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Reverse Auction in Pricing Model

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Reverse Auction in Pricing Model

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Abstract - Dynamic price discrimination adjusts prices based on the option value of future sales, which varies with time and units available. This paper surveys the theoretical literature on dynamic price discrimination, and confronts the theories with new data from airline pricing behavior, Consider a multiple booking class airline-seat inventory control problem that relates to either a single flight leg or to multiple flight legs. During the time before the flight, the airline may face the problems of (1) what are the suitable prices for the opened booking classes, and (2) when to close those opened booking classes. This work deals with these two problems by only using the pricing policy. In this paper, a dynamic pricing model is developed in which the demand for tickets is modeled as a discrete time stochastic process. An important result of this work is that the strategy for the ticket booking policy can be reduced to sets of critical decision periods, which eliminates the need for large amounts of data storage.

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I. Introduction

In Dynamic pricing mechanisms where buyers and sellers actively engage in the price discovery process. Today, traditional dynamic pricing mechanisms serve as the core business models for many Internet-based electronic markets. Indicative of its attractiveness to consumers in the Internet marketplace, the registered users of eBay increased from 1.2 million to 2.1 million during the last three months and about $750 Million worth transactions were conducted on their website that year. Other new approaches like online trading and online auctions are also attracting consumers, however. They include dynamic Pricing mechanisms such as the name-your-own-price.E-bay is the world's largest auction site where the buyers and seller are to be participating in the auction mechanism-bay is one of the most profitable e-business site, in one day 5,00,000 items may added in the auction site, this strategy can work throughout at the end of the day. The initial model of c2c auctions entirely managed by the technology, buyers can easily buy the products at any time in the auction site. Some sites use dynamic pricing in auction mechanism and they are like priceline.com this site involve the dynamic variations of the prices in the market. The other site which is known as travelbids.com in which the buyers can bid their money for travelling expenses through auction mechanism. There are some websites like Priceline.com, TravelBids.com and BuyersEdge.com which uses dynamic pricing mechanism. Retailer itself, As this group-buying discount pricing mechanism is still a new phenomenon on the Internet, there have been no studies that have examined the performance of this market microstructure, and the nature of the bidder behaviour that can be observed as the market operates. Research on consumer behaviour under the group-buying market structure can help both academic researchers and industrial practitioners better understand this new kind of market intermediary, and the efficacy of the market mechanism that it provides to market participants.

a) Basics of Auction Mechanism

The commonly used basic auction mechanisms can be classified into the following two main categories based on the number of bidding sides: a single auction and a double Auction , In a single auction, participants can take part only in one side of an auction (i.e., be either an auctioneer or a bidder). In a double auction, participants are free to take part in both side of an auction. Other kinds of auction mechanism are as follows.

Single auction mechanism: This type of auction can be divided into an open-outcry auction and a sealed bid auction based on bidding methods. In an open-outcry auction, the bids are open to public and Bidders can adjust their bids in the full knowledge of other bids. In a sealed bid auction, only a bidder and the auctioneer can communicate with each other, and bidder to bidder Communication is forbidden. The basic single auction sub-types with open-cry bid are English and Dutch auctions: English auction: In an English auction, an auctioneer creates an auction market and proceeds to solicit in open successively higher bids from the bidders until no one raises the bid. The highest bidder is the winner and pays the price he/she bid. Dutch auction: An auctioneer announces the bids to all bidders. The auctioneer starts the bidding at an extremely high price and then progressively lowers it until a buyer claims an item by calling "mine", or by pressing a button that stops an automatic clock. The winner pays the price bid at the stop time.

