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Use of Predictive Analysis and Artificial Intelligence in Sales Force Automation

Anand Chitanand

Applications Of Artificial Intelligence On E-Commerce Websites

Janhvi Makhija, Adarsh Singh

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Annapurna Lunch Packs - ISO 9000 Case Study

Upendra Lele



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85/1, Law College Road, Erandawane, Pune 411004.

Tel: 020-25431972,25441524

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## Editorial

Data Analytics (DA) and Artificial Intelligence (AI) constitute the latest technological innovations with immense potential for understanding, among other things, human behavior. For business organisations, their application in designing the marketing policy, strategy and processes is of great significance. It is therefore appropriate that this issue should carry five insightful articles explaining the scope and utility of DA and AI application in some important aspects of Marketing .

Chitanand's article discusses the use of predictive analysis in conjunction with sales force automation for field force utilization with the object of increasing sales through optimum utilization of resources.

The paper by Janvi Makhija and Adarsh Singh describes the experience of the e-commerce website of Myntra to conclude that artificial intelligence and machine learning has helped Myntra streamline its customer base for customer engagement.

The later three papers by Jyotinder Kaur Chaddah & Poonam Chauhan, Nitin Tonapi & Mr. Chitanand and Mr. Lele respectively address the impact of data analytics in improving customer loyalty and in-store customer experience in organized retailer outfits, the growing use of sentiment analysis /opinion mining for tracking and predicting customer behavior and the role of quality and standardization in a service Industry for enhanced customer satisfaction.

IndSearch Research Journal, in its mission to promote research appeals to Management Scholars, professionals and students to increasingly pursue relevant research on mainstream management issues of a functionalistic objective and positivistic ethos.

# Use of Predictive Analysis and Artificial Intelligence in Sales Force Automation.

**Anand Chitanand**

Assistant Professor,

Indian Institute of Cost and Management Studies & Research (IndSearch), Pune.

## Abstract

*Significantly large number of companies in the B2C domain have realized the importance of sales force automation in order to effectively utilize the feet-on-street and maximize the sale.*

*The sales force of these companies uses a mobile app for beat planning and management. These apps are either developed by companies in-house or procured from software companies in the market and customized as per the specific need of the company. Majority of the companies are using traditional beat planning methods through these apps. Since the field sales force is always scarce resource, the focus of these apps has been field force utilization.*

*Since these applications generate a significantly large amount of primary data on customer / retailer visits which can be effectively used for a predictive analysis and intelligent information insights to maximize the sales and market penetration. There is a trend to build analytics in the Sales Force Automation application which will help the sales force improve the sales and the company market share.*

*This paper identifies the data points, methods of analysis, interpretations and opportunities for maximizing sales. The focus is shifted from quantity to quality of Beat planning and management.*

## Introduction

A day in the life of a sales person is always hectic. Pick-up the bag early in the morning, take the diary and mobile phone and travel as per the beat route assigned visiting various retailer locations, collecting orders, giving them updates of last orders, sometimes even payment collection and so on ... It is estimated that almost 30% of the daily time is consumed in manual and administrative tasks (Maria Minsker, 2019), which is a substantial time. This sometimes even rises to 50% of the time consumed in manual or administrative tasks.

Many of the companies have moved from pen-and-paper system to a digital application on a handheld device – a mobile phone or a tab in the form of a Sales Force Automation (SFA) software. Lot of manual and administrative tasks have been automated which substantially saves the time of the field salesforce.

The basic forms of applications cover mostly field force management and order management related features such as attendance, beat planning and execution, travel expenses, booking orders, occasionally taking stocks, enrolling new retailers, at times some pictures etc. With the digital processes a lot of data is generated everyday which can be used for valuable information for decision making.

The ultimate aim of the field sales force is to maximize the sales and market share of the company's products. Typical beat management is a laborious and time-consuming activity, especially where the distribution network is well spread out in the rural areas. Companies intend to utilize the time of the field sales force most effectively (Qehaja B. et al., 2016). The scarce resources can be better utilized with the aid of advanced analytics which would help them in focusing at right things at right time. This is where predictive analysis using artificial intelligence can be of significant help.

## Understanding the Challenges

In order to develop a better predictive analysis framework, it is essential to understand the important challenges in front of the field sales force.

In highly competitive B2C markets, the field sales force faces following typical challenges –

- Territory coverage
- Stock outages
- Limited resources
- Limited revenue growth
- Mismatching sales forecast
- Inadequate grassroots visibility
- Lack of real time targets monitoring
- Unexploited product coverage
- Field Force Manageability
- Footprint expansion

In the competitive environment, customers do not wait for the products. Many of the products have been commoditized. For such products brand loyalty is limited as the customers are ready switch to other manufacturer as long as product is available at the right time. Quality and price parameters are no more advantages in the competitive markets. These parameters are almost comparable for all competitive products. Therefore, marketers are focusing on parameters such as customer service, product availability, packaging, delivery etc.

In order to overcome above mentioned challenges, predictive analysis using artificial intelligence comes for the use of marketers. With the help of predictive analysis marketers can strategize and make the best utilization of their field sales force.

## Literature Review

As reported by Jess Gonzalez (2017), Predictive analysis is defined as “A branch of advanced analytics which is used to make predictions about unknown future events. Predictive analytics uses many techniques from data mining, statistics, modeling, machine learning and artificial intelligence to analyze current data to make predictions about the future.”

Salesforce.com explains Predictive Analytics as software programs which enable users to mine large volumes of data to find relations between causes and effects. Predictive analytics uses mainly three models namely – decision trees, regression and neural networks. Decision trees are charts of possible outcomes resulting out of different actions. Regression is a statistical method to find relationship between different variables. Neural networks are complex algorithms reflecting human brain or mind.

Jess Gonzalez (2017) further explains that the patterns can be found in the historical and transactional data which can be used to identify risks and opportunities in the future. Since the data is large in quantity, humanly it is not possible to identify any patterns in the historical data, which is possible through artificial intelligence. Use of Sales Force Automation (SFA) is common among FMCG companies. The frontline sales force is working at the outer boundary of the organization i.e.at the interface of the customer, the empowerment of this force is of extreme importance (Ahearne, M et al., 2005). As stated by Ahearne et al. the empowerment can be given by the senior management. However, such empowerment can be actually leveraged if the sales force is equipped with right information in an intelligent form.

Deloitte Consulting (2018) claim that having a sales predictive model is the first step towards creating a data driven company. Digitalization or automation is half the journey. It is not complete unless a company smartly uses the customer interface data for building and executing the business strategies. Salesforce’s Einstein, which is an AI

application for sales data processing, has features designed to discover insights, predict outcomes, recommend actions and automate tasks (Henschen, 2017) . The artificial intelligence however, can not replace humans but it assists humans to focus on what matters.

Companies have realized value of predictive analysis and therefore, many companies are using it extensively in SFA software. The advances in technologies such as artificial intelligence and machine learning have made predictive analysis more accessible to companies. According to Salesforce, predictive analytics is often used in the CRM software to make predictions regarding analyzing customers' product usage, customers' spending, opportunities for cross-selling, optimizing products, offers, etc.

### **Analyzing Sales Force Automation for Predictive Analytics Opportunities:**

A typical SFA software has following features –

1. New customer enrollment
2. Beat Plans
3. Order Management
4. Update Inventory
5. Perform Survey, Feedbacks
6. Scheme & Campaign management
7. Product catalogs
8. Alerts and Notifications
9. GPS tracking
10. Travel claim reporting
11. Sales Returns
12. Collaboration
13. Broadcast
14. Dashboards
15. Forecast
16. Payments

..... and so on.

Beyond these standard functionalities, the SFA software are getting preference on the basis of power of analytics, ability to integrate with legacy systems and social media, flexibility, customization and management reporting.

Some of the sample analytics presented in one of the software is as shown below –

