can be applied to fuzzy situations.

We shall first introduce the concepts of generalized summation and multiplication, the purpose of which is to ensure that all operations involved in the theory are closed in unit interval [0,1]. Then we provide the definition of BPA., belief function, plausibility function in terms of fuzzy valued summation and multiplication. Then we will propose how to combine two piece of evidence associated with corresponding fuzzy valued basic probability assignment. We will show that proposed theory is more general than interval valued evidence theory and we derive the original theory from the proposed one by adding constraint. Finally we provide a numerical example to illustrate the approach.

KEYWORDS: Fuzzy Numbers, Dempster Shafer Theory