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Application of data science in textile sector: Development and application of an android based app for predicting fashion trend by analyzing consumers' perception

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Abstract

Data science or big data has the potential to transfigure the entire business process of a textile sector and the fashion world, and this paper plays a major role in conceptualizing this metamorphosis. The intention of this paper is to introduce the term 'Data Science' in a new way, as an application used in the textile sector and especially in the fashion industry, with a developed android based app. The operation is like an online shopping site having the vantages- trend prediction, design modification, exposing the variability, selecting between men's or women's clothing, historical analysis, production projections, aggregate information, enabling experimentation to discover needs, improve performance and supporting consumers' decision making with algorithms. The app has been developed entirely for this purpose and trial run with more than 100 customers has been made. It is found that trend can be predicted and creative ideas can be generated by using this app for small fashion areas. Therefore, the ultimate motive of this project is to provide assistance for the fashion industry in devising new ways for satisfying the ever-growing and ever-changing needs of the consumers.

Keywords: Data science, big data, fashion industry, android based app, trend forecasting.

1. Introduction

Data is defined by the Oxford dictionary as "The quantities, characters, or signs on which actions are accomplished by a computer, which may be gathered and transmitted in the form of electrical signals and recorded on optical, magnetic, or mechanical recording media". Data science is identified by the extant literature as the 'prime key for innovation', 'the next footstep of science', 'the frontier for newness and productivity', 'the next turning point of management system', and 'a revolution in science and technology' etc. The rationale behind such statements is that the big data is efficient to change the competition by transforming processes, altering corporate ecosystems, and facilitating innovation; unlocking business value by unleashing new organizational capabilities; and tighten the form to tackle the key of their business challenges [1].

Data science is also named as big data, as the denomination points out, represents an enormous volume of data. Volume, Velocity, Variety, and Veracity (4V's) together make the foundation of data science [2] [3]. Superior judgments are established with big data analysis by converting the data into information, that otherwise could not be disclosed using traditional practices with less data.

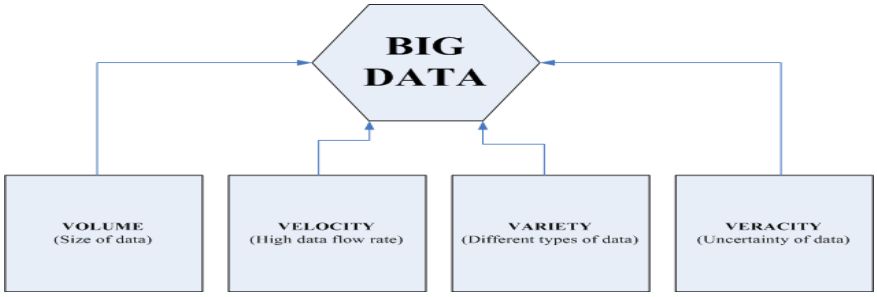

Fig. 1. The foundation of data science (4V's)

Cabalistic consideration has been acquired by data science in the fashion world in the last decade. It is increasingly being used in trend forecasting, analyzing preferences and emotions of the consumers. Nowadays, the preferences of the consumers are constantly changing. A personalized style, fit, pattern, color and design are more preferable to them. For this, trends need to be generated. A trend simply reflects what seems to be going around at any given time. Fashion, pop culture and entertainment are considerable subject for creating trend in any area. There is also the bullish or bearish trend created by the economic indicators, or a political trend that reflects a nation's current mood. Some trends are fun, some fabulous, some appalling, but however long they last, it is sure that there will always be a new trend coming along to replace the old.

Exceptionally competitive and progressive market where trends and styles vary with the blink of an eye is known as fashion industry. Thousands of man-hours from the most creative minds are taken by trend and the simple hot or not judgments are followed by the lucrative outcome from fashion bloggers and celebrities [4]. The main vantages of using data science application in trend prediction are-

- Saving cost-Picking out more skilled ways of doing business by data science application can save the cost.
- Improving decision making- With the capability to analyze new sources of data, businesses are susceptible to analyze information immediately and establish decisions based on what they've learned.
- Creating newness in products and services- With the ability to gauge customer needs and satisfaction through modification come the power to give customers what they want. With data science, fashion designers can be able to create new products and services to meet customers' requirements [5].

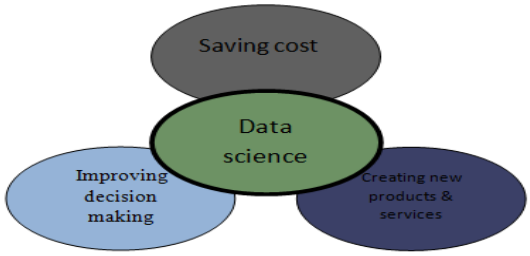

Fig. 2. Data science analysis's advantages

Big data in textile RMG sector

Data science is having effects on other niches, such as the fashion world. Fashion designers, producers, and consumers are all starting to come under the influence of data science, which is reshaping this world of fashion [6]. Big data has the power to chart the cyclical fluctuations of different times, however, at least to some degree, which gives producers some idea of the general trends that may come next. They may also be able to analyze customer purchasing behavior from past seasons to ascertain which fashion qualities or elements shoppers may respond to due to their future preferences [6]. A fashion company must understand the colors that are favored by its own consumers and data science helps them in this regard by telling the range of colors that were purchased or popular among their customers [6]. Data science interprets about the purchases of the customers and also explains how large their purchases are and how many items are sold. This data can be used to decide which lines (men's or women's clothing) are most necessary for the success of any business [7]. The data collected in the past or the analysis of the history gives a company the ability to identify the errors that led to a specific failure in the past and to calculate the techniques that would be best to replicate in the future endeavor. One serious profitability killer