Figure 1 – Sample graph for monitoring trends

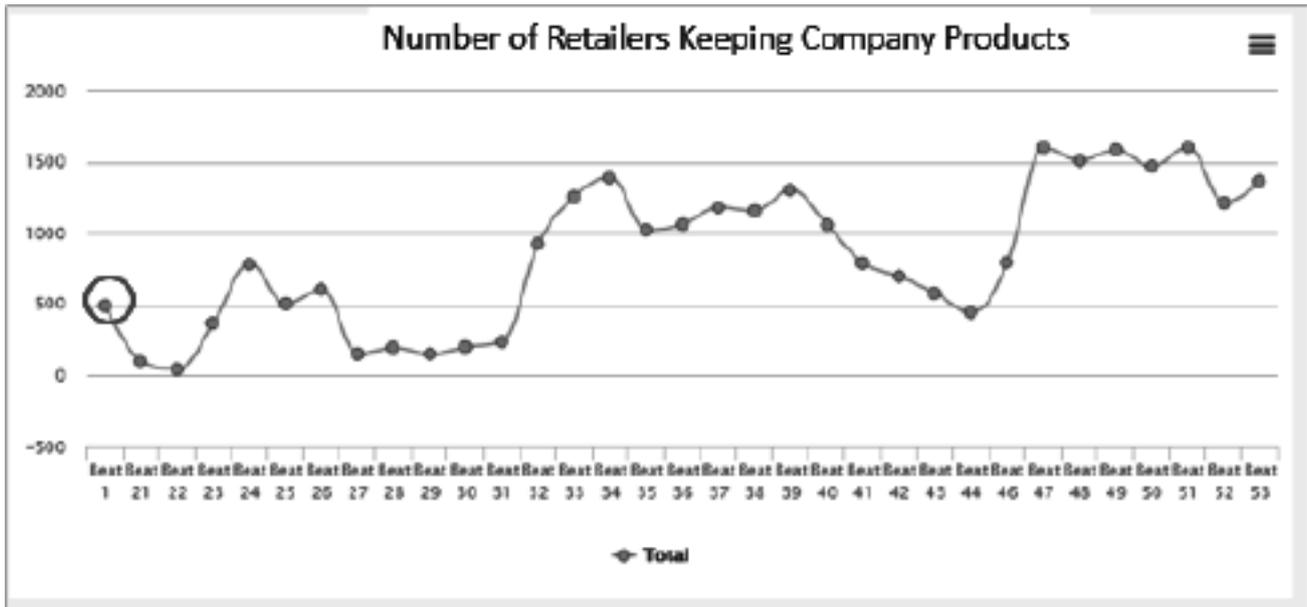


Figure 2 – Sample graph for monitoring trends

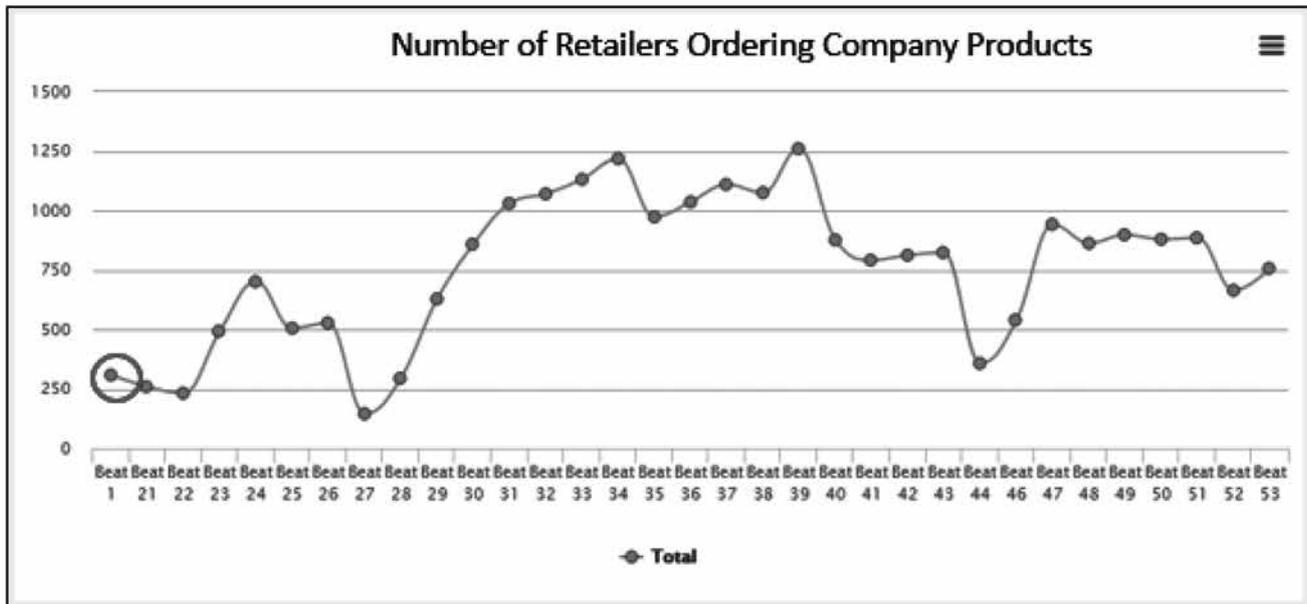


Figure 3 – Sample graph for monitoring trends

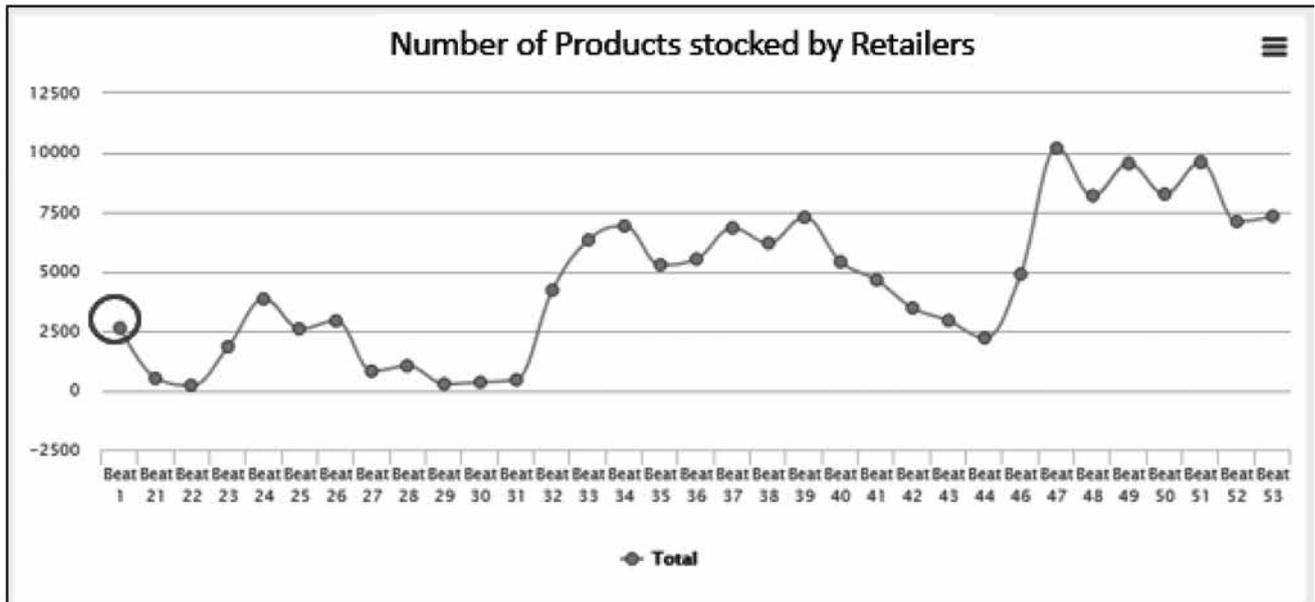
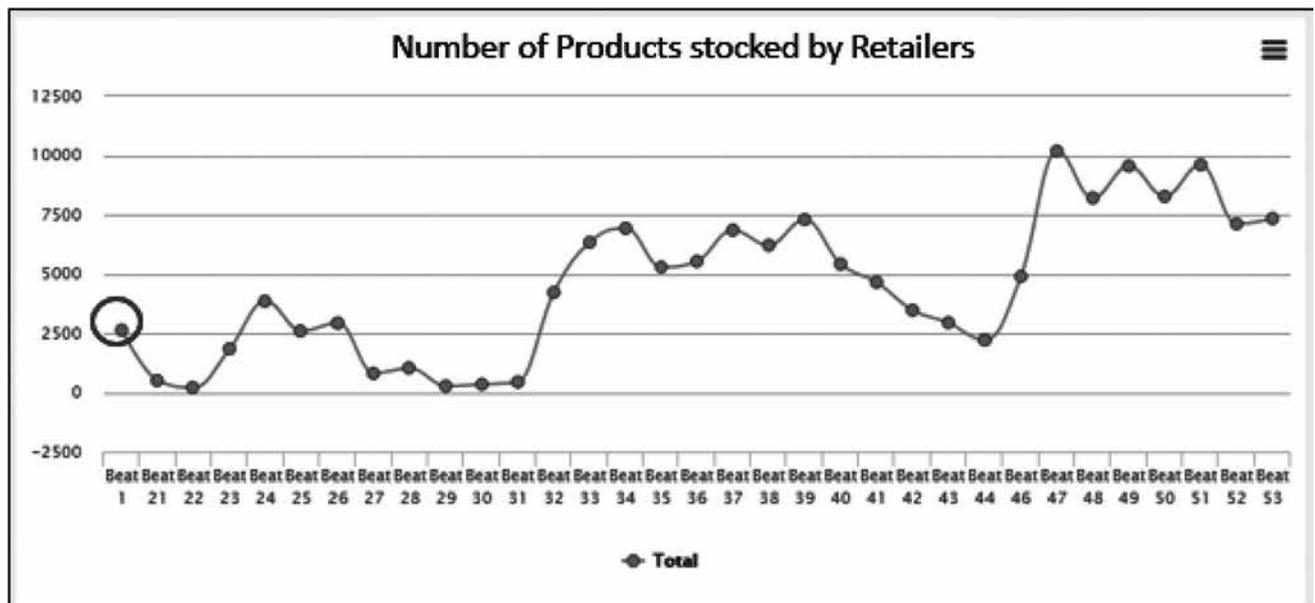


Figure 4 – Sample graph for monitoring trends



Above are sample charts that are monitored by one of the companies. (The point encircled in red is historical reference point, hence highlighted). The parameters are high-level indicators to show if the things are improving or not. For a particular geographical territory –

- More number of retailers should stock company products
- More number of products should be stocked indicating increasing range of products
- More number of retailers should order company's products
- And finally, more lines should get sold every day

## Predictive Analytics

The data generated from the software can be analyzed with the help of statistics and AI tools for deriving intelligent information. The information can be used for tactical as well as strategic purposes. Some of the predictive parameters are listed in the table below –

**Table 1. – Sample Predictive Analysis Parameters**

Predictive Parameter	Data to analyze	Analysis required in SFA app	Benefits
Increase / decrease Beat Frequency	Inventory levels of products at retailer	Repetitive inventory depletion to zero before next beat to suggest increasing beat frequency or increase in inventory level at retailer	Companies can use more scientific method to decide the frequency of visit to a retailer rather than follow one-size-fits-all approach.
Recommend increase in product range	Products kept by other retailers in a geographical territory.	Suggest the retailer to add range of products based on what is being kept and sold at other retailers in the same geography. System to recommend range of products to be stocked at a particular retailer.	Salesman is keen to see that retailer keeps range of company products at the stores.
Order generation	Frequently ordered products by a retailer	During a visit to a retailer, system pops up the list of products stocked. Salesperson enters the stock quantity. Based on the inventory norm decided for each product, an order automatically gets generated. Salesperson needs to verify and submit.	Saves time in populating list of products for a particular retailer.
Stock outs	Product consumption patterns at a particular retailer	The system regularly monitors the consumption patterns of products at a retailer. The application sends an alert to salesperson about likely stock outs at a retailer, if salesperson does not take a new order and the stock is replenished. This analysis will require Order Management system integration with SFA software.	A proactive alert for the salesperson to check with a retailer if there are any stock outs.
Heat Maps	Density of retail outlets in a geographical map	Identify scarce and dense retail outlet territories and suggest increasing / decreasing retailer density	Increase in the 'Reach'.
Seasonality impacts	Seasonal consumption trends for different periods	System compares sales trends of previous month, previous quarter or previous year and suggests increase in stocks or orders for a specific retailer.	
System automatically recommends seasonal products to be included in order e.g. umbrellas, rain-coats, caps etc. at the beginning of rainy season.	Avoids manual assessment of seasonality.		
Matching products	Sales / order data of matching or paired products.	Correlate the sales / order data of paired or matching products and show mismatches. For example, in case of an automotive spares retailer, if Pistons are getting sold but Piston Rings are not sold in proportionate numbers. This means customers are buying piston rings of other manufacturers.	Ensuring the market share of products.

