

FairAW – Additive weighting without discrimination

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ABSTRACT

With growing awareness of the societal impact of decision-making, fairness has become an important issue. More specifically, in many real-world situations, decision-makers can unintentionally discriminate a certain group of individuals based on either inherited or appropriated attributes, such as gender, age, race, or religion. In this paper, we introduce a post-processing technique, called fair additive weighting (FairAW) for achieving group and individual fairness in multi-criteria decision-making methods. The methodology is based on changing the score of an alternative by imposing fair criteria weights. This is achieved through minimization of differences in scores of individuals subject to fairness constraint. The proposed methodology can be successfully used in multi-criteria decision-making methods where the additive weighting is used to evaluate scores of individuals. Moreover, we tested the method both on synthetic and real-world data, and compared it to Disparate Impact Remover and FA*IR methods that are commonly used in achieving fair scoring of individuals. The obtained results showed that FairAW manages to achieve group fairness in terms of statistical parity, while also retaining individual fairness. Additionally, our approach managed to obtain the best equality in scoring between discriminated and privileged groups.

Keywords: Additive weighting, multi-criteria decision making, algorithmic decision making, fairness, bias mitigation

DOI: 10.3233/IDA-226898

* The full content of this research article is available on the Intelligent Data Analysis journal pages:

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