Football Match Result Prediction Using LSTM Models and Multi-Task Learning

Abstract

Football isone of the most popular and loved sport around the world. The gameproduces a huge amount of statistical data that can be used in predictingthe different outcomes of a match. The outcome with the most interest is the result of the match which is usually because of the large monetary gains from betting correctly. It is also interesting as a research problem because of its very unpredictable nature. Picking the right set of features to use for prediction is challenging and has been the focus of many research works. In addition, there are important factors that influence the result of a match that cannot be determined until in the middle of the match while there are others that are not even connected with the matchlike legal issues, endorsement deals, etc.In this paper, we review previous works on the prediction of a football match result using machine learning techniques.We also present a Multi-Task Learning (MTL) method for football match result prediction based on Recurrent Neural Networks (RNNs). We trained our model on statistical data from the five biggest European football leagues over 15 seasons. Finally, we evaluated our approach and compared it with results from previous studies using common metrics like accuracy, recall, precision, and ROI (Return on Investment).

1. Introduction

Football is a very unpredictable sport that is loved by many across the world. Football is the most watched sport in the worldwith TV views exceeding billions for some tournaments.With this large viewership come a lot of business opportunities and investmentsthat runs into billions of dollars.Winning matches and competitions is very important for teams and investors as it ensures they get the best returns out of their investments.

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Our contributions in this paper are in two fold. First, we showed that predicting match result is a time dependent task as important factors change over time. We use LSTM models which are excellent for temporal problems.Secondly, we showed that learning an auxiliary task (multi-task learning) can help improve the performance of match result prediction. We are not aware of any previous work that used both an LSTM-based model and Multi-Task Learning for football match result prediction.

The rest of this paper is organized as follows. Section 2 gives a review of related works. In Section 3,we present preliminary knowledge about LSTMs and Multi-Task Learning. Section 4 gives the details of our proposed approach. We evaluate our approach and compare the results in Section 5. Finally, we conclude this paper and discuss our future work directions in Section 6.

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