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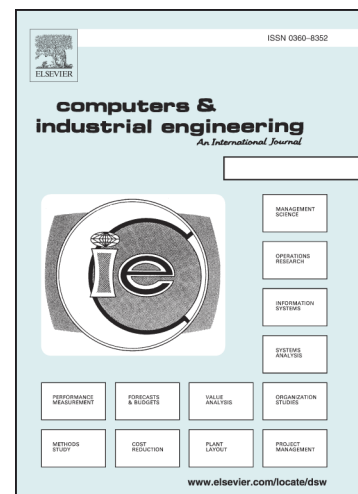
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Socially-Optimal Design of a Service Network with Location-Aware Multi-Services under Different Delivery Policies

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Abstract. This paper considers an immobile service network design problem with multiple location-aware service types and general service-time distributions where a central authority directs customers calling (or registering) for a service to appropriate service centers based on their geographical location and requested service type. The problem seeks to design service network so as to maximize a performance metric considering both the profit of the service system and social metrics for accessibility and quality of service under different service delivery policies. The problem is formulated as a discrete optimization model and different managerial insights are provided.

KEYWORDS: Service system design; Location-aware services; Congested multi-service network; Integer programming; Queuing systems.

1. Introduction

The main promise of location-aware services is to offer proper opportunities to customers based on the knowledge of their geographical location. Raper et al. (2007) and Hong et al. (2009) provided a literature review on the context-aware systems and applications of location-based services, respectively. Location-aware systems have a wide area of applications, including healthcare systems (Bottazzi et al. 2006; Dorairaj et al. 2015; Favela et al. 2004; Favela et al. 2007; Kjeldskov and Skov 2007; Munoz et al. 2003; Rodriguez et al. 2004), transportation context (Chen et al. 2014; Ferris et al. 2010; Matsumoto & Hidaka 2015), communication systems (Fogarty et al. 2004; Goularte et al. 2006; Raento et al. 2005; Udugama et al. 2007), and tourism context (Gavalas et al. 2014; Ghiani et al. 2009; Lanir et al. 2011; O’Grady et al. 2005; Yu & Chang 2009). The just-in-time location-aware service systems are studied by Chen (2016).

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