Consistent Vehicle Routing and Its Influence on Priority-Based Pickup Decisions: The Case of Junior Soccer Player Training Transfers

Christian Jost*[1], Alexander Döge[2], Sebastian Schiffels[1], and Rainer Kolisch[1]

[1]Technical University of Munich (TUM) – Arcisstrasse 21, D- 80333 München, Germany
[2]BASF SE, CoE Excellence Innovations, Advanced Analytics in Procurement – Carl-Bosch-Straße 38, 67063 Ludwigshafen am Rhein, Germany

Abstract

In the multibillion-dollar soccer business, rising player transfer cost make the promotion of young talents a key factor for the soccer clubs' long-term success. German first division club TSG 1899 Hoffenheim (TSG) runs one the most renowned soccer training academies in Germany. As a service, they provide a van transfer for around 100 youth players on each training day. Currently, the manual assignment of players to tours is a complex and time-consuming task, which leaves many players unserved. Our approach increases the rate of served players by up to 21 %.
Given limited van capacities, players are prioritized according to their age group (U12-U19); the closer to professional soccer, the higher the priority. The objective is to find tours that maximize the priority sum of served players. However, a tradeoff exists with TSG's organizational and safety requirements aiming for players to be picked up by the same driver each day they request a transfer. Without this consistency requirement, driver-player assignments would vary significantly, given the different daily training schedules.

To maximize the sum of collected priorities while warranting highly consistent driver-player assignments, we design a two-stage heuristic framework based on Tabu Search: (1) We derive a template driver-player assignment, valid for the entire season and adhering only to a small subset of players. (2) We solve each daily routing problem, maximizing collected priorities, while enforcing assignment consistency for the subset of players from the template.
Results suggest that high assignment consistency can be reached at low pickup priority losses.

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*Speaker