in the fashion companies is the waste that results from overproduction. Producing too many items in a given style causes a surplus of stock which could entail a massive loss. Besides, producing too little of a product makes consumers frustrated. In this case, big data presents a healthy middle ground by making the companies able to forecast demand more accurately, and produce in response to those figures [6]. Data science is just starting to be tapped as a source for flourishing fashion trends by enormous amount of data collection [6].

2. Methodology

An android based app was developed to collect the requirement of the customers. The app was designed in such a way that, a customer can order a readymade apparel item as well as can modify his/her item from lots of options from the app. These data were collected from the app and from these data the features and designs which can be considered as a trend can be analyzed.

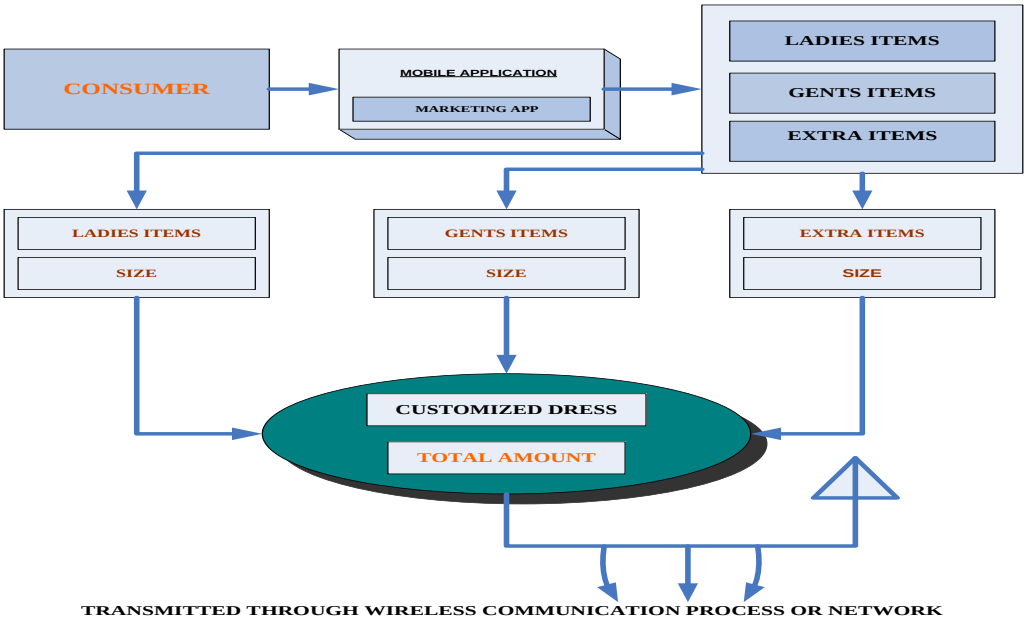

Fig. 3. Interface between the marketing app and the consumer

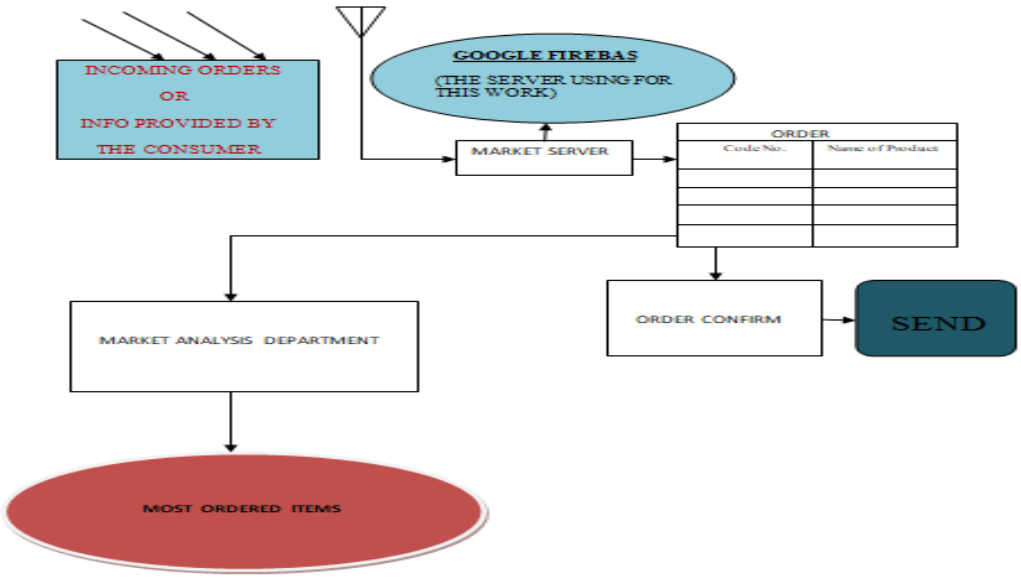

Fig. 4. Relation between information provided by the consumer (ordering) and the market analysis department

3. Results and discussion

This paper represents an android based app named “Loop” which works for the large amount of data collection from the online shopping site. Programming is done in the android studio with the java language. This work is the

first to model consumer's perception in trend analyzing and set a marketing policy by "customization". There are two sections of the app- operating portion for the consumers and operating portion for the admin.

