Algorithms

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The primary aim of Revenue Management (RM) is selling the right product to the right customer at the right time for the right price. Ever since the deregulation of airline industry in the USA, and the emergence of the internet as a distribution channel, RM has come of age and is a topic of importance in tourism, hospitality and services management (Yeoman and McMahon-Beattie 2017). Right at the heart of RM are algorithms. In mathematics and computer science, an algorithm is an unambiguous specification of how to solve a class of problems. Algorithms can perform calculation, data processing, automated reasoning, and other tasks. The concept of algorithm has existed for centuries. Greek mathematicians used algorithms in the sieve of Eratosthenes for finding prime numbers, and the Euclidean algorithm for finding the greatest common divisor of two numbers (Cooke 2014).

van de Geer et al. (2018) summary of the Dynamic Pricing Challenge at the 17th INFORMS Revenue Management and Pricing Section conference was about how participants submitted algorithms for pricing and demand learning of the numerical performance was analyzed in simulated market environments, thus demonstrating one of the importance of Revenue Management research and its relevance to industry—which is the essential virtue of this journal, the Journal of Revenue and Pricing Management. Algorithms are important in today's online world with www.amazon.com making 2,500,000 price changes every day based their algorithm. The example of Amazon is at the centre of how RM research is changing. The movement towards pricing behaviour based upon competitors behaviour and demand. There is a lack of understanding in this field of research from a theoretical perspective and then making the research relevant in a practical environment. The finding of the Geer's (van de Geer et al. 2018) paper are stated as following:

- The relative performance of the pricing and learning algorithms that we consider varies substantially across different market dynamics. Some algorithms perform well in competitive environments, whereas others are better at exploiting monopolist-like environments. None of the considered algorithms is able to dominate all the others in all settings.
- The relative performance of the pricing and learning algorithms that we consider varies substantially across oligopoly and duopoly markets. For example, algorithms based on linear demand models perform very well in duopoly competitions, whilst performing poorly in oligopolies.
- The algorithms that generate most revenue are more reliant on price-sensitive customers, making them vulnerable to intensified competition. Other algorithms are more robust in a sense that they were able to generate revenue from various types of customers and attract more loyal customers.
- A greedy algorithm that follows the lowest-priced competitor in a tit-for-tat fashion proves very difficult to outperform.
- Ignoring competition is increasingly harmful when competition is fiercer, i.e., when the number of competitors in the market is large and/or price sensitivity of the customers is high.
- The amount of exploration needs careful consideration as too much exploration hurts performance significantly.

Lai et al. (2019) paper about menu analysis and revenue management approaches contribute to improving a restaurant's profitability. This paper explores the potential of integrating both approaches to improve strategy formulation. Hence, this paper identified the extent of applicability and synergies among both approaches. The contribution lies in the practical framework integrating both approaches allowing practitioners to formulate more effective strategies and make decisions comprehensively towards the menu.

Lardeux et al. (2018) address the the main stages of a buy-back ticketing process triggered by an airline. The main

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contribution of this paper is a new mathematical model which optimizes airline-expected revenue from buy-back according to the probability of passenger acceptance. Jain and Hazra (2018) analyze a scenario where a business first invests in “on-premise” (or in-house) capacity and also procures the excess demand requirements through the public cloud provider utilizing the pay-as-you-go pricing model. Finding that the cloud computing strategy of the firm is determined by its load/demand profiles. The analysis reveals that at a low range of mean demand, a firm should completely rely on an “on-demand” public cloud provider. However, at a very high range of mean demand, a business should move to a pure “on-premise” capacity investment strategy. Wang and Hu (2018) observe that traditional price discrimination of a monopoly depends on the knowledge of consumers’ valuation (as measured by willingness-to-pay or WTP). Information about consumer uncertainty on WTP, however, has not been considered explicitly as a way of segmentation for pricing purpose. Based on analytical modeling results at the individual level and simulations of survey data at the segment level, this paper proposes a new way of segmentation based on consumers’ valuation uncertainty (as measured by the range of WTP).

Tangsuwan and Mason (2018) billing and revenue management systems (BRMS) represent a key enterprise application across the entire telecommunications industry. However, their inherent complexity makes them notoriously difficult to implement, meaning projects often either end in complete failure, or arrive late and overshoot budgetary costs. The findings clearly indicated that the total effects of service expectancy on intention to use and user satisfaction are substantially greater than system expectancy and information quality. Özdilek (2018) paper on real estate analysis focuses on value and price. Both properties evolve inversely in the state of consciousness; the expectation in events of desire is continuously collapsing into experiences. This research clarifies the scientific nature of value based on these mechanisms and in practical terms ascertains its link to valuation approaches in real estate, as well as their informational sources of price, cost, and income (PCI).

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