Telecom CRM Big Data Analytics for Tariff Plan Design

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ABSTRACT

This paper presents a churn of customer relationship management (CRM) of telecommunication companies and big data analytics for the designing of lucrative strategies on real-time basis in the current era of hard competition to retain plus attract customers and improve business. It is an attempt to identify the research work done in the area of tariff plan design through the big data analytics on CRM of telecom companies and it is found that very less work has been done on this, so a vast scope to automate the system is open.
Keywords: Tariff Plan, CRM, Big Data, Data Mining, Clustering, Frequent-Pattern

I. INTRODUCTION

Combination of big data analytics with customer relationship management is an evolving concept due to the rapid growth in the no. of customers, types of services, telecom service providers, technology, and the frequent change in the behaviour of customer has catch the attention of all businesses which are directly involved in customer services such as telecom, online shopping, hotels, tour and travel agencies, social networking sites etc. even now days governments and political parties are also using these technologies for the improvement of administration, public services and credits. In customer-oriented atmosphere big data analytics helps to optimize the customer understanding and business result [1]. Customer relationship management (CRM) refers to exercises, schemes and techniques that companies use to supervise and evaluate customer relations and data all over the customer lifecycle, with the objective of advancement of business relationships with customers, supporting in customer retention and motivating sales growth. Integration of big data with customer relation management can enhance the company's CRM strategy that results in improved customer reliability and amplified sales. Customer relationship management is a tactic to efficiently manage customers and vendors of any organization for the excellence achievement in business. The features of

CRM are summarized as 1) Customer's Needs, 2) Customers Response, 3) Customer Satisfaction, 4) Customer Loyalty, 5) Customer Retention, 6) Customer Complaints, 7) Customer Service. Jeff Bertolucci in [2] told with the reference of Diern explains three opportunities in big data: **1st** is Real-Time Analytics based on the velocity attribute of big data and can have machine learning algorithms like self-learning, self-healing, self-adjusting etc. **2nd** is Interaction Cultivation by scanning social media and selecting questions which are complaining about the company's products or services. The **3rd** choice is Partnering with CRM staff by making strategies to use information discovered from big data to improve the business of company [2]. Customers are drawing vibrant images of their activities, inclinations, and intentions every minute in daily routine by leaving digital scenery of data through apps, cars, mobile, social, web, product use and service interactions. This data is goldmine for the business people [3]. In introduction section we discussed how customer relationship management data satisfies the attributes of big data 2nd part discusses about how telecom companies are related with CRM, 3rd section describes how data mining techniques applied to get some fruitful patterns that can be used to design tariff plans and last segment concludes the paper with future prospects.

II. TELECOMMUNICATION COMPANY'S CRM BIG DATA

Information Technology and Telecommunication are persistently growing business in words of equipment, augmentation, worldwide contact and confronting a high level threat of elimination due to growth in competition. Customer Relationship Management (CRM) systems developed, from the old system of customer service, as a renovation to provide a proactive rather than reactive service to customer and craft a goodwill for company. A Communicating Sequential Processes (CSP) is expected by customer including good network, perfect invoice, a good voice and data experience, service experience and proper return on investment. The significance of relationship with customer is recognized by telecommunication companies and adopted CRM for better satisfaction of customer, constructing brand equity such as name knowledge, apparent worth, and brand fidelity [4]. Customer engagement can be achieved by performing data analytics on the available information of user behavioral patterns through mobile usage services that provide the perceptive of user needs and demands. Customization as per the usage patterns move towards better customer experience and raised customer loyalty [5]. The real world use of big data analytics in telecommunication is customer retention. CRM software helps telecommunications operators in governing and directing customer revenue and provides competitive ability by delivering tools to recognize and hold back lucrative customers. The classifications of CRM functions in telecommunications industry are shown in the Table 1 [6].

Table 2. CRM Functions

S.N.	Function Name	Description
1.	Customer database	Collection of needed data such as facts and figures about interactions via e-mails, letters, phone calls, etc.
2.	Customer care and billing system	Easy to access and transform billing information with the observation of histories, invoices, account balances and credit advice.
3.	Problem solving system	Solves service issues
4.	Handling disputes system	Creates case for each complaint with all relevant information.
5.	Detection of follow-up activities and tracking of cases	Turns negative situation in positive quickly by using well-tested process.
6.	Marketing tips	Launching of highly focused campaigns.
7.	Sales and contract management	To forecast sales activities with better accuracy and organization of territories according to the criteria such as product lines, revenue, size and strategic accounts.
8.	Partner relationship management	Share critical information among company's partners on sales forecasts, order flow, and delivery schedules.
9.	Commissions-management functionality	Creates incentives for company's partners.
10.	Analytics features	Identifies most profitable customer groups, track and predict retention.

