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An Analysis on Methods to Predict On Demand Based Online Agricultural Commodity of Selling Buying Using Social Computational Driven Models

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Abstract— Consumption and demand for agricultural produce is always on high variable ends. Consumption of an agricultural produce increases the demand among consumers and also vice versa. The need for a system to predict on demand for commodity is always felt among farming commodity such that the demand for agricultural commodity can be predicted earlier and hence supported earlier. This research works on application of social computing models over understanding the trends of consumer for prediction of demand. This research works on base of online marketing along with commodity utilization demand is discussed. Subsequently, ways to improve online marketing using the concepts of social computing are proposed and implemented. Analysis predicts on application of multiple soft computational models employed over traditional online marketing methods to suggest of effective / accurate prediction.

***Keywords*:** Social Computing, Agricultural Commodity, Agricultural Demand / Supply

I. INTRODUCTION

Food supply chain (FSC) management follows a "farm to folk" consumption model[1]. The sets of processes, operations and facilities that assist in changing the food from its raw material state to consumption per consumer can be called as food supply chain management. Supply chain starts with a producer (farmer, agriculture organisation, food manufacturing) and every stage the movement of material is facilitated by transportation and logistics, companies. A company ensures that the food products reach customers (retailers, end users etc.) on time and have the proper quality. i.e. chain of production and distribution.

Complexity and complication in the FSC from the areas

1) Consumer and market choices
2) Retail management of food production
3) Manufacturing
4) Processing agri-produce
5) Maintaining quality
6) Distribution and logistics

Social computing [7] is used to design social contexts and digital systems by using socially produced information from various sources and providing the same to the users. Users may also use social computing to share opinions or insights with each other. This information may be made directly available or via multiple channels. The information is then further processed and distributed according to user demand and requests. The major areas of use for social computing include politics, business and technology. The areas of knowledge discovery, knowledge sharing, and content management make use of social computing aspects. Online marketing [4] is a set of methods that are used to promote certain material such as products or services on the internet. It may be used interchangeably with web marketing or online advertising. To understand the SCM each product makes use of customer data and customer relationship management (CRM) systems to personalize the content delivered for each user. Few examples of understanding the demand involves online marketing such as e-commerce tools and affiliate marketing.

SCM [10] is related only to supply and demand price. It involves a more expansive range of activities, such as strategic sourcing of raw materials, procuring the best prices on goods and materials & coordinating supply chain visibility efforts across the supply chain network of partners. This domain must manage demand, carry the right amount of inventory, deal with disruption. Keep costs to a minimum and meet customer demand in the most effective way. It can be achieved through proper methodologies. So that it can be manage the growing complexity of today's supply chains.

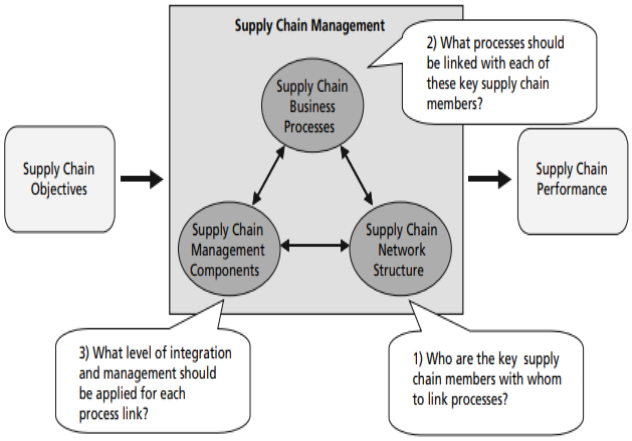

Fig-1 Supply chain management and its processes

In this paper, the authors investigate on social computing techniques as computational machine learning approaches to predict and analyze on demand and supply for agricultural produces. Social computing based machine learning approaches help to identify the hidden knowledge with the help of pattern recognition algorithm in supply chain data observed daily, without necessitating any manual intervention. Here the key factors which influence on supplier quality and demand forecasts (Fig-1) with revolutionizing supply chain management towards the demand of agricultural produce. There are many optimization algorithms available for problem solving in FSCM, few of them are ACO, ABO, FCM, SVM etc. To improvise the accuracy on demand forecasts in supply chain management, the key problem is how to select parameters correctly, and understanding the market demand. Online marketing makes use of customer data and customer relationship management (CRM) systems to personalize the content delivered for each user. Some examples of online marketing include e-commerce and affiliate marketing.

