

# Multiply Robust Subgroup Identification for Longitudinal Data with Dropouts

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**Abstract:** Subgroup identification serves as an important step towards precision medicine which has attracted great attention recently. On the other hand, longitudinal data with dropouts often arises in medical research. However there is little work in subgroup identification considering this data type. Therefore, in this paper we propose a new subgroup identification method based on concave fusion penalization and median regression for longitudinal data with dropouts. In order to deal with missingness, we introduce multiply robust weights which allow multiple models for the probability of being observed. As long as one of the models is correctly specified, the proposed estimator is able to achieve oracle property in the case of missingness. Furthermore, we develop an efficient algorithm and propose a modified Bayesian information criterion to select penalization parameter. The asymptotic properties of the proposed method is established under some regularity conditions. The numerical performance is illustrated in simulations and the proposed method is applied to the quality of life data from a breast cancer trial.