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Attribute Analysis of Quick Response Code Payment Users Using Discriminant Non-negative Matrix Factorization

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Abstract : Recently, the system of quick response (QR) code is getting popular. Many companies introduce new QR code payment services and the services are competing with each other to increase the number of users. For increasing the number of users, we should grasp the difference of feature of the demographic information, usage information, and value of users between services. In this study, we conduct an analysis of real-world data provided by Nomura Research Institute including the demographic data of users and information of users’ usages of two services; LINE Pay, and PayPay. For analyzing such data and interpret the feature of them, Nonnegative Matrix Factorization (NMF) is widely used; however, in case of the target data, there is a problem of the missing data. EM-algorithm NMF (EMNMF) to complete unknown values for understanding the feature of the given data presented by matrix shape. Moreover, for comparing the result of the NMF analysis of two matrices, there is Discriminant NMF (DNMF) shows the difference of users features between two matrices. In this study, we combine EMNMF and DNMF and also analyze the target data. As the interpretation, we show the difference of the features of users between LINE Pay and Paypay.

Keywords : data science, non-negative matrix factorization, missing data, quality of services
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