## Conclusions

Sales Force Automation software improves field force utilization. The predictive analytics makes the application smarter and helps organizations to improve sales by improving the availability of products at the retailers. Predictive analysis improves –

- People utilization
- Product stocks at retailers
- The product range at retailers
- Company's reach
- Product availability

The field of AI is evolving. The integration of SFA with full-fledged CRM systems social media further can add intelligence in to the SFA and make the use of SFA even smarter.

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# Applications Of Artificial Intelligence On E-Commerce Websites.

Case study: MYNTRA APP

Janvi Makhija from TY.BAF. and Adarsh Singh from TY.BSC.IT

**College:** B.K. Birla of Arts, Science and Commerce, Kalyan (West).

Vidyalankar School of Information Technology, Wadala (East).

## Abstract

**Introduction:** Artificial Intelligence is diverse from computer science because it mainly focuses on actions, recognition, reasoning. Artificial Intelligence is providing them with the ability to think like humans. Generally, e-commerce is mentioned as electronic commerce where the trading- buying, and selling of products and services takes place. E-commerce cannot be only trading; it is also transferring of funds and exchange of data through an electronic network. It is primarily connected with the different tasks such as- delivery of the product, managing various services, transactions of payments, maintaining the supply chain. An Indian e-trade website- Myntra.com, designs a lifestyle and casual items. In the year 2010, the B2B model of Myntra.com shifted itself towards web retailing of branded clothes. In May 2015, Myntra.com shut the web and converted itself into a mobile application. At first, the move saw a 10% decrease in sales, but then the whole attention was received by the Myntra app.

**Purpose:** The purpose of this study was to understand the techniques of AI in the E-commerce world. In E-commerce trading, we targeted the popular Indian clothing app- Myntra. The study also explains the increasing importance of e-commerce with the help of Artificial Intelligence. The study sought an explanation of how the subject of Artificial Intelligence is helping the Indian e-commerce market to boost its productivity level.

**Research objective:** To understand the trends of AI used by Myntra app to increase the consumer enhancement. To evaluate the reasons for Myntra app being a customer preferred clothing application.

**Research design:** The study is descriptive. It is based on primary data collected via questionnaire. The questionnaire concentrated on AI techniques such as visual search, data analytics, pattern recognition, video content, augmented reality. 152 respondents were considered for a research study from Mumbai suburbs. The data was analysed to study applications of AI used by the Myntra app, depending on numerous parameters.

**Findings:** The study revealed that Artificial Intelligence has a significant effect on e-commerce businesses. The AI revolution in the field of e-commerce will create a lot of new researches related to machine learning, data mining, data science. AI is helping the Myntra app in various ways, which has only one target- "customer enhancement." AI helps Myntra to concentrate on the cost-saving term. The technique of Augmented reality is helping people to understand the real concept of products, and other than Myntra, no separate e-commerce app is using that technique.

**Implications:** As the e-commerce industry is bringing up new and new AI processes to their service. So, further research on the procedures is possible to know about their unique ways of tackling things, as these AI techniques are helping the Myntra app to target increment in sales.

**Limitations:** As we collected 152 respondents, the study was sample bias; the study had limited time and space. We couldn't be able to directly interrogate the employees of the Myntra app, as e-commerce developers were considered as respondents.

**Keywords:** Myntra app, Artificial Intelligence, customers, e-commerce, product.

## Introduction

The term Artificial Intelligence is a broad area of science which is allowing humans to make machines and computer programs intelligent. Artificial Intelligence is diverse from computer science because it mainly focuses on actions, recognition, reasoning. The presence of Artificial Intelligence is to develop machines and software as intelligent as humans. Artificial Intelligence is providing them with the ability to think like humans. It uses a variety of disciplines offered by technology and science such as- psychology, computer science, mathematics, engineering, linguistics. AI helps companies to make quicker decisions and compete with the hustle competition of the world. Assumptions say that more than 85% of the interactions with customers will be handled without humans by 2025. (Kakkar & Monga, 2017)

E-commerce is a broad term, which cannot be defined under a statement. Generally, e-commerce is mentioned as electronic commerce where the trading- buying and selling of products and services takes place. E-commerce cannot be only trading; it is also transferring of funds and exchange of data through an electronic network. It is primarily connected with the different tasks such as- delivery of the product, managing various services, transactions of payments, maintaining the supply chain. It is a service provided online over the internet. Online business is growing with the help of e-commerce. The word "online business" includes online trading, online sales, online services, online promotions, electronic billing, online payments. (Anuj, Fayaz, & Kapoor, 2018)



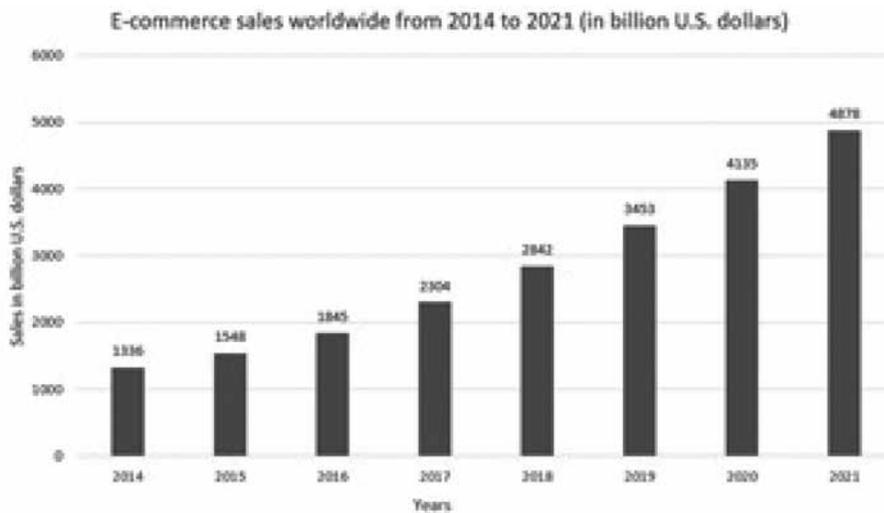
An Indian e-trade website- Myntra.com, designs a lifestyle and casual items. The headquarter is situated in Bangalore built by Mukesh Bansal in the year 2007. In the starting, it uses to work as B2B- business between two companies. In the year 2010, the B2B model of Myntra.com shifted itself towards web retailing of branded clothes. In 2011, Myntra moved far from personalization stage, moved towards incorporate styles of casual items. It tied up hands with a lot of new brands to keep recent trends with a different variety. By 2012, Myntra offered almost 350 brands of India and other international brands. It was offering easygoing wear to men and women. In June 2013, Amazon entered the market, to face the competition, Myntra.com converged with the Flipkart in 2014. In the same year, it had almost 1000 brands which included international brands, designer brands and portfolio of 1,50,000 items. So finally, in May 2015, Myntra.com shut the web and converted itself into a mobile application. At first, the move saw a 10% decrease in sales, but then the whole attention was received by the Myntra app. Even experts got divided over this move. (Roy & Telang, 2018)

## Objectives

- To study the applications of Artificial Intelligence in Myntra app.
- To understand the trends of AI used to increase the productivity of Myntra app.
- To evaluate the reasons for Myntra app being a customer preferred clothing application.
- To suggest opinions regarding the e-commerce competition.

## Purpose of the study

The purpose of this study was to understand the techniques of AI in the E-commerce world. In E-commerce trading we targeted the famous Indian clothing app- Myntra. The study also explains the increasing importance of e-commerce with the help of Artificial Intelligence.



Source: eMarketer statista 2018.

In 2018, a survey was conducted by eMarketer statista, the changes in sales of e-commerce trading has been seen and it is because of techniques of AI and its applications. The survey also predicted the approximate sales of year 2021 which is totally based on same pattern in data.

The study sought explanation of how the subject Artificial Intelligence is helping Indian e-commerce market to boost their productivity level.

## Research design

To scrutinize the parameters of Artificial Intelligence used by Myntra, the study was conducted. The research design was descriptive in nature. The survey related to the study was based on the samples of 152 respondents. These respondents are e-commerce website developers, AI developers and general public. Google form was used as the research instrument to collect the data. Apart from primary data, secondary data was taken to study the relevancy of the articles, e-journals, reports, etc., towards Artificial Intelligence and Myntra mobile application.

## Review of Literature

- According to Pannu, *Artificial Intelligence* provides ability to machines to think analytically. From last 2 decades, AI techniques have been contributing to various areas and it is forecasted that AI is going to play increasingly major role in different fields. AI helps to recognize the environment and take actions successfully. (Pannu, 2015)
- Anuj, Fayaz, and Kapoor states that *e-commerce* industry is significant currently in this world. And likewise, in India, e-commerce is growing trend and is one of the highest growing business. India is having investment potential which is supporting the e-commerce trade. (Anuj, Fayaz, & Kapoor, 2018)
- Das, Dey, Pal, and Roy in their paper states that *Machine Learning* is an area that allows computers to learn without being explicitly programmed. It is a field which had grown out the subject Artificial Intelligence. Machine learning is the important area as it allows machines to have human intelligence. Machine learning is a part of AI which derives different techniques. (Das, Dey, Pal, & Roy, 2015)
- Pasha, and Bal says that the new technology of *visual search* is used by e-commerce websites to search a similar product online by uploading an image. Visual search is an AI technique which improves the advancement of search for customers. It is different from normal search; visualization search satisfies the customer expectations in a better way. (Pasha & Bal, 2017)

