MODULE 5

What are the main themes of the paper, and in what capacity is ranking utilised?

The main theme is using machine learning techniques, called the learn-to-rank approach, to predict the outcomes of road cycling races.

The ranking is utilised to predict the top 10 riders in a road cycling race by considering all the riders of the race when creating a ranking. The Learn-to-Rank approach is applied to order the most relevant results to a particular query, where the query represents a specific race, and the results are the individual riders.

Could you explain the concept of Learning-to-Rank through this paper?

The concept of Learn-to-Rank is a machine learning approach that aims to predict a permutation of a set of items, with the most relevant items at the top of the list. In the context of road cycling race prediction, the LTR approach is applied to predict the top 10 riders in road cycling races. To train the model by used a dataset of race results and various features extracted from the riders' performance data, such as their past race results, and physiological profiles. The model is trained to learn the patterns and relationships between these features and the race outcomes, allowing it to make predictions for future races.

In what manner was the NDCG metric applied?

The NDCG (Normalised Discounted Cumulative Gain) metric was used to measure the performance of the ranking algorithms that consider the difference in relevance between items. It is particularly useful for non-binary ranking, where the relevancy score can have different values. The NDCG@k metric was used to cut-off at a specific k^{th} place and the calculation of the NDCG by calculating DCG(Discounted Cumulative Gain) at k, then ordering the ranking by weight to calculate IDCG(Ideal Discounted Cumulative Gain) and calculating the NDCG score by normalising DCG score with IDCG

MODULE 5

Does the model demonstrate sufficient reliability for predicting future outcomes? And why?

The model demonstrates sufficient reliability for predicting future outcomes following these reasons,

Firstly, the Cross-Validation: this model trained using a leave-one-year-out-cross-validation(figure 7, page 8), helps prevent overfitting and ensures that the models' performance generalises well for the new data.

Secondly, the Ensemble approach: helps to deal with outlier results.

Thirdly, Evaluation metric: this model applied the NDCG metric to measure the ranking algorithm. And the average NDCG is 0.55 indicating that this model's predictions were generally accurate.

Moreover,

Therefore, based on these factors, The model demonstrates sufficient reliability for predicting future outcomes.