II. LITERATURE SURVEY

Although social computing is an emerging domain with applications in various areas, a mathematical foundation for the same is still in a newer phase [11]. Some cases of mathematical approaches to the same include crowdsourcing, prediction and user generated content sites [6]. Furthermore, the inability to follow the data flow of a project and reuse the knowledge gained is one of the biggest issues in institutions that have made use of social computing [2] [4]. Proper Knowledge Network Analysis (KNA) may be used to effectively solve this issue. Using the concepts of social computing, like-minded people and experts in the enterprise [3] can be found.

Nowadays, computational methods are used to solve questions pertinent to society [5]. Ideas from social sciences are combined with machine learning and statistics to achieve the same [14]. One of the approaches for dealing with cyber-physical-social systems (CPSS) that combine a social framework with technical domain is the ACP approach (A for artificial societies for complex models, C for computational experiments for accurate analysis and reliable evaluation and P for parallel execution at decision making) [7]. This approach uses big data concepts as input and applies analytics on the same. The approach comprises of 3 parts: Descriptive Intelligence, Predictive Intelligence and Prescriptive Intelligence.

A challenging task in the field of social computing today involves energy saving in public buildings since this would require prompting a behavioural change in the general public using these buildings. A framework attempting to solve the same is CAFCLA (Context-Aware Framework for Collaborative Learning Activities) [8] that integrates multiple technologies providing context awareness along with social computing. This framework consists of multiple levels such as physical (smartphone, temperature, and location beacons), communication (Wi-Fi, ZigBee), context-awareness (WSN's, Real time locating system), management (social computing) and application (API and Web Interface). CSCW (Computer supported cooperative work) also makes use of social computing concepts and any changes in the method of practicing social computing can affect the way CSCW researchers think [9][12]. Similarly social computing practices may also be affected by structures and processes of the current policies.

A possible approach for mining current research trends is by using anomaly detection models. Using a rule based anomaly detector (WSARE) it was discovered that social computing research trends have shifted from computer science towards medicine and communication. Using a network evolution analysis it was found that anomaly detection models may also prove useful in forecasting in certain fields [10].Values in social computing research may also be seen by using values dimensions that comprise of sources (settings, environments or contexts from which the values are obtained) and attributes for each value in a socio-technical system [21].There are also certain areas of uncertainty for social computing in data analysis today. Social computing is still in a new phase and has not been fully conceptualized yet. There is a need for uncertainty social computing problems to be analysed and possible solutions obtained [13]. To select effective policies for emergency management, an agile and lightweight social computing approach for selection and evaluation of the required policy relative to emergency management may be used. The approach comprises of three parts represented as (P) emergency management policy selecting; (Z) modelling artificial societies with a zombie-city model (a general and formal artificial society model); and (E) policy evaluation or PZE [15]. The zombie-city model and multiple scenarios enable description and formal reasoning of an artificial society. Results of this approach indicate effective emergency management policies can be established in an iterative way.
Online marketing includes wide range of marketing elements than in traditional business marketing due to the extra channels and mechanisms available. Marketing online include communicating with customers online, promoting business or products online and making sure that all online content is routinely updated and relevant. Some recent online marketing trends include: non-visual experience (speakers and voice commands in every part of life), native advertising and individual communication with brands among others [17] [18] [20].

An appointment platform running on a server identifies a new appointment to be filled based on an appointment inventory of a service provider [16]. The appointment

platform ranks users to which the appointment may be offered using a membership score. Incentives may also be given to the selected user based on his/her membership score. These incentives may be provided using online marketing methods such as loyalty points to the service provider based on factors such as prompt payment for services, past record, willingness to fill appointments and so on.

The effect of consumer creativity on their evaluations of brands is a significant one. Online retailers make use of their customer's creativity as a promotional tool nowadays. Creative consumers show a higher level of acceptance of distant brand extensions [19]. Consumers' attitudes toward a focal brand depends on their attitudes toward their activities and hence it is beneficial to firms that they design their activities in an appropriate manner. One of the lesser used measurements of offline and online marketing is affiliate marketing which may help in understanding the effectiveness of practitioner-led online performance assessment [21] [22]. Affiliate marketing is an online form of partnership between vendors and affiliates, in which the affiliates are rewarded for the referral of customers to their websites and for promotion and distribution of the vendor's goods through sales outlets. Users often select a specific brand among multiple competing ones. An internet crawler engine collects sentiments relating to these brands according to a sampling method and refines it using a refinement engine which assigns a score that may be viewed via a user interface [23].

Potential consumers react to demand based marketing communication efforts in different ways and have certain perceptions that influence decisions. According to theories of consumer behaviour a model may be designed taking various variables into consideration to integrate existing theories [24]. Data may be analysed in order to identify meanings, opportunities and challenges of integrated online marketing communication. A model for the adaptation of online messages to core corporate values, communication strategy and tactics, and targeted audience/communication channels may then be designed [9].