- According to Seema, and Rajeshwar *pattern recognition* should be stated as classification. Pattern recognition decides the category of new data. This new data is developed on basis of previous knowledge available. The performance of pattern recognition techniques is mainly dominated by 3 elements: 1. The amount of data available. 2. The technology or method used. 3. The person who is using it (user). Pattern recognition becomes challenging because of massive amounts of data. (Asht & Dass, 2012)
- According to Akter, and Wamba *data analytics* is providing value to ecommerce. Data analytics is helping e-commerce in different ways such as- data analytics needs identification to recognize the category of the user, data analytics helps to improve the performance, it also supports to make logical decisions without disappointing any party, it also creates transparency between customer and seller, helps to decide for new product or service. Data analytics is used by many different e-commerce websites and in many different ways. (Akter & Wamba, 2016)
- *Augmented Reality* is a technology that supports the computer graphics on the real world. According to economic-times, in December 2017, published about Myntra app trying to involve Augmented Reality (AR) to enhance connections with customers. It stated that the feature uses camera of the phone and helps to point out (AR enabled) cloth which the person wants to try. This method converts the design into real life. The article was published in 2017 and Myntra proved its words by installing the AR technique in 2019.
- According to Business Standard, on September 2019, stated that Myntra is investing more in *video content* to enhance customer experience and say that video content can explain more about the product. Myntra has already started working on video content with designers and influencers which will help customers to be updated with latest trends, says Flipkart Group Company. The app has almost one-third of catalogue with video content.
- Economic times in the year 2018, states about Myntra launching a loyalty program named as “Myntra Insider”. This loyalty program has a lot to offer to customers. Customers will earn Insider points and use those points in different ways. One of the ways for using these coins is having a *fashion assistant* which will help the person to choose trendy products. As in 2019, the loyalty program “Myntra Insider” has be accomplished successfully and has been loved by customers.
- In Forrester’s *Customer Experience* Index (CX Index) India rankings 2019, Flipkart- the parent company of Myntra app ranked 1st in digital retailer’s category. (The myntra.com was acquired by Flipkart in May 2014.) The survey was based on more than 10,000 customers in India. In the list of digital retailers’ category, from almost 10 points Flipkart has been improved. In year 2018, it was on the rank of 4th; beating out other digital retailers Flipkart acquired top spot in year 2019.

## Applications Of These Techniques Of Ai In Myntra App

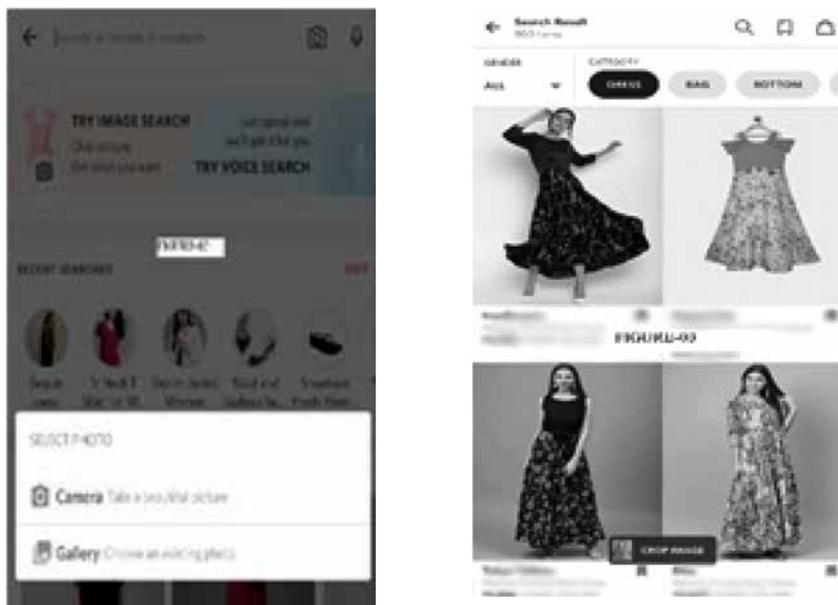
**Visual search:** Myntra app uses this technique in the following steps- Myntra visual search allows you to find similar



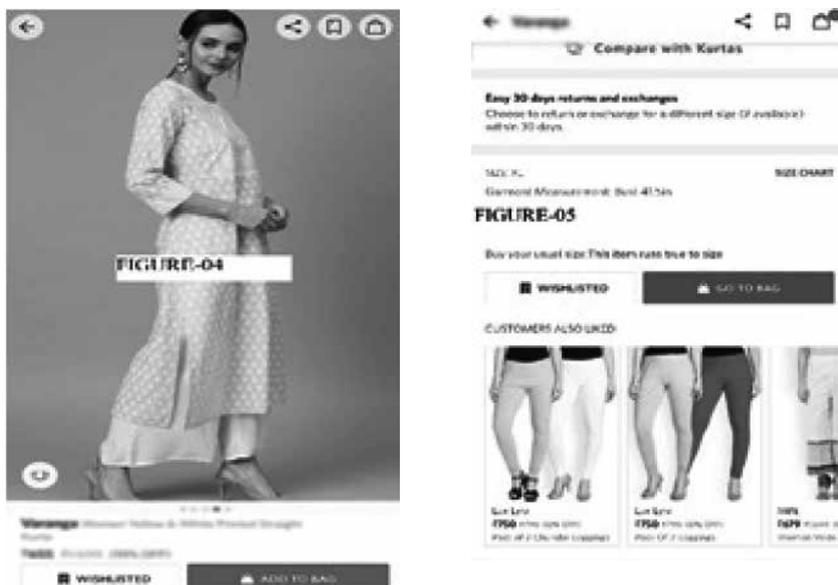
products which you desire to purchase. In the figure-01, there is a search menu bar, on that bar there is a sign of camera. To use the visual search option first you need to click on it.

In the figure-02, after clicking the camera option, two new option arrive on the screen, these options allow you to select the picture or take the picture of your chosen product. In the figure-03, (we tried to search a skirt to refer as

an example.) the results are on the screen. The app serves you the similar or sometimes even same product to what we search. Even it allows you to crop the product image to find exactly what we want.



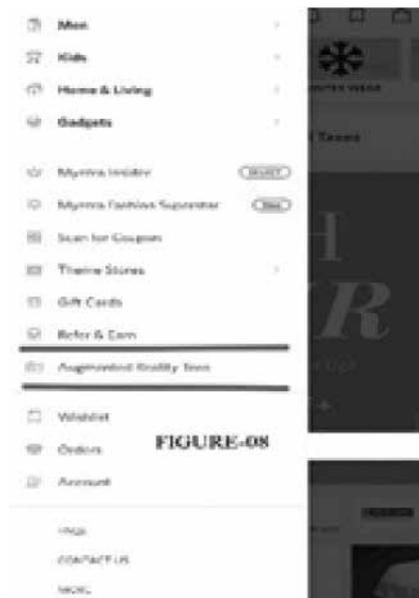
**Pattern recognition:** Pattern recognition is used to understand the pattern of any customer. The pattern here refers to buying pattern, or can be said as buying pairs. (An example has taken of a pair- kurti and pants) If a customer has a previous record of buying a kurti and pants together; so, the data pattern will be recorded and every time customer views a kurti, an option of pants will be reflected in suggestions below the product. It is clearly seen in figure-04 and figure-05.



**Data analytics:** Data analytics refers to helping out the e-commerce website to decide about different things. (It helps in many other ways too.) Here, we have taken an example into consideration about a customer who has been looking into a particular category (dress) again and again. The data catches the buyer's behavior towards that category and his buying behavior as well. So here we are trying to explain about a dress whose price has been reduced by 5%. (In figure-06 is INR 769/- and in figure-07 its INR 699/-) This happened because of data analytics. It is not necessary that price may fall every time. viewing any item again and again may lead to increment in the price. It depends upon data analytics.



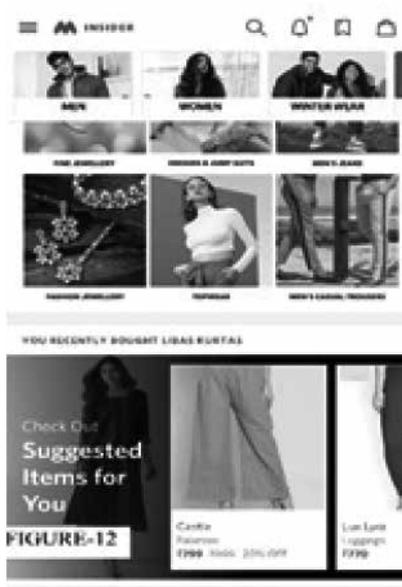
**Augmented Reality:** It is a technique which help people to take a glance of real world and this allows any person to make better buying decision regarding the product. Myntra allows its customers to take benefit of this technique. As seen in figure-08, the app has an option for AR. After clicking at that option, just like shown in figure-09 it appears on the screen. And by just clicking the “explore” option, customer get chance to use the Augmented Reality technique.



**Video content:** From the name itself it is clear; video content is a technique which allows the customer to view the product in a form of video from 360 degree. Myntra has been using this technique from the start itself apart from other applications. In figure-10, it is seen that a video icon is there with all the images for the product. In figure-11, the seconds of the video is shown and here we are trying to show that how video content looks like.



**Fashion assistant:** Fashion assistant refers to assisting or suggesting the products to customers according to their buying behavior. As in figure-12, a customer having a buying behavior towards ethnic wears. He/she will get suggestions of ethnic wears for their last purchase or for future purchase. Myntra allows its consumers to have this assistance for free and focuses more on their choices with the help of this technique.



## Data Analysis

1. **ANOVA:** The ANOVA analysis is used to test the significance of the category with seven variables related to techniques of AI used by Myntra app.

The category has four professions-

- AI developer (in any industrial work)
- AI developer (freelancer)
- E-commerce website/application developer (in any industrial work)
- E-commerce website/application developer (freelancer)

**NULL HYPOTHESIS (H0):** The section of category doesn't influence the techniques of Artificial intelligence used by Myntra app.

**ALTERNATIVE HYPOTHESIS (H1):** The section of category does influence the techniques of Artificial intelligence used by Myntra app.

Source of Variation	SS	df	ANOVA			P-value	F crit
			MS	F			
Between Groups	270.9455446	7	38.70650636	74.49587238	0.000	2.021007685	
Within Groups	415.6633663	800	0.519579208				
<b>Total</b>	<b>686.6089109</b>	<b>807</b>					

**SOURCE: Primary data:** S – Significant at 5% level (p value ≤ 0.05); NS – Not Significant at 5% level (p value > 0.05).

So that we reject the null hypothesis and accept the alternative hypothesis

It is found from the table above that the null hypothesis is rejected. It means that the category does influence the techniques of AI used by Myntra app.

2. **AVERAGE SCORE:** The Average score analysis is mainly used in any study is to assess the level of opinion of the different category of respondents on the various aspects relating to the study.

