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Communication Networks Based on Price Differentiation

K. Uma Maheswara Rao[1], T .Y. Srinivasa Rao[2]

1M.Tech. Student, Dept. of CSE, St. Ann's College of Engineering & Technology, Chirala, Prakasam Dist., A.P., India
[2]Associate Professor, Dept. of CSE, St. Ann's College of Engineering & Technology, Chirala, Prakasam Dist., A.P., India

ABSTRACT:*We study the optimum usage-based rating downside in a resource-constrained network with one increasing service supplier and multiple teams of surplus-maximizing users. With the belief that the service supplier is aware of the utility perform of every user (thus complete information), we find that the whole worth differentiation theme can do an oversized revenue gain (e.g., 50%) compared to no worth differentiation, when the entire network resource is comparably restricted and the high disposition to pay users square measure minorities. However, the complete worth differentiation theme might result in a high implementation complexness. To trade off the revenue against the implementation complexness, we tend to any study the partial worth differentiation theme, and style a polynomial-time rule that can calculate the optimum partial differentiation costs. We also contemplate the unfinished data case wherever the service provider doesn't grasp that cluster every user belongs to. We show that it's still doable to worth differentiation under this situation, and supply the enough and necessary condition under that AN incentive compatible differentiation theme will achieve identical revenue as beneath complete data.*

Keywords: resource, usage, rating, monitor.

INTRODUCTION:

Pricing is very important for the planning, operation, and management of communication networks. Valuation has been used with 2 totally different meanings within the space of communication networks. One is that the "optimization-oriented" valuation for network resource allocation: it's created fashionable by Kelly's seminal work on network congestion management [2], [3]. As an example, the Transmission Control Protocol (TCP) has been with success reverse engineered as a congestion valuation based mostly answer to a network optimization drawback [4], [5].A additional general framework of Network Utility Maximization (NUM) was afterward developed to forward-engineer several new network protocols (see a recent survey in [6]). In numerous NUM formulations, the "optimization-oriented" costs typically represent the Lagrangianmultipliers of varied resource constraints and square measure accustomed coordinate totally different network entities to attain the most system performance in an exceedingly distributed fashion. The opposite is that the "economics-based" valuation, that is

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employed by a network service provider to varied objectives together with revenue maximization. The proper style of such a valuation becomes significantly difficult today thanks to the exponential growth of information volume and applications in each wireline and wireless networks. In this paper, we tend to concentrate on learning the "economics-based" valuation schemes for managing communication networks. Economists have projected several subtle valuation mechanisms to extract surpluses from the customers and maximize revenue (or profits) for the suppliers. A typical example is that the optimum nonlinear valuation [7]–[9]. In follow, however, we regularly observe straightforward valuation schemes deployed by the service suppliers. Typical examples embrace flat-fee pricing and (piecewise) linear usage-based valuation. One potential reason behind the gap between "theory" and "practice" is that the optimum valuation schemes derived in political economy typically has a high implementation quality. Besides a bettermaintenance price, advanced valuation schemes aren't "customerfriendly"and discourage customers from victimization the services [10], [11]. What is more, achieving the best potential revenue often with difficult valuation schemes needs knowing the information (identity and preference) of every client, which can be difficult in giant scale communication networks.

In this paper, we have a tendency to take into account the revenue maximization downsideof a monopolizer service supplier facing multiple teams of users. Every user determines its optimum resource demand to maximize the excess, that is that the distinction between its utility and payment. The service supplier chooses the pricing schemes to maximise his revenue, subject to a restricted resource. We have a tendency to take into account each complete data and incomplete data eventualities and style totally different rating schemes with totally different implementation complexness levels.

Complete network information

We propose a polynomial algorithm to cipher the optimum answer of the partialprice differentiation downside, which has the entire price differentiation theme and therefore the single rating scheme as special cases. The optimum answer incorporates a threshold structure, thatallocates positive resources to high temperament to pay users with priorities.

Revenue gain under the complete network information

Compared to the only rating theme, we have a tendency to establish the two

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necessary factors behind the revenue increase of the (complete and partial) worth differentiation schemes: the differentiation gain and therefore the effective market size. The revenue gain is that the most important once high users area unit minority among the entire population and total resource is limited however not too tiny.

***Incomplete network information*:**

We style associate degree incentive compatible scheme with the goal to realize identical maximum revenue that may be achieved with the entire information. we discover that if the variations of temperament to pays of users area unit larger than some thresholds, this incentive-compatible theme can do identical maximum revenue. We have a tendency to any characterize the required and sufficient condition for the thresholds.

