

Engineering Management, Information, and Systems

GENERALIZED RELAY NETWORK DESIGN AND COLLABORATIVE DISPATCHING IN TRUCKLOAD TRANSPORTATION

Ph.D. Dissertation Defense



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Room 384, Caruth Engineering Building

Abstract: The truckload industry faces a serious problem of high driver shortage and turnover rate which is typically around 100%. Among the major causes of this problem are extended on-the-road times where drivers handle several truckload pickup and deliveries successively; non-regular schedules and get-home rates; and low utilization of drivers dedicated time. These are by-and-large consequences of the driver-to-load dispatching method, which is based on point-to-point dispatching or direct shipment from origin-to-destination, commonly employed in the industry. Relay networks can be considered as a viable alternative dispatching method that necessitates careful design of an underlying network. In this scheme, a truckload on its way to destination visits multiple relay nodes and the driver and/or tractor are switched with a new one at these locations so that each driver stays close to their home domicile. In this dissertation, we investigate designing and generalizing this type of network for the truckload transportation industry. In this respect, we evaluate the problem in three different parts in which we address strategic, tactical and operational decisions to design, and examine the proposed network. We suggest multiple optimization models and algorithms to optimize the network in stochastic and deterministic settings. The computational results illustrate that our models and algorithms can efficiently handle the problem in large scales and under uncertainty. This research was supported by National Science Foundation (grant number CMMI 1538115).

Biography: Amin Ziaefar is a Ph.D. candidate with a major in Operations Research at Lyle school of engineering. He has been a Research and Teaching Assistant at Southern Methodist University since 2016. He received his B.Sc. in Industrial Engineering from Isfahan University of Technology (IUT) and M.Sc. degree in Industrial Engineering from the University of Tehran. His research interests include optimization models and efficient solution algorithms for network design problems.