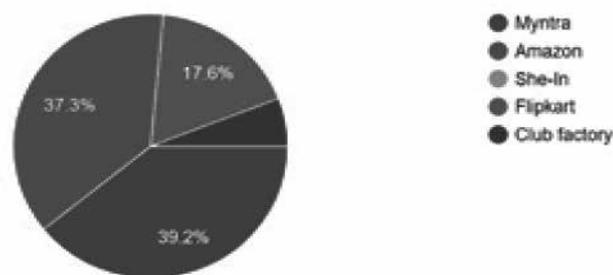
V no.	Average score analysis				Total
	0-2 years	2-4 years	4-6 years	6 and above years	
v1	→ 3.94	→ 3.67	→ 4	→ 3.8	↓ 3.18
v2	→ 3.5	→ 3.29	↓ 2.89	→ 3.4	→ 3.52
v3	→ 3.36	→ 3.47	→ 3.33	→ 3.6	→ 3.38
v4	↓ 2.75	↓ 2.71	↓ 2.44	↓ 2.6	↓ 2.61
v5	↑ 4.31	↑ 4.47	→ 4	→ 3.6	↑ 4.32
v6	→ 3.39	↓ 3.04	↓ 2.67	↑ 4.8	↓ 3.07
v7	→ 3.64	↓ 2.82	↓ 3.11	→ 3.6	↓ 3.05

Source: Primary data. Experience wise average score analysis.

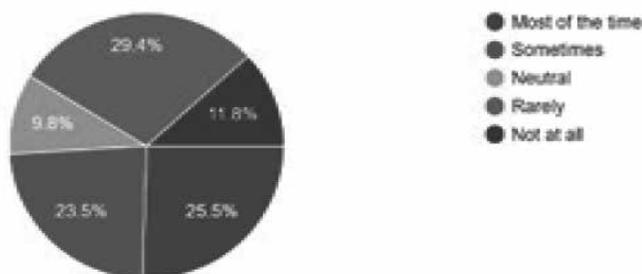
- According to the primary data, from the view of experienced people, the variable-4 i.e. data analytics don't majorly affect on the buyer's perception and data analytics at some extent help the Myntra application to decide things.
- The new technology of Augmented Reality- variable 5, has created good impact on the minds of respondents as they highly agree with the it. They highly agree that AR is going to the change the market and the online shopping perception of public.
- Respondents with the experience of 6 and above years says highly agree with the statement that video content (variable 6) will replace the form of images in near future. Apart from that, people with 0-2 years, 2-4 years, experience disagree with the statement.
- From the primary data, it is noticed that people disagree with the variable 7 i.e. fashion assistant.

## Findings

1. From the primary data collected, it is seen that Myntra has been popular among the customers and has been used by them on frequent bases. (From the following pie chart.)
2. It is also noticed that Amazon is a big competitor to Myntra, as seen in the pie chart. Myntra is known almost 39.2% and amazon is for 37.3%.
3. It is found that machine learning allows Myntra to grow in all the fields and supports to enhance its customer base.



4. As no other application (such as- Amazon) is using the feature of visual search, only myntra uses it. It has been loved by the customers. Consumers agree that it helps and enhances the shopping experience.
5. From the following survey conducted, it was found that almost 49% of the people use the Myntra app. (25.5% most of the time and 23.5% sometimes.) There are 9.8% people who agree with the usage of Myntra app neutrally.



6. Almost 27% people highly agree and 64% people agree that pattern recognition increases the prediction accuracy and helps Myntra to decide things for its customers.
7. From the primary data, it is found that 37.6% of people highly agree and 55.4% of people agree with the data analytics helping Myntra to decide the decisions regarding different needs and bases of the market.
8. 92% of people highly agree and agree with the statement that Augmented Reality is going to change the E-commerce market and it will bring drastic changes for Myntra as well.
9. 77% of the people think that video content is going to replace the form of images in near future, but 22.8% of people don't agree with that; they think the form of images is important as well as video content.
10. 19.6% of people highly agree and 45.1% agree that Myntra genuinely considers the customer feedback towards everything; 27.5% have neutral response towards it and 7.8% of people disagree with the statement. No person highly disagrees with the statement. (From the following pie chart.)

## Implications

The application of research work is as follows:

- Augmented Reality (AR) is going to change the e-commerce industry drastically.
- Fashion Assistance can be improved which can help Myntra to enhance and engage the customers more into it.
- Data Analytics in e-commerce industry and it helps to take the decisions.
- Pattern Recognition Algorithms and its methods to predict the consumer behavior.
- AI techniques are helping the Myntra app to target increment in sales.

## Limitations

The research work is time bias; the work would have been more technical if we would have got more time. 152 respondents were taken as sample and on the bases of sample, the findings and results are assumed for the whole population; the research is sample bias. The research is also cost and space bias. We couldn't be able to directly interrogate the employees of the Myntra app, as e-commerce developers were considered as respondents.

## Conclusion

This research paper comprises the analysis of techniques of AI used by Myntra app. It is noticed that Artificial intelligence has helped Myntra a lot in many ways to grow in different fields. Using Pattern Recognition and Data Analytics, Myntra has concentrated on customers and enhancement of the application. As data analytics helped Myntra to take decisions regarding different things and pattern recognition helped Myntra to know more about its customers and to provide them in best manner. The very new technology of Augmented Reality (AR) is going to help Myntra to reach the extreme point and no other e-commerce application is having this technology for their customers; Myntra introduced it in year 2019 and it has ruled on the hearts of the buyers.

Myntra has tried every possible way to impress the consumers and to satisfy them, such as the technique of visual search; it is no where promoted but always loved by the buyers because it helps them to find out not exact but almost similar product and again no other e-commerce website/ application uses this AI technique. Even to increase the productivity of producing fashion clothes, Myntra is using Artificial Intelligence which is not only saving money but also time.

So, in a nutshell, Myntra is using AI in its best to increase the efforts of the production, to serve the trendy and latest fashion to the buyers and to drop perfect impression in the minds of people with new and innovative AI techniques. Myntra knows AI very well and using it, in its all possible manner.

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# Evaluate Impact Of New Data Sources And Data Analytics To Improve Customer Loyalty And In Store Experience Among Organized Retailers In Mumbai

**Dr. Jyotinder Kaur Chaddah,**

Faculty (Marketing), Guru Nanak Institute Of Management Studies, Mumbai.

**Dr. Poonam Chauhan,**

Faculty (Marketing), KJ Somaiya Institute Of Management Studies and Research, Mumbai. Phone: 9820735187.  
poonam@somaiya.edu

## Abstract

*Data is an asset for any retailer. Modern trade or Organised Retail gives opportunity to work with many petabytes of data as it collects customer transactions data by the minute. Customers today interact with retailers through multiple touch points — mobile, social media, stores, e-commerce sites. This has created challenges for retailers who are grappling with complex and diverse data that is concurrently analysed to get customer insight to make informed decisions for improving business operations.*

## Keywords

Data Analytics, Data Integration, Data Sources, Customer Experience, Customer Loyalty.

## Purpose of Study

The research reported in this paper investigates new data sources impacting decision making in retail applications. Based on primary research, it examines the opportunities and possibilities arising from new data sources in retailing, particularly integration of on- line and off-line channels. The researchers explored usage of data analytics guiding retailers overcome customer loyalty challenges towards the retail brand and how retailers are working on personalizing in-store experience for their customers thereby creating an advantage for retailers.

## Implication

With multiple channels of sale, new consumer friendly offers to motivate purchase and declining customer loyalty, retailers are trying to come up with different strategies to improve both customer traffic and customer loyalty by mining petabytes of data collected through different customer touch points. Continuing this note, Retailers are using Data analytics to discover valuable customer insights and turning this knowledge into loyalty inducing initiatives and improving in store strategies to cater to individual customer needs. Usage of Analytics is the key to achieve the aforementioned objectives.

There are highly subjective judgments about capabilities of new technology. The researchers found that Indian retailers till recently had a sluggish approach to adopting Analytics. They are not using it at every level and the scale of (Data Analytics) implementation is restricted. Cultural, economic and technological reasons are behind slow adoption of Data Analytics.

The research work provides a view into the future of retail as it leverages New Data Sources with associated market outlook for Retail industry in India.

This study was undertaken to gain clarity on use of data analytics by retailer for making informed decisions for enhancing customer loyalty and in store experience. Based on preceding discussion following questions were offered for examination:

1. Using data analytics, is the retailer able to improve the customer loyalty towards the retail brand?
2. Has the retailer worked on personalizing in-store experience for the customer using data analytics?

## Methodology

The researchers interviewed 80 middle level store employees across organized retail stores in apparel, footwear, groceries, white goods and electronics in the city of Mumbai to understand different and new touch points of data collection and subsequent usage of Data Analytics by them to provide consistent information, improve customer loyalty and seamless experience for the consumer.

The researchers collected qualitative data using long interview method. They procured information on different channels of acquiring customer data and subsequent processing of the same. This research work is used to gain insight on operational and strategic use of data by retailers to drive conversion rate and personalizing in store experience.

One –on- One meeting was requested in the store premises, where semi structured questionnaire was administered. Each interview lasted approximately 45 minutes. Inter rater reliability of responses is 80%.

## Literature Review

### New Data Sources

Unconventional sources of data like social media and surveillance video are being used to study customer preference patterns for suitable product placement and promotions in the store. (Verma, N., & Singh, J. 2017). In the emerging e-commerce business model IoT would expand its scope by linking people, smart devices and objects generating data on brand performance and customer engagements. (Johnson, J.E., 2012).