Double auction mechanism: A double auction admits multiple buyers and multiple sellers concurrently into the market. Thus, the double auction must match bids of the both sides in the market. The double auction

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can be divided into two main classes based on the auction clearing time: Call Market and Continuous Double Auction (CDA). In a Call Market, bids are collected over a specific time interval from both sellers and buyers in a sealed manner.

b) Extended Types of Auction Mechanism

Multi-attribute Auction (MA): A Multi-attribute Auction allows bidders to bid on various attributes beyond the price. In this type of an auction, the auctioneer selects winners based on the price as well as on those various attributes. Thus, the overall utility of a deal for the buyer must consider not only the price of the auctioning item, but also a combination of the different attributes, Combinatorial Auction (CA):In a Combinatorial Auction, each bidder offers a bid for a collection of resources (of the bidder's choosing) rather than placing a bid on each item separately. This enables the bidder to express dependencies and complementarities between various resources. The auctioneer selects such set of these combinatorial bids that result in the highest revenue without assigning any item to more than one bidder. Snadholm showed that the number of possible allocations in a combinatorial auction is where m is the number of items traded in the auction.

Generalized Vickrey Auction (GVA): Another mechanism for determining prices for an allocation of multiple units of resources is the Generalized Vickrey Auction. In GVA, the price of a bidder k in the efficient allocation is computed by deducting the sum of payments of all other bidders in an allocation from the sum of the payments that would be obtained from those bidders in the optimum allocation where the bidder k removed from the allocation.

Finally, enough bidders must be willing to participate in future auction roundsto prevent a collapse of market prices. Because of these requirements, previously designedauctions cannot work efficiently in e-service markets.A static time differential pricing mechanism in which two or more tiers ofon/off peak rates are used can improve efficiency by partially matching lower (higher) demand with lower (higher) price. However, this mechanismstill remains inflexible, since demands of buyers do not follow a step function, but rather gradually shift from on- to off-peaks and back. Dynamic pricing mechanism that adapts tochanging market conditions constantly is more efficient. It maintains highresource utilization and the seller's revenue in variety of market conditions.

II. Literature Review

In the year 2009, the paper proposed by Roumen Vragov, Di Shang, Karl R. Lang, In the paper "Auction based E-Procurement Mechanism Design ", They sugest that a view of an emerging phenomenon The E-procurement [3]. But the drawback of a new mechanism is designed based on E-auction mechanism; one problem occurred during this paper that without internet we are not able to implement the auction strategies.

In the year 2009,the paper proposed by Hila Etzion and Scott Moore ,In the paper "Secure keyword auction:[4] preserving privacy of bidding prices and CTRs",they suggest that we use a simulation model to extend previous analytical research on a firm selling consumer goods online using posted price and auction at the same time.Three research streams are useful in informing our how their expectations about future prices develop, and how their attitudes toward risk affect their behavior.but the drawback in this paper[16] is Bidder and buyer reactions to prices are especially worthwhile to consider in the context of group buying discount electronic markets. Even though Drakopoulos doesn't use the term explicitly,[14] he explains the main idea of price indifference thresholds, which refer to the minimum price changes required for consumers to detect the differences. By incorporating a threshold into a demand curve, he proposes that when a price change is smaller than some critical threshold, consumers will not detect the price change, resulting in no change in demand. In our research, we will refer to the related term, price threshold, to indicate proximity in order quantity terms to the quantity-price combination that reflects a drop in price to the lower-tier[2].

In the year 2009,the paper proposed by Robert J. Kauffman, in the paper "New Buyers' Arrival under Dynamic Pricing Market Microstructure" they suggest that Using data collected from MobShop.com, the current study tested a model that predicts bidder participation and order arrivals in an electronic market that uses an innovative group-buying discount market microstructure.[4][5]The problem can be occurring as some buyer's donot use the electronic equipments in the market. The variations of a cost can be high, the consumer can pay high amount for new features and new items can be added.

In the year 2009, the paper proposed by Shamik Sengupta and Mainak Chatterjee, in the paper "An Economic Framework for Dynamic Spectrum Access and Service Pricing" they suggest that Dynamic spectrum allocation coupled with fine granularity switching of services by end-users will engender a flexible and competitive environment for trading wireless services.[6][8] The drawback of this paper to implement the radio signals and their dynamic mechanism.In the year 2010,the paper proposed by Wei-Yu Lin, Guan-Yu Lin, Hung-Yu Wei, In the paper "Dynamic Auction Mechanism for resource allocation" they suggest The main contribution of this paper is developing a new resource allocation algorithm by applying auction method into the resource allocation, but one problem occurred while in the allocation of resources in the market, it is not able to determine the approximate profit

and loss for a product in market.In the year 2011, the paper[9] proposed by lin gao, xinbing wang and youyunxu, in the paper "Multiauctioneer Progressive Auction for Dynamic Spectrum Access", they suggest the problem of residual channel allocation We propose an auction-based mechanism MAP, in which each PO systematically raises the trading prices and each SU subsequently decides whether to buy a spectrum band and from which PO he is going to buy a spectrum band.

