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Conference Abstract

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Chasing Points: Optimal Rider Allocation in Cycling

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1 Abstract

Prior to 2020, the UCI point system primarily served as a metric for prestige. The Pro-Continental Teams fought for automatic wildcards and the nations for extra spots at the World Championships or the Olympic Road Race. However, the 2020 regulatory overhaul transformed these points into a promotion and relegation system between the WorldTour and ProTeam levels, through three year cycles. This led to a large shift in focus for teams to achieve the goal of promotion or evade relegation; and even to evade promotion to the World Tour. Despite the rise of cycling analytics over the last decade, the prediction of team-wide or single-rider point accumulation remains under-represented in peer-reviewed literature.

This study leverages public data and machine learning to predict the season total of UCI points a rider will collect. Our feature set incorporates rider history, team context, course difficulty and rider-race performance features of 19,359 riders across 10 seasons. We train an XGBoost ranking model to predict within-race finishing order and evaluate its performance on held-out race data using race-level ranking metrics such as winner identification, top-k overlap, and rank correlation. The prediction model significantly outperforms a naive baseline across multiple evaluation metrics, demonstrating strong predictive capability in identifying race outcomes and point accumulation patterns. In particular, the model shows strong performance in identifying race winners and top-ranked riders, enabling realistic simulation of season-level point distributions.

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The model is then embedded in a season simulation framework that converts race-level ranking scores to expected points through race-specific UCI point scales. By framing season planning as a Linear Programming problem, we are able to optimize a race schedule for a given team based on their riders and the races on their program. Given the expected UCI points for each rider and race combination, the optimization engine computes the mathematically optimal roster, while respecting constraints (e.g., a maximum of 85 race days per rider).

From an applied perspective, our model enables teams to optimize race calendars, evaluate transfer targets through points-per-cost analyses, and strategically manage promotion or relegation risks within the current system. More broadly, our findings highlight how the UCI points reform has not only changed competitive outcomes but also introduced measurable incentives for strategic behavior in professional cycling.