III. ANALYSIS AND REVIEW

To support on an efficient supply chains model, variable demand and uncertainty in supply of agri-produce are the major aspects which require an efficient supply chain strategy to optimize the profitability. Profitability can be achieved only by cost and information coordination. Low product costs can be realized by eliminating non-value-added activities, striving to scale economies and optimizing of techniques and production.

The analysis of models (Fig-3) adopt dataset which holds the details of agri-products to be marketed online in addition to the main content online. The dataset will include product id, product name, description, base price (from farm), retail price, market price and demand price.

The impact of selected social computing methods will then be observed to see if there is any change in user preference for the listed products and then the results will be analysed and discussed.

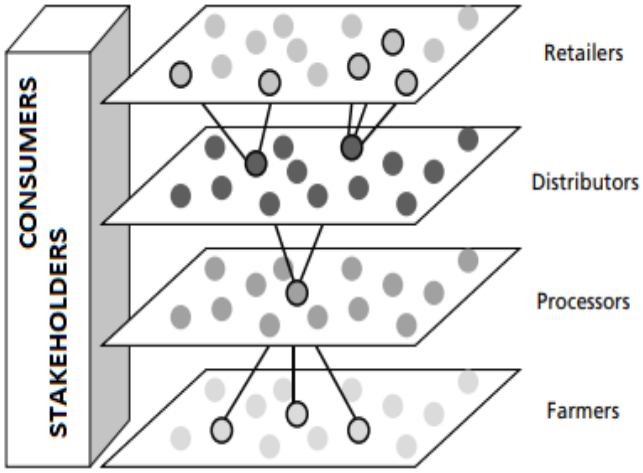

Fig-2 –Stack architectural flow of agri-produce as part of SCM

SCM end goal is to achieve efficient inventory management as well as it reach its customer service goals(Fig-2). Practices are demand forecasts, anticipated lead times and safety stock quantities. Demand forecasting can be done by using the past value.

In future SCM is affected due to :

a). Customer gain
b). Product popularity
c). Introduction of new products
d). Short term increase in demand through promotions.

Here analytics can determine where to put smart lockers in densely populated areas to cut the number of single item deliveries. This section discusses about two major computational models such as ACO (Ant Colony Optimization) and Bee hive Optimization approaches.

In this method, this algorithm determines and analysis on prediction of the shortest paths between the production and customers. i.e supplier and demand. This method is exploited to solve hard combinatorial optimization problem by artificial ants, denoted by artificial phenomenon trails. The aim is to search for an optimal path in a graph, based on the behaviour of ants searching a path between their colony and a source of food.

In Bee colony optimization, first step is to place the supply randomly in the search space. By evaluating the selected spare for the fitness, which possess on the highest demand is selected and the nearest customers, demanded places are marked with the direction towards a destination. In the

remaining places, the population are assigned randomly around the search space, then scouting for new potential solutions, mostly BCO is less adaptive in nature.

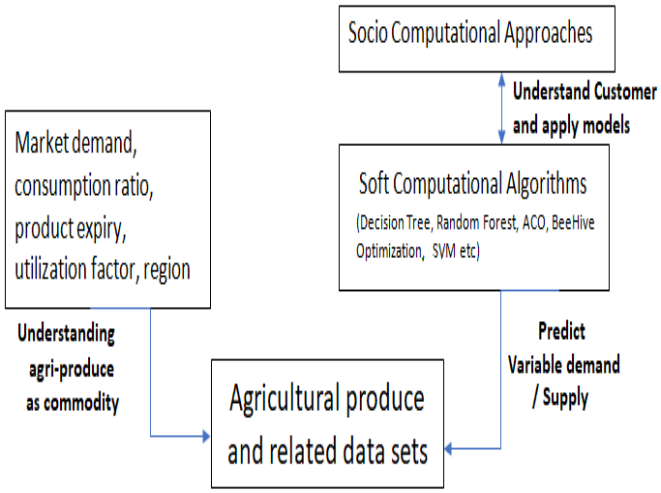

Fig 3. Functionality Flow and Architecture

IV. CONCLUSION

Nature has always been a source of inspiration of mankind. There are many optimization models available for SUPPLY CHAIN MANAGEMENT. According to the supplier and demand location the authors suggest on identifying the parameters and applying the respective algorithm on agricultural produces (Fig-3) to achieve the optimal solutions. Some algorithms are more appropriate for less search space, some are good for larger search spaces. The authors wish to suggest multiple social computational models and soft computational models such be analysed and decide on earlier prediction of demand supply model such that the farming community can be benefitted.