In the year 2011, the paper proposed by Andrew Chang, in the paper[8] "Time dynamics of user behavior in a series of overlapping electronic mechanism" they suggest shed new lights on time dynamics of online user behavior in the market which comprise a series of multiple overlapping auctions, the error can be occur during the series of electronic equipments there might be a loss of data and loss of important database.

In the year 2011, the paper proposed by R. J. Thomas, T. D. Mount, R. Zimmerman, W. D. Schulze, in the paper[11] "Testing the Effects of Price Responsive Demand on Uniform Price and Soft-Cap Electricity Auctions", they suggest that the effectiveness of a price while bidding in a market, the price can be low or high during auction mechanism. The drawback of this paper is the user can know about variations of prices in a market. But one problem occurs during researching of this paper that the user not able to extra features or more items.

In the year 2011, the paper proposed by Shabnam Sodagari, Alireza Attar, in the paper "On a Truthful Mechanism for Expiring Spectrum Sharing in Cognitive Radio Networks" they suggest a powerful tool to realize such subletting of Spectrum is auction mechanisms. In this paper, we proposed a dynamic, online auction for secondary spectrum access, the drawback of this paper is proposed auction structure, secondary CRs not only will submit their valuation of auctioned spectrum band, but also their arrival and departure time instances.

Computerized reservation systems were developed in the 1950s to keep track of airline seat booking and fare information. Initially these were internal systems, but were soon made available to travel agents. Deregulation of airline pricing in 1978 permitted much more extensive use of the systems for economic activity[12], especially pricing. The initial development of dynamically adjusted pricing is often credited to American Airlines' Robert Crandall, as a response to the rise of discount airline People's express in the early 1980s.

a) Problem Formulation

The complexity and opaqueness of airline pricing has grown over time. As a result, the "yield management"[12]systems employed by airlines for pricing have become one of the most arcane and complex information systems on the planet, and one with a very large economic component. Airline pricing represents a great challenge for modern economic analysis because it is so distant from the "law of one price" level of analysis. This surveys the theoretical literature, which is mostly found in operations research journals, develops some new theory, assesses the holes in our knowledge, and describes some results from a new database of airline prices. Dynamic pricing, which is also known as yield management or revenue management, is a set of pricing strategies aimed at increasing profits. The techniques are most useful when two product characteristics co-exist. First, the product expires at a point in time, like hotel rooms, airline flights, generated electricity, or time-dated ("sell before") products. Second, capacity is fixed well in advance and can be augmented only at a relatively high marginal cost. These characteristics create the potential for very large swings in the opportunity cost of sale, because the opportunity cost of sale is a potential foregone subsequent sale. The value of a unit in a shortage situation is the highest value of an unserved customer. Forecasting this value given current sales and available capacity represents dynamic pricing.

III. Empirical Solution

The dynamic pricing in auction mechanism involve some existing sytems like e-bay auction technology site and multi-agent wireless system for dynamic and local combined pricing, allocation and billing. The e-bay is an world's largest auction site where this site shows the interaction between the seller and buyer-bay is one of the profitable e-business site, on e-bay people can buy and sell just about anything, the company collects a submission see upfront and a commission as a percentage of the sale amount.

Example1: The auction process in e-bay: The seller fills in the appropriate registration information post the description of the item for sale specifying a minimum opening bid, if a successful bid is made ,the seller and the buyer negotiate the payment method, shipping details, warranty and other perticulers,e-bay is the interface through which sellers and buyers can conduct business. In 2011 e-bay started to auction fine art in collaboration with icollector.com of the united kingdom and sothebys.com, e-bay operates globally buyers from more than 150 other countries participate, trading can be made from anywhere and at any time.

