ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 8, Issue 10, October 2021

Identifying the Influence of Social Media Factors to the Apparel Ecommerce Products in Sri Lanka

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Abstract: E-commerce is the new trend of retail apparel industry in Sri Lanka. Apparel products are highly volatile since it's related to style, it frequently changes with the influence of society. Today local society is represented by social media. Therefore, the changes in local social media factors will directly influence to the local apparel market. Social media product virality plays a major role among those factors. Currently apparel ecommerce companies analyses these virality based on the past sales and google trend data, but it is highly inaccurate due to the high volatility of fashion. Due to this most ecommerce apparel companies left behind with the trend and loss sales with overstock or understock situations. One who catch up with viral apparel trend will win, while others need to work hard to provide their unique selling propositions by spending lot of financials to SEO and marketing. Due to volatility even small apparel ecommerce companies resist to enter as early adapters. The complexity of the market makes it more tough task to analyses all the viral apparel products. The current research analyses and measures the virality impact of apparel ecommerce products by considering reaction emotions, shares, product type from selected ecommerce pages, so that ecommerce sellers can pre-identify how much virality impact the respective apparel ecommerce product can make, which will ultimately help them to identify the riskiness in real time. The virality impact had been graded into 4 categories after the analyses. Finally, the product description/caption will be analyses to find the reason for the product virality by analyzing the product price, discount & likes and image by using image processing algorithm techniques.

Keywords: apparel, ecommerce, social media, virality

I. INTRODUCTION

With the digitalization the current local B2B and B2C apparel markets had been transformed into e-commerce-based platforms. With the influence of vastly growing local social media networks, it had been able to change the entire potential consumer's lifestyle and preferences on local apparel products. These influences of social media can lead consumers to seek more information on local ecommerce apparel products which ultimately make products go viral. Social media virality plays a major role when it comes to the influencing of consumers apparel preferences.

Oxford dictionary defines virality as any information which has spread rapidly on internet within a short time [1]. Product virality is real time, it cannot be predicted from past data. Herbert. A Simon [2] states that today its running an attention economy, People mostly consumes information which they got attention and from that they later search or seek for more information based on the interest. When it comes to apparel industry also the attention plays a major role with the virality, through social media apparel product virality people get to know about fashion as shown in Figure 1.1 .Word of mouth is a great way to market a product. Nielsen [3] stated that 92% of consumers interest or believe

products when they get to know or recommend by their friends or family. Social media is not anymore, a communication channel, it support WOM when network of friends share viral products [4], therefore apparel product virality is very significant player when it comes to WOM marketing.

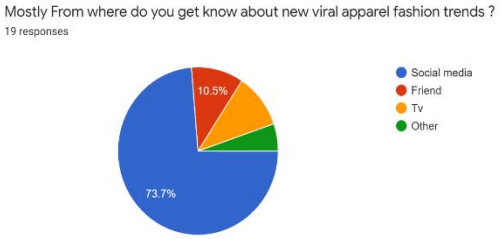

Figure 1.1: Statistical Summary of responses about viral fashion trends

Currently most of the Sri Lankan companies use Google trend to find most trending and viral apparel products in Sri Lanka [5] . Also, they use more traditional market research to get more viral apparel products details which is time consuming and not real time accurate.

Many researchers have been done in the past to measure

ISSN (Online) 2394-6849

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
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the social media virality to find the impact of several domains. One research have been done to measure the impact of social media virality of news through twitter & YouTube data [6].The authors have used emotions to find the impact of virality to each news and they have found that social significance to be the most emotional important element that makes news viral. There was another research which have been done to improve the engagement rate (ultimately increase the virality of a content) of a advertising content by analyzing eye tracking and emotions by brain waves through biometric research methods. [7].

Another research has been done to find the social media virality of content using hashtags of twitter data by analyzing three factors namely, item virality, and user virality and user susceptibility by mainly considering the viral diffusion in a network [8]. The authors have developed this virality measurement along with the help of SIR diffusion model which is used in epidemiological studies [9] and this model has been able to give more accurate measurement than existing models. In future the authors planned to perform other factors such sentimental analysis and event detection to improve the accuracy.

