Optimized MLCNN for Personalized News Recommendation Based on Social Media Harnessing Using Modified Genetic Algorithm

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Abstract

Classification of label-specific users' diversified interests is the most formidable task in personalized news recommendation systems (PNRS). To bring personalization to PNRS, many remarkable features have to be considered from their user profile to classify their interest. In this paper, 13, 346 features are considered per user to classify their interest for 15 labels using Multi-label Convolution Neural Network (MLCNN). The efficiency of MLCNN highly depends on its architecture through the tuning of its hyper parameters. Generally, researchers have manually designed a constant CNN architecture for each label and every label and verified the effectiveness, but this leads to additional complexity as well as large computational resources were consumed. Moreover, Designing the structure for all 15 labels leads to an increase in network structure exponentially with an increase in labels. Hence, in this paper, MLCNN architectures are optimized by implementing a novel approach Modified Genetic Algorithm (MGA) with the help of introducing four novel crossover operators to strengthen CNN performance for users interest classification. Further, for the recommendation process, the label-specific news articles were clustered from social media Facebook and Twitter feeds, and then most popular news articles were determined along with label-specific breaking news articles rendered from news feeds concerning users' interest. The experimental result precisely proves that the proposed approach MGA attained an accuracy of 89.64%, 90.56%, 90.41%, and 91.79% for classifying users label specific interest and label-wise recommendation accuracy attained 93.3%, 90%, 90% from Twitter, Facebook, and also from Newsfeed respectively.

Full Text

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Overall architecture of proposed popularity based personalized News Recommendation System framework

Figure 2

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Figure 6

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Figure 7

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Figure 8

Label Specific Popularity of Twitter

Figure 9

Label Specific breaking news articles retrieval from news feeds .

Figure 10

Average Precision for proposed approaches MLCNN + MGA vs MLCNN+GA for 15 labels

Figure 11

Average Recall for proposed approaches MLCNN + MGA vs MLCNN+GA for 15 labels

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Average F1- Score for proposed approaches MLCNN + MGA vs MLCNN+GA for 15 labels

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Average Specificity for proposed approaches MLCNN + MGA vs MLCNN+GA for 15 labels

Figure 14

Average NPV for proposed approaches MLCNN + MGA vs MLCNN+GA for 15 labels

Figure 15

Average Accuracy for proposed approaches MLCNN + MGA vs MLCNN+GA for 15 labels

Figure 16

Label specific news recommendation accuracy.