Operating portion for the consumers

A customer can go to a company's online shopping site with the app, and either chose a garment exactly that the company offers or can modify it with the available features/designs that are present in the editing section "EXTRA ITEMS" of that app. A consumer has to log in to his email account first. Then after customizing and placing order by the consumer, the total amount will pop up on the screen of the consumer.

Operating portion for the admin

The admin can also use the same app and has to login with his/her ID and password to the admin switch to take a look at the information provided by the customers that are arranged with the help of a server named "GOOGLE FIREBAS". Collected orders has been arranged in an excel file to know the highest purchased items that indicates which designs of the fashion designer are enormously appreciated and can be run as a trend.

	A	B	C	D	F	G	L	M	P	Q	R	T	Y	Z	AA	AB	AC	AD	AG	AH	AJ	AK	AL
1		XTRA ITEM	NULL	BUTTON - 0	BUTTON - 0	BUTTON - 0	BUTTON - 0	EM - 01	EM - 04	EM - 05	EM - 06	EM - 08	LACE - 0	LACE - 0	PRINT-0	PRINT-0	PRINT-0	PRINT-0	ZIP - 03	APLQ-01	APLQ-0	APLQ-0	
2	PRODUCTS	PICTURES																					TOTAL PCS
3	WOMEN'S T-SHIRT 01		3											1									4
4	WOMEN'S T-SHIRT 02							1															1
6	WOMEN'S T-SHIRT 04		3																				3
7	WOMEN'S T-SHIRT 05		1							2													3
10	WOMEN'S T-SHIRT 08		1				1			1		3											6
11	WOMEN'S T-SHIRT 09																				1		1
12	WOMEN'S T-SHIRT 10		10																				10
13	WOMEN'S T-SHIRT 11		2									1											3
14	WOMEN'S T-SHIRT 12		2										1										3

Fig. 5. Orders arranged in an excel file to know highest purchased items

Here, women t-shirt 10 is the highest purchased item which can be run as a trend.
Comments of the customers from order history section of the app have also been aggregated. From this comments collection sector, it can be known that which products are mostly modified and how they are being modified. The mostly modified products according to the customers' choice can also be chosen as a trend because these modifications are commonly cherished by most of the consumers.

SL NO.	PRODUCT CODE	COMMENTS	TOTAL
01	WOMEN'S T-SHIRT 01	1. LACE 04 bottom of sleeves and t-shirt.	1
02	WOMEN'S T-SHIRT 02	1. EMB 01 on the chest in exchange of print.	1
03	WOMEN'S T-SHIRT 05	1. EMB 05 on chest.	2
04	**WOMEN'S T-SHIRT 08**	**1. EMB 08 on the right side of the chest.** **2. BUTTON 09 (3 pcs) on the middle of neck portion.** **3. EMB 05 on the middle of chest.**	**3** **1** **1**

Fig. 6. Comments collection from the customers' order history

Here, women t-shirt 08 is the mostly modified product which can also be run as a trend as a new developed product.

Moreover, these modifications of the products and the embellishments used to modify them can generate ideas for more products. Then the company or fashion designer can produce more of the items and sell them off. It is hoped to be profitable for both the companies or fashion designers and the consumers. All the data associated with a fashion product is hence called as fashion data or big data. This data can be used for trend analysis, customer behavior analysis, forecasting, customer need analysis etc. The app has been developed entirely for this purpose and trial run with more than 100 customers has been made. It is found that trend can be predicted and creative ideas can be generated by using this app for small fashion areas. Therefore, the ultimate motive of this project is to provide assistance for the fashion industry in devising new ways for satisfying the ever-growing and ever-changing needs of the consumers.

4. Conclusion

As this research works with a huge amount of data provided by the consumers, it has some limitations because of the behavioral change of the customers. Moreover, the orders are analyzed here manually in the excel file for the trend prediction. Despite of all these limitations, a system is proposed that can use this data to provide the customers with a mass customization service and the company with a profit by trend prediction.

The methodology and result of the proposed system is briefly described. The future work involves the analysis of orders in the excel file for trend with the software automatically, the collection of the fashion data in image processing in 3D form, human body scan for full fit fashion etc. It is believed that the intersections of textile discipline with data science, predictive analytics of trend, image processing will create significant amenities for flourishing future textile industries and fashion world. Indeed, it is hoped that it's a real doozy for knowledge creation in textile RMG sector for the fashion designers.

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