Authors of another research has taken number of reactions, comments, shares, and followers to measure the virality of a content on Facebook [10]. Also, the same authors have used number of retweets, replies and followers to calculate the virality of a content. Their intention is to find the impact of social media content message to the user's attitudes, beliefs, and cognitions.

Above points depicts that throughout the past years many researchers have tried to solve the issue of measuring virality through considering several factors since virality is an important factor for any local business to survive in the complex market. Although there are many research papers exist with finding a measurement to get the virality and impact of it to a particular domain, most of the considered factors which have correlation are done in separate researchers. Virality depends on strong emotions [11] and it depends on number of shares, because it shows how much the user is interested or related [12] to the apparel ecommerce product. The virality also depends on the type of the product, therefore the apparel product type also had been considered. Current research will measure the virality of local apparel ecommerce products by considering reaction emotions, number of shares and apparel product type. Not only will the virality the product caption/description be analyzed to find the reason for the product virality statistically by analyzing product price, discount and likes. If the reason couldn't find the product caption/description then an image processing component will extract the design of frock and let user know it's a matter of design of the frock.

II. METHODOLOGY

The virality metric and product caption/description tone identification run as two independent functions as in figure 2.2. Finally, an image processing component run to identify the design and the frock from an apparel image/video from a post as mentioned in figure 2.1. This mechanism helps to early identify the market trend in real time with the reason. For this, a comprehensive study was carried out to build the virality metric equation and product caption/description tone identification method.

For the current research frocks was selected as the product type with the data Fetched from Nils Store social media page [13].A feasibility study was conducted to identify the data privacy, available API's to fetch data and practicality for the end users need (apparel product sellers & Manufactures).

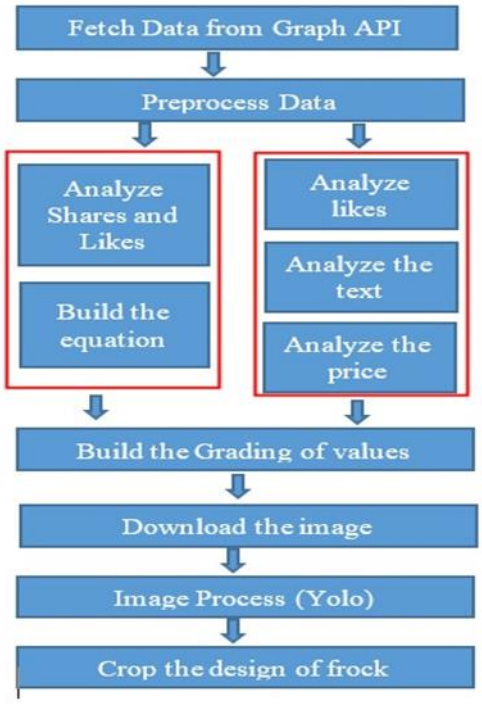

Figure 2.1

ISSN (Online) 2394-6849

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
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A. Data Extraction

Facebook will be select as the social media to fetch data due to the following reasons

- Largest user base in Sri Lanka (6m) [14] which represent overall demographics of Sri Lanka
- Not for professional usage [15], therefore, can get more accurate real time data of users
- High local user engagement due to majority of usage [14]
- Fast update with viral information
- Availability of many E-commerce accounts/pages with past data since Facebook has been there for many years in Sri Lanka

Data will be collected by Facepager software which was made for fetching publicly available data from Facebook through Graph API which was provided by Facebook itself.

B. Product Virality metric

Nils store has its Facebook post's number of shares between 0 to 7 with high data points by some common people as seen in figure 2.2, but according to graph it can be seen that after 7 shares there is a significant drop. Virality is not happening all the time [16], therefore after going through the Nils store page and analyzing the graph it can be clearly seen that after 7 shares it's going to get to the viral points by new people. Therefore, for further analyzing of the viral products the data was filtered in such a way that number of shares >= 7.

