Workforce Scheduling and Vehicle Sharing to Reduce Carbon Emissions and Improve Service Quality

Pol Arias*[1], Jiyin Liu[1], and Rupal Rana[1]

[1]Loughborough University – United Kingdom

Abstract

Most previous research on the Vehicle Routing Problem (VRP) assumes that each driver is assigned to one and only one vehicle. However, in recent years, VRP variants with different settings and features found in practice have drawn attention from researchers. Along this line, vehicle sharing has attracted interest of big companies as it becomes increasingly important to reduce vehicle emissions. In this study, we consider a problem where workers with appropriate skills are to be assigned to perform tasks at various locations. The times needed for these tasks can be much longer than travel times between the locations. Therefore different workers sharing a vehicle could be beneficial. We introduce a mathematical programming model combining the vehicle routing and the task scheduling decisions with time constraints and allowing workers to share vehicles when travelling among the task locations. In addition, we present some computational results on small instances to validate our model.

*Speaker