ABSTRACT

Abstract—Despite easy access to information, people struggle to find accurate culinary. The recommender system aims to provide recommendations that suit users' needs. Matrix factorization (MF) is the method known to overcome scalability and sparsity problems to achieve high prediction accuracy in a recommender system. MF often uses optimization techniques such as gradient descent (GD), stochastic gradient descent (SGD), and mini-batch gradient descent (MGD). SGD has advantages over GD and MGD in terms of faster convergence, more frequent parameter updates, better memory efficiency, more robustness to outliers, and helping to avoid local minimums, especially in handling sparsity values. SGD is a good choice because it is computationally efficient in finding the minimum error and handling large, sparse, and high-dimensional datasets. In previous research in the area of culinary place recommendation, the majority uses memory-based collaborative filtering (CF), such as user-based CF and item-based CF. Meanwhile, these methods have shortcomings in handling data sparsity and handling minimum error, as CF only evaluates a small number of entries in a large matrix. Furthermore, in this study, the authors develop a culinary place recommender system that utilizes MF and SGD to handle sparse problems and aid in finding the minimum error. This study compared the evaluation results of SGD with those of the MGD. SGD result for RMSE of 0.5437 and precision of 0.7842 for train and 0.6036 for validation.The comparison results show that the evaluation value based on the Root Mean Squared Error (RMSE) and precision value of SGD is better than MGD.

Keywords—*recommender system, matrix factorization, stochastic gradient descent, culinary recommendations*