

Dissertation Proposal

Essays in Service Operations Management

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Selecting a Model for Twitter-Based Customer Service Quality Metrics (with Sunder Kekre)

While elements of traditional customer service have been studied extensively, the applicability of these elements to new, social media based forms of customer service is unclear. We consider a large telecommunications company that provides customer support over Twitter. Using 10 months of service data, we use model selection techniques to develop an ordinal logistic model assessing the probability that a given customer service interaction will result in a positive, neutral or negative resolution as determined by the customer's sentiment expression. Our model incorporates customer, service and network attributes.

We find that customers are less likely to experience a positive final sentiment as time passes, that is, those cases later in the 10 month period studied are logistically less likely to experience positive resolution. This suggests that there is a drop-off in the likelihood of more positive resolution, but that this effect levels off. This finding may indicate a shift by the customer service team to harder to resolve cases as the program matures.

Necessary Condition for Finite Delay for FIFO GI/GI/K queues with $\rho=1$ (with Alan Scheller-Wolf and Rein Vesilo)

Scheller-Wolf (2003) shows that for a FIFO multiserver queue, delay will be finite if $E[S^{1+(1/(s-k))}]$ is finite, where S represents service time, K is the number of servers in the system, $k \leq k+1 \leq K$, k integral and $\rho := E[S]/E[T]$, with T representing interarrival time. This is also a necessary condition if $S \in \mathcal{L}^{1+\alpha}$ and $k < \rho < k+1$ or if $k+1=K$. Consequently, there is a gap between the identified necessary and sufficient conditions for integral ρ .

Using large deviation results, we found a slightly stricter necessary condition for a D/GI/K-server system with $\rho=1$: delay will be infinite if $E[S^{1+(1/(\alpha(s-1)))]$, with $\alpha = (1/2) + [(\sqrt{(K-1)^2 + 4(K-1)})]/(2(K-1))$. We plan to extend these results to K-server systems with higher ρ , to higher moments and to general arrival times.

Revenue Management with Bargaining with a Finite Horizon (with Nicola Secomandi)

Bhandari and Secomandi (2011) consider the problem of a seller with an inventory of Y items for sale. During each sale period (over an infinite horizon) a buyer may arrive, in which case a sale may or may not be negotiated. Using a MDP, they demonstrate that the seller's valuation of a certain inventory level under a "Seller Posted Price" mechanism is higher than under the "Neutral Bargaining Solution," which in turn is higher than under a "Buyer Posted Price" mechanism. Additionally, a "Split-the-Difference" mechanism results in a higher seller valuation than the "Buyer Posted Price" mechanism. This is shown analytically and illustrated numerically.

We propose to extend this work to a finite horizon model. While we expect the ordering of these mechanisms to remain the same, the magnitude of the difference may change as we move to a situation where the seller faces a deadline to complete the sales. Additionally, we plan to explore the relevance of the incentive compatibility constraints for the neutral bargaining solution case.