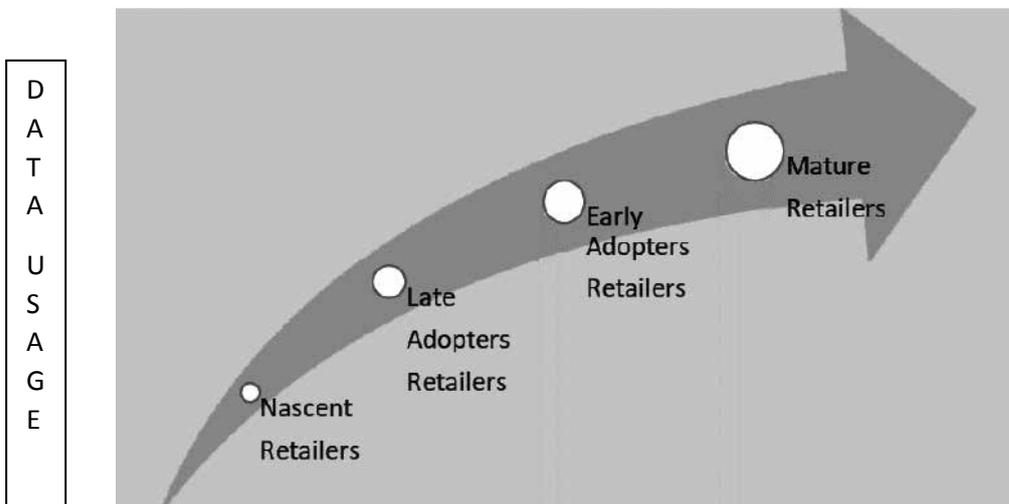
### On-line and Off-Line integration of Data

Huge volume of data is captured through CRM and site analytics about customers. The challenge is to combine the data into one platform for actionable insights.

The Study on customer shopping behaviour found that retail sales are not significantly cannibalized by on line sales. The firm's internet activities develop long term on-line equity. (Biyalogorsky, E., & Naik, P, 2003).

## Findings

A frequency of Data Usage-Customer Engagement Matrix has been developed. Detailed list of characteristics of each has been specified for each. Here the retailers have been grouped as Nascent, Late Adopters, Early Adopters and Mature based on their frequency of data usage and subsequent customer engagement.



Based on Judgement Sample Primary Data is presented below

Quotes of respondents	Theme	Important words	Strength of relationship	Reference
<ul style="list-style-type: none"> <li>• `Data Analytics has ensured customization is brought to production and marketing`</li> </ul>	Process, usage	Customization, production and marketing	Strong	Verma, N., & Singh, J. 2017
<ul style="list-style-type: none"> <li>• `Analytics helps keep customers engaged with the offers thus contributing to customer loyalty`</li> <li>• `Stock is kept according to the purchase insight sought through Data Analytics which leads to customer loyalty`</li> </ul>	Customer loyalty	Engaged, customer loyalty.  Purchase insights, customer loyalty	Strong.	Lu.L. and Chang, H., 2018-09-06 Malhotra and Rishi, 2016a.b)
<ul style="list-style-type: none"> <li>• Facebook and social media analytics helps to segment followers based on age, gender and interests. This is used to focus advertisement products to specific target group.</li> <li>• Data is tracked at every purchase</li> </ul>	Social Media, technology	Segmentation, advertising to Focus TG	Strong	Johnson, J.E., 2012

• **Data is tracked at every purchase**

Traditional Source to New sources of Data

Moving on from the traditional approach of collecting data through loyalty cards and studying the purchase history, the major new data sources where analytics is applied include Twitter, Instagram, You Tube, Facebook, Interactive screens in the outlet and Corporate website. Moreover the data is integrated. There is no one reliable source of Data. The website is not just used to display services and products and fresh stock, it also gives retailer its client profile.

**Usage of collected Data**

**Date of Birth**

Date of birth is used for pitching offers and discounts on their birthdays.

**Age and Gender**

Age and Gender helps to pitch the right offer. For example, a female is given offer on female sportswear with a discount code and select males are given offers on male sportswear.

### **Specific sports interest (If mentioned on the profile)**

This information helps them to pitch the right product of a particular sport to the right TG.

### **Profession**

If the profession is mentioned as Coach, trainer, gym trainer etc. these customers are offered commission and special discounts to promote their products in bulk.

**Data sources are used for further data analysis through which customization is brought to the product and marketing which enhances both customer loyalty and in store experience of the customer.**

### **Influence on collection and range of merchandise in the outlets.**

Leading Apparel retailer Raymond uses the data from Facebook and Instagram to keep the stock of particular colour in a season. If a pattern is recognized or shade of a colour is getting more likes, shares then this colour is kept in more quantity across the stores from where the customer data is captured.

Further, in many retail stores the data is encrypted and secured through DMS software. And this data is tracked at the every purchase and if the customer is searching on website with the same registered mobile number. Email are sent to them about the availability of the shirts or trousers in their nearby store.

Continuing on the same note, many retailers have confirmed that **data driven customer insights has helped in:**

### **Analysing New Data Sources helps in**

- Improving conversion rate
- Personalizing campaigns to increase revenues
- Reduce customer acquisition cost
- Take corrective marketing decision
- Getting the Right product to the Right Store
- Getting closer to the customer
- Faster Decision Making process.
- Avoiding customer attrition

### **Enhanced consumer engagement due to accessibility and processing of data.**

Acquired data when processed helps the store to keep the customer engaged by sending (them) different messages on festivals about special offers and discounts. Messages about the new arrivals, customised offers ,messages to redeem their points before the expiry. which keep the customer loyalty intact and lowers the retention cost. And most importantly helps boost the sales.

## **Retailers use Technology to personalise in- store experience for the customer.**

In many organised Retail stores after customers complete the purchase they are likely to get a feedback message in which they need to rate the in-store experience. If they rate less than accepted or benchmark rating, the store manager or someone from the CRM team personally call that customer, to enquire about the reason for low rating and relevant changes are made in the store.

To make the process robust, retailers are today taking feedback every time, a customer enters the store. Further the data is updated every time the customer visits. A standardized procedure is implemented in many chain of stores. Data is used to send emails to the local customers. Personalized emails are sent which contains the offers, new arrival and stock availability.

**In modern trade, retailers who are early adopters of technology send the data collected at their outlets to the corporate office in real time or at the earliest.** The CRM team analyse the data, check if it matches with the social media data/customer data on the ecommerce site. In case of many late adopters of Technology, If a customer shops online (keeps the product in his/her shopping cart) and checks the product offline too, to cater to this scenario the retailer than gives the consumer a special code which he/she can use it in the nearby outlet. This is another step in customer conversion.

Assists in Marketing Decisions: The information collected in the data is encrypted and used whenever necessary to generate reports to take corrective marketing decisions.

Software like Data Pine help retailers analyse the pattern of the customer purchase and the category of merchandise they have purchased. So, when there are discounts on products which are relevant to the customers, messages are sent to the phone number provided. This improves in sending relevant communication to the right target audience, which impacts customer loyalty and improves sales

Software used for storing the data generates a report every end of the month. This includes the following.

- Frequent customers
- Highest spending customers
- Highest selling product and many more insights.

From this report high value customers are identified and targeted.

Data Analytics especially among Mature and early adopters of Technology may lead to a conversion rate of up to 20%. Further, It does help to keep the customer engaged with the offers.

Facebook analytics helps to give the followers segmentation based on age, gender and interests. This data is then used to further advertise the product to the specific target group. Facebook ads are much cheaper, and the reach is more specific: Leading to higher conversion rate.

## **Outsourcing Data Analysis**

It is observed that in case of many new entrants to Data Analysis, at Present the data handling and data analysis is outsourced to the different agencies who convert raw data into business intelligence, After hiring the Agency and using the data analytics, frequency of the customers increased due to constant engagement. #batafashionweek which was an Instagram and Facebook campaign increased the conversion rates due to contests and giveaways.

## **Software Used**

A simplified EDM software is used by many retailers in which the store manager or category head can also access to send communication to customers in 5 kilometre radius. For example, in a particular outlet when the Rainy season sale was going on, special discounts codes were sent to the nearby customers.

## Data Processing at local, Regional or Head Quarters

Though Data is collected at store level but it could be processed and synthesised at local, regional or head quarter level and then business intelligence is used to come up with marketing plan according to store location.

After hiring the Agency and using the data analytics, frequency of the customers have increases due to constant engagement. Specially the #batafashionweek which is an Instagram and Facebook campaign have increased the conversion rates due to contests and giveaways.

After customers purchase a merchandise or use a service, they receive a link to obtain a feedback. If ratings are low than the customers are called by CRM team to enquire about the bad experience or any issue. This is a good opportunity to improve any short comings in their system and process.

## Limitations

- This study included off line and physical stores only. Similar study could be extended to online stores as well.
- The study was carried out in the city of Mumbai and neighboring areas only.

## Conclusion

It will take time before data analytics will find its rightful place in Organised Retail in India. Motivated by start-up firms using Analytics, many recognised and reputed retailers are now adopting technology efficiently. The biggest challenge faced by organised retailer is creating a well-oiled and agile IT systems that can capture dynamic data and respond to it in right time. Smartphones and in store interactive devices have resulted in robust touch points of Data collection and customer engagement. Collection of mixed data including text, image, and location based inputs of retail stores has facilitated retailers in identifying new strategies and marketing plan for their customers, improving in store experiences, conversions and enhanced customer loyalty.

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# Sentiment Data Analysis To Predict Customer Behavior

**Nitin Tonapi,**  
Vice President Accenture

**Anand Chitanand,**  
Assistant Professor  
Indian Institute of Cost and Management Studies & Research (IndSearch), Pune

## Abstract

*To succeed in the competing market, it is necessary to understand the customer behavior and customer satisfaction level. In the world of data analytics, it is essential for business to know how customer treats or think about their business, product, service and people. Insight into this data will help in defining the robust customer experience marketing strategy.*

*Nowadays leading industries and business are looking to gain insights from customer data in form of the feedback. Unfiltered customer feedback provides an opportunity to understand what customer thinks about the product and their experience with the company. This article investigates the benefit of sentiment analysis of the customers to predict data analysis.*

*A case study analysis and a literature review of different social media and eCommerce sites to derive the analysis and impact of sentiment data was used. Following methods were followed for research.*

- *Knowledge based Techniques*
- *Statistical Methods*
- *Hybrid approaches*

## Findings

- **The rise of social media such as social network sites, blogs, surveys has fueled interest in sentiment analysis.**
- **With the abundance of ratings, reviews, recommendation, opinion and other form of online expressions has become a virtual currency for business.**
- **Voice of customer in terms of their feedback plays a critical role in defining the next strategy for the business.**
- **Customer sentiments can drive the growth, strategy, market reputation, sales and so on and hence sentiment data analysis is key to predict the customer behavior**

## Limitations

This work doesn't focus on emotions, facial expression, gesture and body language. Cultural factors, linguistic nuances are not considered as part of the scope of the work.