REFERENCES

[1] Arunkumar Thangavelu, N Manoharan, Design and Analysis of an Effective Channel Distribution Approach for Agricultural Commodities using MongoDB, Indian Journal of Science and Technology, Volume 9, Issue 47, 2018

[2] Chandra, R., Iyer, R. S., & Raman, R. (2015). "Enabling organizations to implement smarter, customized social computing platforms by leveraging knowledge flow patterns" *In Journal of Knowledge Management, 19(1), 95-107*

[3] Evans, N.D. (2010), "Application modernization and outsourcing-the adoption of social computing in the enterprise" *In UNISYS, Tech Republic*

[4] Chandra, R., Iyer, R.S. and Raman, R. (2013), "Social computing platforms leveraging knowledge flow patterns" *In ICKM conference proceedings, pp. 29-39.*

[5] W. Mason, J. W. Vaughan, and H. Wallach. (2013). "Computational social science and social computing" *In Journal of Machine Learning, pages 1–4.*

[6] Fei-Yue Wang, Xiaochen Li, Wenji Mao, Tao Wang. (2012). "Social Computing: Methods and Applications" *In Zhejiang University Press, Hangzhou*

[7] X Wang, L Li, Y Yuan, P Ye, FY Wang. (2016). "ACP based social computing and parallel intelligence" *In CAAI Transactions on Intelligence Technology pp 377-393*

[8] Steven J. Jackson, Tarleton Gillespie, and Sandy Payette. (2014). "The policy knot: Re-integrating policy, practice and design in CSCW studies of social computing" *In Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing* (CSCW '14). ACM, New York, NY, USA, pp. 588–602.

[9] Gunasundari Anantharaj, Arunkumar Thangavelu, A Predictive analytical approach towards improving the crop growth yield using fuzzy cognitive maps – CROYAN, IIOAB, Vol. 6,No-4, pgs: 120–130, 2015

[10]Shilton K., Koepfler Jes A., Fleischmann Kenneth R. (2014). "How to see values in social computing: methods for studying values dimensions" *In Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing, February 15-19 2014, Baltimore, Maryland, USA*

[11] Koch M, Schwabe G, Briggs R O. (2015). "CSCW and Social Computing" *In Business and Information Systems Engineering Vol 57 Issue 3 pp 149-153*

[12] Jin R., Zhang H., Zhang Y. (2018). "The Uncertainty problem in Social Computing and its Solution Method" In 2018 International Conference on Robots and Intelligent Systems (ICRIS) pp 517-521

[13] Sakthikumar Subramanian, Arunkumar Thangavelu, FACT-An adaptive customer churn rate prediction method using fuzzy muti-criteria classification approach for decision making, Asian Journal of Science and Technology, Volume-4, Issue-11, pg: 227-233, 2011

[14] Tang M., Zhu H., Mao X. (2015). "A Lightweight social computing approach to emergency management policy selection" *In IEEE Transactions on Systems, Man and Cybernetics 2016 Vol 46 Issue 8*

[15] Yu R., Prakash S. (2017). "Optimized online marketing and scheduling systems and methods that are based on demand driven results" *In US Patent US9741021B2*

[16] Padmanabhan N. (2018). "Online Marketing- Present Scenario" *In International Journal of Scientific Research Vol 7 No 4(2018)*

[17] Susanne Schwarzl and Monika Grabowska. (2015), "Online Marketing Strategies: the future is here" *In Journal of international studies, Volume :8, No.2, pp.187 – 196.*

[18] Wu, J., N. Wen, W. Dou, and J. Chen. (2015). "Exploring the Effectiveness of Consumer Creativity in Online Marketing Communications" *In European Journal of Marketing* 49 (1/2): 262–276.

[19] G Roy, B Datta, R Basu. (2017). "Trends and future directions in online marketing research" *In Journal of Internet Commerce Vol 16 Issue 1*

[20] Bowie D., Paraskevas A., Mariussen A. (2014). "Technology driven online marketing- Lessons from Affiliate Marketing" *International Journal of Online Marketing 4(4)*

[21] Stoliartchouk A., Jordan F., Box B. (2017). "System and method for dynamic management of affiliate links for online marketing" *US Patent US9779425B2*

[22] Ting T., Davis J., Pettit F. (2014). "Online marketing research utilizing sentiment analysis and tunable demographics analysis" US Patent US8694357B2

[23] Mitran A., Negricea C., Edu T. (2014). "Modelling the Influence of Online Marketing Communication on Behavioural Intentions", *Network Intelligence Studies Volume II, 2 (4), 245-253.*

[24] Gurau C. (2008). "Integrated online marketing communication: implementation and management" Journal of communication management Vol 12 Issue 2

