Abstract

The school bus routing problem (SBRP) seeks to plan an efficient schedule of a fleet of school buses that must pick up students from various bus stops and deliver them by satisfying various constraints: maximum capacity of the bus, maximum riding time of students, time window to arrive to school. In this paper, we consider a case study of SBRP for a school in Bogotá, Colombia. The problem is solved using ant colony optimization (ACO). Computational experiments are performed using real data. Results lead to increased bus utilization and reduction in transportation times with on-time delivery to the school. The proposed decision-aid tool has shown its usefulness for actual decision-making at the school: it outperforms current routing by reducing the total distance traveled by 8.3 % and 21.4 % respectively in the morning and in the afternoon.

Keywords

School bus, routing, ant colony, case study.