**Key words :** Sentiments, customer behavior

## Introduction

To succeed in the competing market, it is necessary to understand the customer behavior and customer satisfaction level. In the world of data analytics, it is essential for business to know how customer treats or thinks about their business, product, service and people. Insight into this data will help in defining the robust customer experience marketing strategy.

Nowadays leading industries and businesses are looking to gain insights from customer data in the form of feedback. Unfiltered customer feedback provides an opportunity to understand what customers think about the product and their experience with the company.

The opinions, decision and views of others have a significant influence in our day to day decision-making process. These decisions range from buying a product such as a smart phone to making investments to choosing a school—all decisions that affect various aspects of our daily life. Before the Internet, people would seek opinions on products and services from sources such as friends, relatives, or consumer reports. However, in the world of internet, it is much easier to collect diverse opinions from different people around the world. People look to review sites (e.g., CNET, Epinions.com), e-commerce sites (e.g., Amazon, eBay), online opinion sites (e.g., TripAdvisor, Rotten Tomatoes, Yelp) and social media (e.g., Facebook, Twitter) to get feedback on how a particular product or service may be perceived in the market.

Similarly, Industries, Organizations, corporate houses use surveys, opinion polls, and social media as a mechanism to obtain feedback on their products and services. Sentiment analysis is the computational study of emotions, sentiments, expressions and views expressed in text format. The use and application of sentiment analysis is becoming more widely because the information it yields can result in the monetization of products and services. For example, by obtaining consumer feedback on a marketing campaign, an organization can measure the campaign's success or learn how to adjust it for greater success. Product feedback is also helpful in building better products, which can have a direct impact on revenue, as well as comparing competitor offerings.

The transactional surveys are becoming more realistic than conventional once-in-a-while kind of surveys. Conventional surveys take longer time and are often costly. At the same time the information analyzed usually is not immediately acted upon. Since it is a longer format of survey, the information gathered is aggregated at regional / zonal or national level and therefore the action plans are usually strategic in nature.

Whereas, transactional surveys comprise of one or two questions. The answer to the question is based on the recent experience of the customer of the product or service and therefore is more realistic and tactical actions can be quickly initiated for a specific customer. Author of the book 'The Ultimate Question' Reichheld (2006) emphasizes only one question to be asked which is – “Based on your recent experience, how likely are you to recommend our products or services to your friends or colleagues” and asks the customer to rate on a scale of 1 to 10. Such customer generated data is of immense help for understanding the psychology of the customers while buying and their after-buying experience of the product. The big data analytics tools can throw light on the consumer response to the product or service and which can be proactively used as input for the companies formulating their business strategy.

Sentiment analysis analyzes the humongous unstructured data to draw meaningful conclusion. Companies have also realized importance of the emotional or psychological factors over technical or quality factors in the customers' buying decisions. Sentiment analysis is a kind of tool which gauges the public opinion of an event or a product through analysis of a huge data which humanly is not possible. The tool has a tremendous power but very few companies are using it currently. As stated by Charly Walther (2019), essentially, Sentiment Analysis is about judging the feeling behind a piece of writing. It analyses if any phrase or full article is expressing any emotions. Some of the very basic sentiment analysis classifies the text as positive, negative or neutral. However, at times, language is not straight forward always. Therefore, advanced analysis also builds judgement based on the context, training data, previous experiences with similar edge cases etc.

According to Provoost et al. (2019), sentiment analysis is also interchangeably used with Opinion Mining. Provoost et al. (2019) also claim that Sentiment Analysis is extensively used in mining the data on social media in contexts ranging from predictions in politics to detection of depression.

Yadav et al. (2019) elaborate supervised sentiment analysis in which training data is created by either manual labelling or automatic labelling of historical data. They also claim that manual labelling is more precise though for a large data set manual labelling cannot be applied. Yadav et al. have studied impact of a news on the market sentiments in the spot market context.

This paper does a deep dive on use of sentiment analysis for predicting customer behavior.

## What Is Sentiment Analysis?

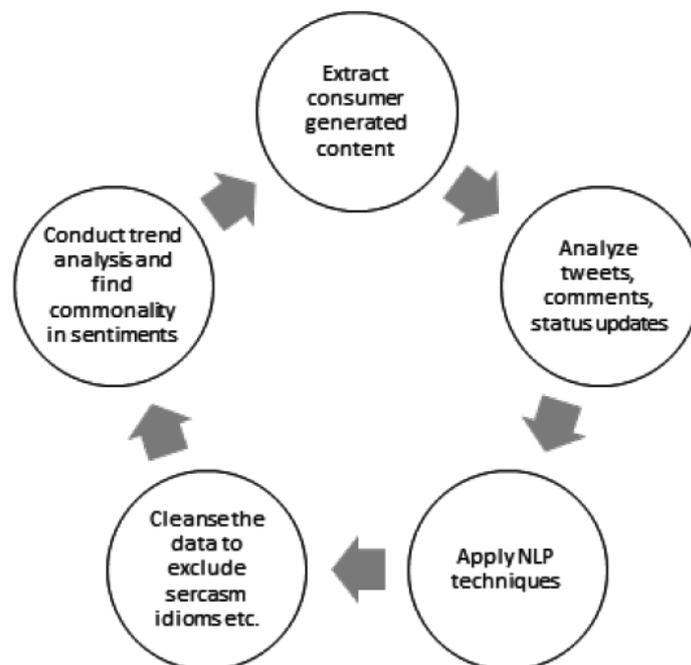
Sentiment analysis (also known as opinion mining or emotion AI) refers to the use of natural language processing, text analysis, computational linguistics, and biometrics to systematically identify, extract, quantify, and study affective states and subjective information. An extensive applications of Sentiment analysis in the areas of marketing, customer service or even in clinical medicine. The voice of the customer extracted from reviews and survey responses, online or social media, and healthcare materials.

## Process Of Sentiment Analysis

A typical process followed in Sentiment Analysis is as below-

1. Extract the consumer generated content like tweets, comments, status updates, etc., is captured through the Application Program Interfaces (APIs) of different social media networks.
2. Analyze these extracts and build the data dictionary. Classify them into different types of sentiments / emotions
3. Apply Natural Language Processing (NLP) techniques and derive the meaningful insights. NLP is a branch of artificial intelligence which analyzes and understand human language and interfaces with computers. It uses natural human languages instead of computer languages.
4. Cleanse the data by removing sarcasms, idioms and metaphors, etc.
5. Conduct the trend analysis across different social media accounts and find the commonality in the sentiments.

Figure 1 – Process of Sentiment Analysis



## Methods & Features

There are three prominent methods used for Sentiment Analysis.

1. Knowledge-based techniques: Knowledge-based technique classifies the text by affect categories. It screens the presence of some unambiguous affect words such as happy, sad, afraid, and bored etc. and finds the mood or emotions.

2. Statistical methods: Statistical methods pull elements from machine learning such as support vector machines, latent semantic analysis, “bag of words”, “Pointwise Mutual Information” for Semantic Orientation and deep learning. Some of the sophisticated methods try to identify the holder of a sentiment (i.e., the person who maintains that affective state) and the target (i.e., the entity about which the affect is felt). Grammatical relationship is used to mine the opinion in context and get the feature about which the speaker has opined.
3. Hybrid approaches use both machine learning and basics from knowledge representation such as ontologies and semantic networks in order to detect semantics that are expressed in a subtle manner, e.g., through an analysis of concepts which even though do not explicitly convey relevant information, but are implicitly linked to other concepts that do so.

There are open source software tools as well as various free and paid sentiment analysis tools. These tools deploy machine learning, statistics, and natural language processing techniques to carry out sentiment analysis automatically on a large collections of texts, including web pages, online news, internet discussion groups, online reviews, web blogs, and social media. Whereas, Knowledge-based systems make use of publicly available data, to extract the semantic and affective information associated with natural language concepts. Sentiment analysis can also be performed on images and videos (referred as Multimodal sentiment analysis). One of the first approaches in this direction is SentiBank which utilizes an adjective-noun combination of visual content. In addition, the vast majority of sentiment classification approaches rely on the bag-of-words model, which disregards context, grammar and even word order. Approaches that analyze the sentiments based on how words are composed and the meaning of longer phrases have shown better result.

Automated systems still have some limitations. A human analysis component is required in sentiment analysis, as automated systems are not able to analyze historical tendencies of the individual commenter or the platform and are often classified incorrectly in their expressed sentiment. Context, background or sarcasm often impacts the expressed statements. Automation impacts approximately 23% of comments that are correctly classified by humans. However, problem with the humans are that they are not consistent. Humans often disagree. It is, therefore, argued that the inter-human agreement provides an upper bound that automated sentiment classifiers can eventually reach.

The structure of sentiments and topics is fairly complex. Also, the problem of sentiment analysis is non-monotonic in respect to sentence extension and stop-word substitution (compare THEY would not let my dog stay in this hotel vs I would not let my dog stay in this hotel). To address this issue a number of rule-based and reasoning-based approaches have been applied to sentiment analysis, including defeasible logic programming. Also, there are number of tree traversal techniques which are applied to syntactic parse tree to derive the relevance of sentiment in an open domain setting.

## Algorithms

This classification step usually involves a statistical model like Naïve Bayes, Logistic Regression, Support Vector Machines, or Neural Networks:

- Naïve Bayes: a family of probabilistic algorithms that uses Bayes’s Theorem to predict the category of a text.
- Linear Regression: a very well-known algorithm in statistics used to predict some value (Y) given a set of features (X).
- Logistic Regression: uses a logistic function to model a binary dependent variable.
- Support Vector Machines: a non-probabilistic model which uses a representation of text examples as points in a multidimensional space. These examples are mapped so that the different categories (sentiments) belong to distinct regions of that space. Then, new texts are mapped onto that same space and predicted to belong to a category based on which region they fall into.
- Deep Learning: a diverse set of algorithms that attempts to imitate how the human brain works by employing artificial neural networks to process data.

## **Levels Of Sentiment Analysis**

### **Document Level Sentiment Analysis**

The Document Level Sentiment analysis is performed for whole document. The basic unit of information is a single document of opinionated text. In this type of classification, a single review about a single topic is considered. But in case of forums or blogs, comparative sentences may appear and customers may compare one product with the other that has similar characteristics and hence document level analysis is not desirable in forums and blogs.

### **Sentence Level Sentiment Analysis**

The Sentence level sentiment analysis is related to find sentiment from different sentences whether the sentence expressed is positive, negative or neutral sentiment. The Sentence level sentiment analysis is closely related to subjectivity classification.