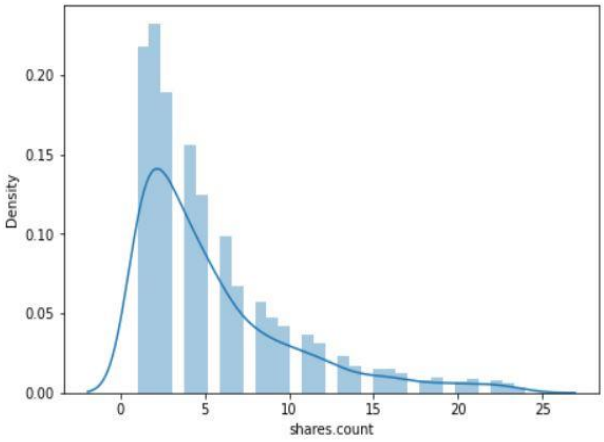

Figure 2.2: Number of Shares Distribution Plot

The virality cannot be calculated only by likes, because the virality means how much spread its goings to new people [17] which is happen by shares. Today the likes can be get by boosting which is inorganic (paid) [18] , but to get shares it should really felt to the user that its good [12].A more than 300 likes having frock can have 5 shares as seen in the figure 2.3 which might be boosted.

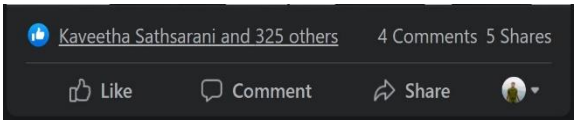

Figure 2.3: Nils Store Product likes and shares

Therefore, it was needed to identify how much of shares are therefore number of likes to verify whether the product has gone viral. To achieve that it was needed to get the ratio between likes and shares which as below.

Virality ratio = No of likes / No of shares

i. Finding the boundaries for Virality Ratio

As discussed earlier, the upper boundaries should be identified to avoid abnormal output from the formulae. The virality ratio was then calculated to all the data points, then the upper outlier boundaries were then calculated. Then the datapoints less than 171.13 was filtered out for further processing of data to avoid any anomalies.

Upper outlier: 171.13

ii. Grading the metric

To get the grading, the scores were divided into four percentiles. Lower the grade number higher the virality.

Range	Values	Grade	Definition
VR < 25%	VR > 22.5	4	Bad
25% <= VR VR< 50%	22.5 >= VR VR < 38.2	3	Medium
50% <= VR VR< 75%	38.2 <= VR VR < 57.4	2	High
VR >= 75%	VR >= 57.4	1	Very Good

Table 1 Metric Table

ISSN (Online) 2394-6849

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 8, Issue 10, October 2021

C. Product Caption / Description Tone Identification

For this first it was needed to identify the people sentimental (good / bad) on the product, rather than analyzing the comments to get peoples sentimental, the Facebook itself has provided the emotions / reactions (like, love , ha-ha , wow , sad ,angry) as shown in the figure 2.4, to identify the people sentimental .

Figure 2.4: Facebook Emotions

In this section it was only considering "like" reaction to identify the people sentimental about the frock (product post on social media)." like" is the first popping up reaction to the user with a single touch, so most of the people use "like" to represent their thought about the product, hence it captures a large sample of the audience rather than other reactions and comments. Normally there is a constant audience base which is loyal to Nils store and they do like any post from Nils store, to avoid this range a distribution plot was used to identify in what number of likes range does the high number of data points starts dropping as in figure 2.5. when its 180 likes data points density starts to drop gradually. Then the product data was filtered out in way where number of likes > 180.