It is fascinating to check our results beneath the wholenetwork info situation with leads to [10] and [15]. In [10], the authors showed that the revenue gain of value differentiation is little with a flat entry-fee primarily based Paris railroad mPricing (e.g., [16]), and an advanced differentiation strategy may not be worthy. Chau et al. [15] additional derived the sufficient conditions of congestion functions that guarantee theviability of those Paris railroad valuation schemes. Against this, ourresults show that the revenue gain of value differentiation willbe substantial for a usage-based system. Some recent work of usage-based valuation and revenuemanagement in communication network includes [17]–[24].Basar and Srikant in [17] investigated the information measure allocationproblem in a very single link network with the only valuation scheme. Shen and Basar in [18] extended the study to a lot of general nonlinear valuation case with the unfinished network info scenario. They mentioned the only valuation theme under incomplete info with a time distribution of users' sorts. In distinction, our study on the unfinished information focuses on the linear valuation with a distinct setting of users' sorts. We tend to additionally show that, besides the only valuation scheme, it's additionally doable to style differentiation valuation schemes beneath incomplete info. Daoud et al. [19] studied a transmission power allocation drawback in a very CDMA system, where the interference among users are the key constraint instead of the restricted total resource thought-about in our paper. Jiang et al. in [20] and Hande et al. in [21] centered on the study of the time-dependent valuation. He and Walrand in [22], Shakkottai and Srikant in [23] and Gajic et al. in [24] focused on the

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interaction between completely different service suppliers embodied within the valuation ways, instead of the planning of the valuation mechanism. Besides, none of the connected work considered the partial differential valuation as in our paper.

EXISTING SYSTEM:

Some previous work that thought of a flat-fee evaluation theme wherever the payment doesn't rely upon the resource consumption , here we have a tendency to study the revenue maximization drawback with the linear usage-based evaluation schemes, wherever a user's total payment is linearly proportional to allotted resource.Existing work doesn't acheive the below things1).How to style easy evaluation schemes to attain the most effective trade-off between complexness and performance?2) however will the network info structure impact the look of evaluation schemes

PROPOSED SYSTEM:

In this paper, we have a tendency to specialise in finding out the "economics-based" evaluation schemes for managing communication networks.Economists have planned several subtle evaluation mechanisms to extract surpluses from the customers and maximize revenue (or profits) for the suppliers. A typical example is that the best nonlinear evaluation. In applyhowever, we frequently observe easy evaluation schemes deployed by the service suppliers. Typical examples embrace flat-fee evaluation and (piecewise) linear usage-based evaluation. One potential reason behind the gap between "theory" and "practice" is that the best evaluation schemes derived in economic science typically contains a high implementation complexness. Besides the next maintenance price, complicated evaluation schemes don't seem to be "customer friendly" and discourage customers from victimization the services. Moreover, achieving the very best potential revenue typically with sophisticated evaluation schemes needs knowing the data (identity and preference) of every client, which might be difficult in massive scale communication networks.

SYSTEM IMPLEMENTATION:

COMPLETE PRICING:

In this module we are giving three options for user(for example-Normal user(pay-free user),Partial Premium User and Premium User.In Normal user mode,there is revenue gain for service provider.Only usage charges.In Partial Premium user the user has to pay for using some additional features of the network.Premium user only

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has to utilize the whole features of the network.So the revenue gain for the service provider is more when compared to the Partial Pricing network.

PARTIAL PRICING:

In this module we are giving two options for user(for example-Normal user(pay-free user),Partial Premium User.In Normal user mode,there is revenue gain for service provider.Only usage charges.In Partial Premium user the user has to pay for using some additional features of the network.So the revenue gain for the service provider is more when compared to the No Pricing network and revenue gain for the service provider is less when compared to the revenue gain from the Complete Pricing.

CONCLUSION:

In this paper, we have a tendency to study the revenue-maximizing drawback for a monopoly service supplier beneath each complete and incomplete network data. beneath complete data, our focus is to analyze the exchange between the full revenue and also the implementation quality (measured in the number of rating decisions on the market for users). Among the 3 rating differentiation schemes we have a tendency to projected (i.e., complete, single, and partial), the partial value differentiation is the most general one and includes the opposite 2 as special cases. By exploiting the distinctive drawback structure, we have a tendency to designedan algorithmic rule that computes the best partial rating theme in polynomial time, and numerically quantize the exchange between implementation quality and total revenue. Under incomplete data, planning associate degree incentive-compatible differentiation rating theme is tough generally. We show that once the users area unit considerably totally different, it's attainable to design a quantity-based rating theme that achieves a similarmaximum revenue as beneath complete data**.**

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AUTHORS:

K. Uma Maheswara Raoreceived B.Tech. degree from Bapatla Engineering College, which is affiliated to ANU Guntur. Currently he is pursuing M.Tech. in St. Ann's College of Engineering and Technology which is affiliated to JNTU Kakinada.

Mr. T.Y.Srinivasa Rao is presently working as anAssociate Professor in Dept. of Computer Science and Engineering, in St.Ann'sCollege Of Engineering and Technology,Chirala. He guided many UG and PG Students. He has more than 20 years of Teaching Experience. He published paper in 1 International Journal and 4Research Oriented Papers in Various Conferences and also participated in several Workshops and Development Programs.He is currently pursuing Ph.D.at JNTUK, Kakinada.