According to Harvard Business Review [7] telecom companies are facing challenges and opportunities in same scope, and to survive in such saturated scenario customer satisfaction and knowledge of customer behaviour is very important. The savvy use of data can help to create new business models, the analysis of usage data can be used to develop new programs to attract unhappy subscribers of other service providers and enhance revenue. In year 2012 global telecom companies have spent $25 million on big data projects and by 2015 it reached $4 billion. Use of analytics on CRM big data can help managers to analyse the change of customer behaviour within a short frame of time and reveal patterns to catch the opportunity. In-Memory Technology, Real-Time Processing, Business Intelligence and Predictive Analytics, Data Visualization, Social Media and Sentiment Analysis are new platforms on which telecom companies must think [7]. The most important measure is measure of customer experience that can be measured by Net Promoter Score (NPS) to rate the customer's

recommendations that are received during the lifecycle of customer which consist of 8 phases including Awareness, Interact, Agree/Get, Consume, Support, Pay, Reward, and Leave. The communications service provider (CSP) lifecycle can also be defined in the similar way including Acquire, Market/Sell, Fulfil Order, Manage Customer, Service Assurance, Charge Bill, Retain Optimize and Retire total 8 phases. By combining these two lifecycles we can measure and quantify the customer experience in all phases of his journey and can transform data into insights to take action accordingly [8]. The mobile big data [MBD] analytics is studied in [9] where Deep Learning Model and Spark-Based Deep Learning Framework is discussed; branch of machine learning to refine the problems of mobile big data that are volume, velocity, veracity, variety and value. The identified future works include Crowd Labelling of MBD, Economics of MBD, and Privacy and MBD collection. In the next section we discuss how big data mining techniques can be utilized to identify clusters of similar customers that form patterns to guide in the direction of tariff plan design.

III. BIG DATA ANALYTICS ON TELECOM CRM FOR TARIFF PLAN DESIGN

Research on the strategy design through the application of big data mining techniques on customer relationship management big data of telecom companies is still at preliminary stage; little work has been done on tariff plan design for electricity companies through the CRM data by using clustering techniques including steps like Customer selection, Data collection, Data cleaning and normalization, Clustering with k-means plus fuzzy c-means, Analysis of clusters and finally finding out the consumption patterns, so that the strategies can be finalized [10]. K-means clustering method is used to identify the seven groups of customers from the historical data with combination of different characteristics that results in fruitful suggestions for the strategy design, which are also verified towards a successful strategy [11]. Service oriented business intelligence (SOBI) architecture has been proposed on the basis of existing models and customer requirements in [12] with a survey of CRM and CDR (Call Detail Records) data of telecom operators via service oriented approach to support telecom business managers in developing real-time policies of tariff plan for the benefit of both customer and company [12]. A fast frequent pattern mining algorithm is proposed in [13] for real-time CRM data to predict future behaviors of consumer and take positive decisions. An evaluation of the effectiveness of mobile service providers using data envelopment analysis is performed on the implementation of CRM in Indian telecom industry in [14] which concludes that the CRM is extensively used by telecom companies for the profit, but it needs more research and advancement in the perspective of real-time data. A Huawei sponsored report [15] states that big data analytics is a multi-billion-dollar revenue opportunity in telecom. Standard fuzzy c-mean clustering algorithm is extended to detect the customer movement between clusters over time, so dynamic customer profiles can be build that can further lead in designing of customer-centric information system to respond customer's changing requirements and understand the varying behavior of user to make strategic plans which look tempting to mobile service user and beneficial for service provider [16].A novel work has been done by [17] with 1381 potential attributes derived from the usage data of prepaid clients by applying regression data mining techniques.

IV.CONCLUSION

A combination of big data technology and CRM is presented with a specific business of telecom services. Big data is a rapidly growing technology which is encroaching the CRM in most of the businesses directly providing services to customers among which telecommunication is hottest and discussed here. Business strategies like designing of tariff plans on the real-time data of customer behaviour is a mega challenge in front of business firms, so the application of big data clustering techniques on CRM to confront such challenge is reviewed here and found that a very less work has been done in this area and many combination of algorithms can be applied and modified to generate strategies on the basis of available data.

V. REFERENCES

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