Example 2 : Multi-Agent Wireless System for Dynamic and Local Combined Pricing, Allocation and Billing: In established communications systems with an underlying provider infrastructure the market is designed according to the Fixed Price Model (FPM). A user can get access to the network only if there are free resources controlled by the Base Station (BS) within a cell. Furthermore, he has to accept the fixed price for

awide area and quasi-static in time. The user has to pay the same price whether there is a high or a low demanding the cell. Thus, if his preferences and purchase power allow him to spend more money for using Radio Resource Goods (RRG), he is not able to influence the allocation. For the same reason the operator misses the chance to increase his monetary gain by adapting the price for RRG to the users RRG evaluation. To overcome these problems will introduce a distributed, dynamical and combined pricing, allocation and billing system, suitable for wireless infrastructure communications systems which are capable to manage multi-homing. By applying Cognitive Radio (CR) abilities not only to the allocation but also to this combined architecture, it is mandatory to dynamically allocate RRG by an Auction Sequence (AS) to exploit the CR abilities the repetition of auctions should happen very fast up to milliseconds to react on the load dynamic. A class of auctions, the multi-unit sealed-bid auction, is suitable to execute the auction within specified time and with an acceptable signalling effort in comparison to sequential auctions.The economical field auction theory mainly deals with single shot auction, but not with auction repetition. The framework of the optimal multi-unit auction is proposed in, but does not deal with repetitions and does not include learning facilities of the UTs. Gaining experience of the past and applying it in the current auction destroy the independence of the single shot auctions.the asymmetric balance of negotiation power needs to be considered in auction design. The prices bid in a basic auction are dependent only on the bidder's willingness to pay. This means that intentions of only bidders, but not the auctioneer, are reflected in the auction winning prices. To restore the symmetric balance of negotiating power, the reservation price (RPA) and cancelable (CA) auctions were proposed. In RPA, only bids higher than the auctioneer's reservation price are considered during winner selection. On the other hand, in CA, if the resulting revenue of an auction round does not meet the minimum requirement of the auctioneer, the entire auction round is cancelled. By providing reservation price or cancellation option to the auctioneer, the asymmetric negotiation power problem is resolved. However, when the perishable resources are traded, both of these auctions cause resource waste. In RPA, the reservation price restricts the number of winners. Hence, the resources unused because of this restriction are wasted. In CA, the cancellation of an auction round wastes the entire stock of resources that are allocated to this auction round.

IV. Conclusion

1. It is very clear that advances in internet and e-commerce technologies have opened up rich opportunities for reaping the benefits of dynamic pricing. Companies resorting to dynamic pricing strategies are increasing in number steadily. Moreover, increasingly complex dynamic pricing strategies are being tried out. In this paper, we have covered the following topics.

We have shown that the fixed pricing paradigm is giving way to a dynamic pricing paradigm in e-business markets and those dynamic pricing strategies: Conditions under which dynamic pricing strategies will outperform fixed pricing strategies have been enunciated.

Searching for more efficient ways of deciding the auctioneer's optimal bid that defines the DW and PW classes. Seeking a better way to find the optimal winning score coefficient for the winner selection strategy. Attempting to identify more efficient and simpler pricing rules that preserve incentive compatibility but achieve higher auctioneer's revenue

Software modelling of dynamic pricing mechanism which illustrates the reliability and efficiency of the proposed model.

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V. Future Works

We can develop a pricing model for substitutable flights where customers choose among the available flights. To overcome computational problems posed by the formulation's multi-dimensional state and action spaces, we considered heuristics based on pooling ideas. We also derived easily-computable separable bounds for the value function of our model. Policies motivated by these bounds were shown numerically to be near optimal for a range of problem instances, and to dominate the policies from pooling in most cases. Our results suggest that pooling heuristics perform well for symmetric problems in which (a) customers, when viewed as a population, are mostly indifferent in their preferences over flights and (b) the flights have the same seating capacity. However, the pooling heuristics can perform poorly for asymmetric problems. The approaches motivated by the separable bounds do not suffer from such shortcomings, and remain implementable for large problems.

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