Feed characteristics dependent parameter estimation in manufacturing process

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In this study, we propose a method to estimate batch operation control inputs (i.e., recipe parameters), which are parameters of a high order regression model, by using previous operation data. In some processes, the parameters show a strong dependence on a combination of several factors concerning previous operation steps performed on the feed material (called "feed characteristics" hereafter). Here, it is assumed that the present parameters can be estimated by using the parameters from previous operations with same feed characteristics. We proposed a method to use not only data from operations of exactly same feed characteristics but also those from operations of "similar" one. By MANOVA(multivariate analysis of variance), statistical significance of different feed characteristics was tested. The test provides a basis to distinguish between the effects of each level of factors. Then, various data from real industry can be ranked by their similarities to the current intended operation in terms of the feed characteristics. Highly similar levels can be substituted, resulting in a significant increase in the amount of data that are utilized to determine the control input.