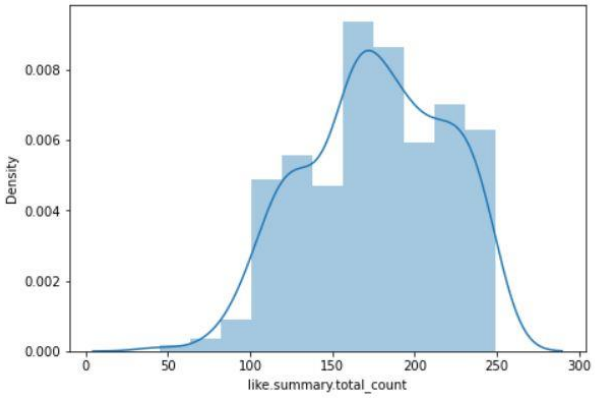

Figure 2.5: Distribution Plot for Number of Likes

The fetch filtered product data's number of likes was divided into 4 percentiles. Then the percentiles were divided into 4 grades as seen in the table 2.

Like Range	Grade	Definition
253 < range	Red	Bad
253 >= range < 350	yellow	Medium
350 >= range < 500	Light blue	High
Range >= 500	Green	Very High

Table 2 Number of likes grading to customer sentimental

i. Price identification for each category

Next it was needed to identify the price boundary for each category. Here two approaches were followed to get the price line for each category as follows.

a. Average

Facebook is the largest social media in Sri Lanka [14], where it covers the samples of almost all the potential youth audience who are interested in frocks. But in Sri Lanka most of the people are from middle class background [19], therefore the price line should decrease from low to high "like" category. But the average price categorizes didn't go as per the pattern (price didn't decrease from low to high category) as shown the figure 2.6.

The reason for the above abnormal pattern was that even though there is a high price line, there can be many numbers of likes for the frocks post if the design was good.

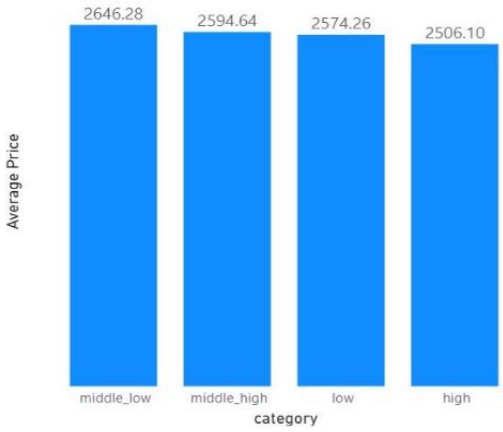

Figure 2.6: Mean Price per category

b. Minimum

This method was success as show in the figure 8, since this method get the minimum price line where each category should have in order to a product to belong in a specific grade category. Again, the prices the of the figure 8 will be change when the Per capita income change in Sri Lanka, therefore these prices should be analyzed at

ISSN (Online) 2394-6849

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
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least by annually.

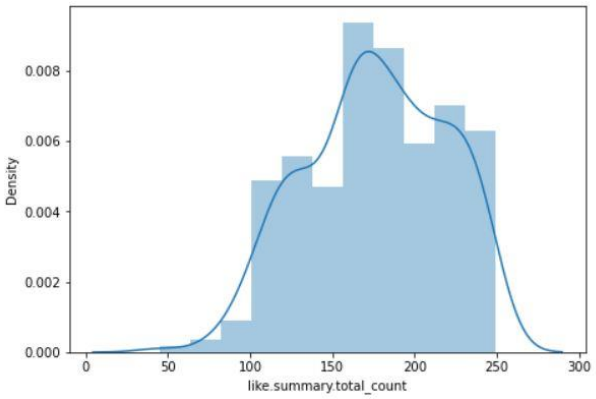

Figure 2.8: Minimum Price per category

Price was then graded according to the amount which people are affordable to pay. Since there is small gap between price change the prices then were divided into two groups as in Table 3.

Definition	Price Range
Good Price	Price < 1500
Bad Price	Price >= 1500

Table 3

G. Frock Design Identification using Image Processing

Due to the adversity in the prevailing Economic environment and Social environment, the apparel industry in Sri Lanka has considerably impacted in certain aspects. Accordingly, due to the volatility of environmental factors such as, demography, taste, culture, and economic conditions the apparel industry has to consistently focus on the current trends in the society using several platforms to obtain an understanding about the contemporary fashions.