### **Entity or Aspect Level Sentiment Analysis**

The Entity or Aspect Level sentiment analysis performs finer-grained analysis. The goal is to find out the sentiment on entities or some aspect of those entities.

### **Phrase Level Sentiment Analysis**

In phrase level sentiment classification, the phrases that contain opinion words are found out and a phrase level classification is done.

### **Feature Level Sentiment Analysis**

Product features are considered as product attributes. Analysis of these product features for identifying sentiment is called as feature based sentiment analysis.

## **Benefits Of Sentiment Analysis To Business**

### **A. Enhance customer experience**

Sentiment analysis helps to understand the customer's sentiment on the products / services from their social media postings and classify them as positive or negative. Ecommerce companies can make use these insights to improve their customer experience and their brand image.

### **B. Achieve competitive edge**

The customers those are very much active on social media, expect that their concerns or feedback is heard and replied within minutes by the company. So, it is crucial for the customer support team to react to the customer's post in the social media. Sentiment analysis helps to detect the trends based on such customer feedback and work on the strategies to capitalize and achieve competitive advantage.

### **C. Insightful Business Intelligence**

Companies require business intelligence to meet and improve upon their customers' expectations in service delivery. Sentiment analysis provides the required insights about the customer's expectation to define the strategies for improvement of customer service.

### **D. Market analysis**

Sentiment analysis helps to discover the latest trends and new business opportunities. It helps understand whether the market for the products and services is stable enough. Whether the brand is received well in the market, what the customers are talking about our products / services, are there any untapped opportunities and customers, etc.

## E. Brand revitalization

Brand image is none other than the customer's perception about the overall company. Sentiment analysis helps to quantify the customer perception and get the competitive edge in the market.

### Examples Of Sentiment Analysis:

Several papers are published about the use of sentiment analysis. Several authors have carried out analysis based on Twitter, Facebook social media feeds from customers. Similarly customer feedback captured through various digital means is used for performing the analysis. Here are some of the references of authors and their papers.

#### 1) Analyzing Stock Market Movements Using Twitter Sentiment Analysis

**Authors:** Tushar Rao, Saket Srivastava; Published in: Proceeding: ASONAM '12 Proceedings of the 2012 International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2012) Pages 119-123

#### 2) A system for real-time Twitter sentiment analysis of 2012 U.S. presidential election cycle

**Authors:** Hao Wang University of Southern California, Los Angeles, CA

Dogan Can University of Southern California, Los Angeles, CA

Abe Kazemzadeh University of Southern California, Los Angeles, CA

François Bar University of Southern California, Los Angeles, CA

Shrikanth Narayanan University of Southern California, Los Angeles, CA

**Published in:** · Proceeding ACL '12 Proceedings of the ACL 2012 System Demonstrations Pages 115-120

#### 3) Understanding social media marketing: a case study on topics, categories and sentiment on a Facebook brand page

**Authors:** Irena Pletikosa Cvijikj Information Management, ETH Zurich, Zurich, Switzerland

Florian Michahelles Information Management, ETH Zurich, Zurich, Switzerland Published in: Proceeding MindTrek '11 Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments Pages 175-182

#### 4) Relationship between customer sentiment and online customer ratings for hotels - An empirical analysis

**Authors:** M. Geetha a, Pratap Singha b, Sumedha Sinha b

**Tourism Management:** Volume 61, August 2017, Pages 43-54

#### 5) Review-based measurement of customer satisfaction in mobile service: Sentiment analysis and VIKOR approach

**Authors:** Daekook Kang, Yongtae Park

Expert Systems with Applications

Volume 41, Issue 4, Part 1, March 2014, Pages 1041-1050

#### 6) More than words: Social networks' text mining for consumer brand sentiments

**Authors:** Mohamed M. Mostafa

Expert Systems with Applications

Volume 40, Issue 10, August 2013, Pages 4241-4251

## Limitation Of Sentiment Analysis

It is likely that Customer's sentiment about the product or brand may be influenced by many factors. She might have had a bad day and it might directly influence her remarks negatively. Also, sentiments can change over a period based on customer's mood. So, it is advisable to go with large sample size of data.

Sarcasm in the language is also at times a bottleneck. It is difficult for an algorithm to understand the sarcasm and ironic language while interpreting the sentiment in isolation. Therefore, the model needs to be rigorously trained over a period of time. Self learning and corrective action can gradually make the analysis more robust of such sarcasm in the language.

## Conclusion

This paper covers an introduction to sentiment analysis (or opinion mining). This area has many challenging research problems and a variety of practical applications. A significant amount of research is in progress under sentiment analysis. In fact, it has spread from computer science to management science. The growing importance of sentiment analysis coincides with the growth of social media such as reviews, forum discussions, blogs, micro-blogs, Twitter, and social networks. For the first time in human history, we now have a huge volume of opinionated data recorded in digital form for analysis.

Sentiment analysis systems are being applied in almost every business and social domain because opinions are central to almost all human activities and are key influencers of our behaviors. Our beliefs and perceptions of reality, and the choices we make, are largely conditioned on how others see and evaluate the world. For this reason, when we need to make a decision, we often seek out the opinions of others. This is true not only for individuals but also for organizations. Key messages we derived out of a deep dive into this subject.

- The rise of social media such as social network sites, blogs, surveys has fueled interest in sentiment analysis.
- With the abundance of ratings, reviews, recommendations, opinion and other form of online expressions has become a virtual currency for business.
- Voice of customer in terms of their feedback plays a critical role in defining the next strategy for the business.
- Customer sentiments can predict the customer behavior, it can be extensively used to drive growth, strategy, market reputation, sales and so on.

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# Annapurna Lunch Packs - ISO 9000 Case Study

**Upendra Lele,**

Assistant Professor

Indian Institute of Cost and Management Studies & Research (IndSearch), Pune

“Annapurna Lunch Packs” - a famous catering service in Pimpri was started in 2007 by Smt. Asha Jadhav, with a view to supply packed meals to the workers in Pimpri-Chinchwad Industrial area. Smt. Jadhav who came from a humble background had started a small fast food joint near Pimpri bus stand. Later, she earned a degree in Nutrition and Food Sciences from Indira Gandhi Open University. The company soon flourished under her able leadership and got excellent response from the industrial workers because of its quality of food and service. Smt. Jadhav also had a strong focus on community service and provided employment to the poor and needy women. She received many awards from the Government, for her entrepreneurship and service to the society.

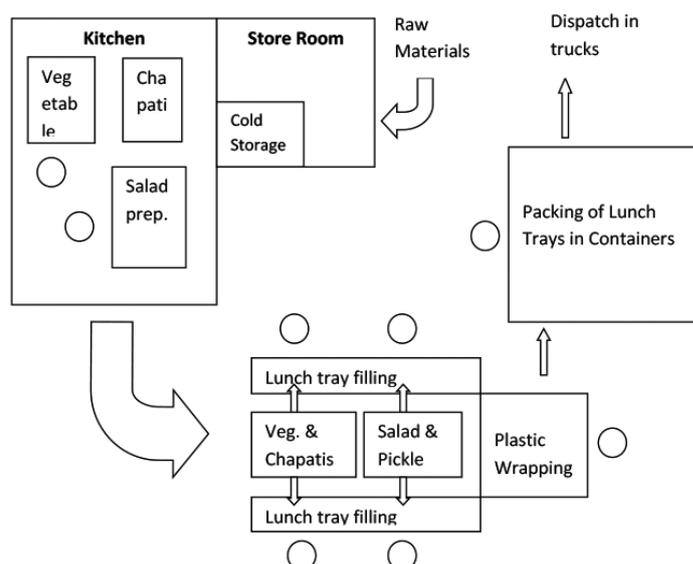
At the start, the operations of Annapurna Lunch Packs were rather limited. The company supplied around 100 packs per day in 2007. There were 7 workers working in the early morning shift. Cold storage space was limited and the food could not be stored in large volumes. However, as the business grew, the operations were more streamlined, reliable suppliers were developed for raw materials and in 2012, the company started supplying more than 3000 lunch packs per day.

The contents of the lunch pack are standardized as below: 1. Vegetable 2. Chapatis (3 pieces) 3. Salad 4. Pickle

The company has standardized the recipes of the preparations of vegetables, chapatis, and salad which are prepared in their kitchen. With a competitive price of Rs. 40 per lunch, the company has now started getting enquiries from non-industrial customers like colleges and schools also.

With increasing demand, the company has now decided to expand its operations further by moving to a bigger facility in a nearby area. However, Smt. Jadhav realizes that quality is critical for sustenance of business and there is a need to have a formal Quality Management System in the company. Since last one year, she has been thinking about acquiring the ISO9000 certification, and she believes that the time is now ripe for its implementation. She called her senior team members for a meeting to decide the implementation strategy. The senior team comprised the Kitchen Manager, Finance & Administration Officer and Smt. Jadhav herself, who was responsible for marketing activity also, apart from her overall responsibilities. The team was convinced about the benefits of ISO9000 and they decided to take the help of Technoshift Consultants, a renowned firm in Pune, to help them with the accreditation process.

The following diagram shows a schematic representation of the Operations of Annapurna Lunch Packs.



The Kitchen Manager looks after daily production, purchases of raw materials and dispatches to the Industries. The production facilities include a kitchen, two lines for filling the dishes, a table for shrink packing and a table for packing of trays in containers. The kitchen is manned by one cook and one assistant. The tray filling line consists of three stages: 1. Filling vegetable and chapatis in the dish 2. Fill salad and pickle 3. Shrink wrapping with plastic on a machine. Lunch trays, duly wrapped in plastic are packed in containers. Each container can hold 30 trays. Containers are shipped in mini trucks with a capacity of 20 containers per truck. The operations are supervised by a Supervisor, who reports to the CEO, Smt. Jadhav. There are 9 workers working in the operations area. The company has entered into a contract with a Transport company for supply of lunch containers to the Industrial area.

The Finance & Administration officer takes care of the Accounting and general housekeeping of the production facilities and office. He is also responsible for managing the utilities like electricity, water, and cooking gas. An agency has been employed for disposal of daily garbage. There is an office assistant reporting to the Finance & Administration Officer.

for Annapurna Lunch Packs on the basis of ISO9000 methodology.



