

Judgment Aggregation with Fuzzy Deontic Logics

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Abstract. Judgment aggregation poses the problem to find a consistent collective judgment on a set of logically dependent propositions, called agenda, based on a profile of individual judgments on the agenda items. We argue that two stages of generalization from the classical setup are useful for handling various application scenarios for assessing uncertain and vague information in a systematic manner: Firstly, rather than considering only judgments about the truth or falsity of propositions, it is often useful to allow for degrees of assent or dissent, and hence to replace classical logic by appropriate fuzzy logics for formalizing the collective as well as the individual judgments (Scenario 1). In a second step, we focus on a special type of agenda items, where the individuals are solicited to specify their degree of assent to deontic claims, asserting that something should or should not be the case (Scenario 2). There are many results in the literature regarding Scenario 1, i.e. many-valued (fuzzy) judgment aggregation. Most of those results are negative, demonstrating that there is no general aggregation rule, satisfying various rationality constraints, that guarantees consistent collective judgments when applied to arbitrary profiles of consistent individual judgments. We will show that there are in fact more options for arriving at consistent collective judgments if the agenda items are graded (fuzzy) deontic statements. This calls for considering a graded deontic logic as underlying formalism for Scenario 2. The literature on that type of logic is still very sparse. We will adapt a fuzzy deontic logic introduced by Dellunde and Godo (2008) to our setting. Finally, we will provide an outlook on alternative graded deontic logics and their application to judgment aggregation.

Keywords: judgment aggregation · deontic logic · fuzzy logic.