Therefore, making this process convenient, the Apparel product detection for "Frock Designs" is implemented through viral images and videos extracted from "Facebook" Social Media Posts since the comments, captions, likes and shares are not capable to solely predict the apparel products fully accurately. For this system, among several garment categories only "Frocks" are being considered due to certain theoretical and practical limitations.

For the Frocks apparel product detection, the YOLO algorithm is used as the Image Processing / Object Detection Algorithm. Provide a trending predictions on-demand, the product detection also should be a real-time process. Accordingly used YOLO algorithm is a particular model can reach about average of 45 frames per second real-time outputs [20]. The version of the YOLO algorithm is used for this research was YOLOv5 (Latest Version) where this project is on continuous integration improving bug fixes and having greater accuracy rather than earlier versions [21].

The Frocks Design classes have been considered for this research, assuming that the final web application will be accessed by organizations in the apparel industry who design and manufacture the designs for Baby Children, Batik Print Floral, Long Maxi , Maternity , Midi ,Off Shoulder , Party , Short Mini , Sleeveless Strip , Sleeves ,Wedding.

A real time images and videos will be taken to the web application server from the cloud using graph API that developed by Facebook. The selected images will be processed using the developed frock detector service and the detected frock design will be cropped and saved in a database where the trending designs will be available for the users through the browser from the web application on a real time basis. Moreover, based on user preference users has the ability to save the trending information.

III. RESULTS AND DISCUSSIONS

As discussed in Methodology the virality metric and product caption /description work as two independent components to give the grading output. From the fetched data, first it will run the virality ratio for all the frock Facebook posts, then the data points will sort in a descending order with respective to their virality ratio as in the figure 2.9.

Figure 2.9 Virality Grading with Reasons

Then the identified grading in methodology will grade the pricing and number of likes to identify the reason for the above virality ratio as in the figure 2.9.

Then the image processing model will further show crop

ISSN (Online) 2394-6849

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
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design/ frock section of the image or the video. All the images were used to train a model where the average accuracy was 48% for all the 11 selected design classes (mAP). To get the prediction report one of the training report websites was accessed [22]. The Training Images were taken from several Facebook pages [13]. For Image Annotation one of the annotating websites was used [23]. Finally, the Training was done by using one of the data-science service providers [24].

According to the Training done from the Frock Design Detection Model the Table 2 shows the prediction outcomes that are achieved. Average accuracy of the training model was less than 50% due to smaller sample size.

Class	**mAP@**
Baby Children	0.736
Batik Print Floral	0.224
Long Maxi	0.298
Maternity	0.773
Midi	0.282
Off Shoulder	0.545
Party	0.609
Short Mini	0.367
Sleeveless Strip	0.37
Sleeves	0.305
Wedding	0.767
All Classes	**0.48**

Table 3 Class with mAP

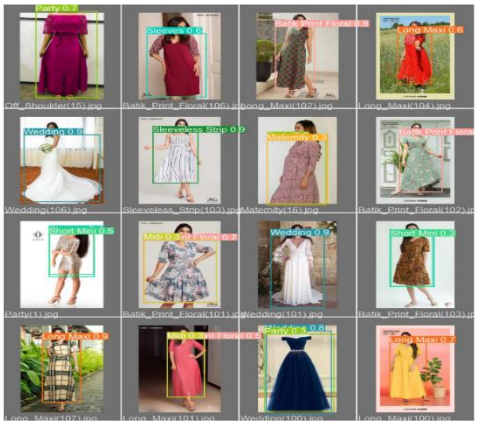

Figure 3.1

Figure 3.1 shows the sample output of how the training model predict the Frock Designs by drawing the boundaries for the detections where it shows the prediction value as well.

IV. FUTURE WORK AND CONCLUSION

Currently the analysis and grading support for Nils Store frocks, for future work more social media page data can be used for more informative update. Although here in the research frock had been used as the product type, same procedure can be enhanced for many products such as shirts, watches, electronic devices etc. This research provides many advantages to the end users (apparel ecommerce sellers and manufactures) in time, stock handling and marketing to the issues mentioned in abstract.

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