Calculating Effective Product Marketing on E-Commerce Applications based on Customer Rating using big data

R Vijayan, V Mareeswari, S Prasanna, C Navaneethan, K Yaswanth

***Abstract*:** *While purchasing online products, our priority is to consider online rating regarding the product. Based on the customer rating of products it can be possible to determine their lifetime, sales and that impacts the ability to be maintained at a certain rate or level of a product in the market. The rating is considered as datasets where they are being extracted from E-Commerce websites. In specific, consider the review content, product ratings and divide product lifetime. While collecting the relevant information from our review data we consider the data into two categories as positive data and negative data. When a user posted a review, we consider the keywords to state the review was good or bad and their rating behaviors, these extracted scores can be correlated with their rating with product popularity. The product popularity can be considered by the total number of purchases of the product and the rating given to the product. It also can be analyzed by product ratings that indicate that raters' ratings are likely to influence product popularity. Taking different e-commerce datasets to extract review content and obtaining relevant information from the review data can analyze and predict the product's early raters and product marketing.*

***Keywords*:** *E-commerce; products; rating; content; data analysis*

I. INTRODUCTION

Online purchasing of different kind of products contains each customer review on it, accessing every review is difficult while purchasing. Most of the rating can be considered as good or bad, but there are loads of data or information available to consider for purchasing or not. Every customer wants a better product, getting a better product can be easy, but the product can be sustained for a long period of time cannot be determined.

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Analysis of the earlier customer data can be a huge plus to calculate the product quality, product popularity, product sustainability, product availability, etc.

There is a wide range of products available in the market, so there is no discussion about whether the product completely undergoes without sales, at least there can be expectations from the producers it may attention from people. Navigating through huge customer rating isn't an easy task, to help most of the users who are confused in buying products some of the e-commerce giants like amazon offers Q/A feature to its application and as well as to their websites that allow customers to post any questions regarding their queries. There are different online platforms such as Flipkart, Amazon, Snapdeal, Paytm, etc. Each e-commerce website having loads of product varieties. For example, Amazon is one of the greatest e-commerce sites to launch variety of products, even there are different companies producing the same product, everything is being sold in amazon, in this situation some of the products could fail the customer satisfaction and some can become a trend and increase in sales as customer loves the product. The companies access these ratings and calculate the customer requirements. So, the firm can update the product based on customer requirements and if the requirements are satisfied by the customer, there can be an increase in sales and productivity. It leads to product marketing development and an excellent relationship with the customers. Generally, for any type of products, there is n number of customers purchasing and writing rating. For example, let us consider smartphones, the purchasing of these smartphones cannot be countable. Some customers say the product has excellent features compared to other smartphones. Some customers say the product has amazing design, build quality, long battery life and comments on overall performance. So, the other customers consider the ratings given by the earlier customers, the rating plays a major role in purchasing product. Other customers are like taking these instructions and purchasing the product. Based on these ratings and rating some of the websites recommend the product to the customers who are in searching of that product.

II. RELATED WORKS

The related work which is done is to extract the relevant information required to summarize the facts and opinions. First getting the datasets for different products which consist of several customer opinions and ratings given by them. In this process Data sorting is done in the usage of our software.

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Sorting of different data into their product type, branding, rating and mostly removing the null values in it. Data pre-processing is done to remove all the extra baggage of unusual data from the collected information.

[1]The rise of online business sites has empowered clients to distribute or share buy encounters by posting item audits, which more often than not contain helpful sentiments, remarks, and input towards an item. All things considered, most clients will peruse online surveys before settling on an educated buy choice. It has been accounted for about 71% of worldwide online customers read online audits before acquiring an item. Item audits, particularly the early surveys, the audits posted in the beginning time of an item, highly affect consequent item deals. They call the clients who posted the early audits, early analysts. Albeit early commentators contribute just a little extent of surveys, their feelings can decide the achievement or disappointment of new items and administrations. It is significant for organizations to distinguish early analysts since their inputs can help organizations to alter promoting methodologies and improve item structures, which can, in the end, lead to the achievement of their new items.

Online surveys are regularly our first port of call when considering items and buy on the web. When assessing a potential buyer, they may have a particular question at the top of the priority list, for example 'will this infant seat fit in the overhead compartment' or 'will I like this collection in the event that I loved Taylor Swift'. To respond to such questions, the creator should either swim through immense volumes of customer surveys planning to discover one that is applicable or generally offer our conversation starter straightforwardly to the network by means of a Q/A framework. In this paper the creator would like to meld these two standards: given an enormous volume of recently addressed questions about items, the creator wants to consequently realize whether an audit of an item is applicable to a given inquiry. The creator figure this as an AI issue utilizing a blend of master's sort system here each audit is a 'specialist' that gets the chance to decide on the reaction to a question; all the while it learns a significance capacity with the end goal that 'important' surveys are those that vote accurately. At test time this educated importance capacity enables us to surface audits that are significant to new inquiries on-request. the assessment of framework, Mona, on a novel corpus of 1.4 million inquiries and answers and 13 million surveys. how quantitatively that it is successful attending to both paired and open-finished inquiries, and subjectively that it surfaces audits that human evaluators consider to be relevant.[2]

[3]E-trade is a huge business and getting greater consistently. Development gauges from eMarketer report that business-to-purchaser (B2C) online business deals worldwide will reach $1.5 trillion of every 2014, expanding about 20% more than 2013. Yet, not all web-based business classes are made equivalent. The most prevalent internet business classes, as anyone might expect, are non-consumable durables and excitement related items. Nielsen reports that practically 50% of worldwide respondents in an online overview plan to buy dress or make aircraft or lodging reservations utilizing an online gadget in the following a half year. Different classifications developing in noticeable quality for internet shopping incorporate digital books, occasion tickets, outdoor supplies, and toys. Burning through expectations for each have ascended at a twofold digit or close to twofold digit rate point rates since 2011. The online market for purchasing staple goods and other consumable items is relatively littler yet is beginning to show guarantee. While durables are the beginning stage of selection, consumables are alluring because of the recurrence of procurement. Besides web-based buying, advanced is an undeniably significant research and commitment stage.

The creator [4] states in what manner can achievement in social markets be without a moment's delay strikingly particular from normal execution, but then so difficult to foresee for benefit spurred specialists outfitted with broad statistical surveying, clarification for the watched imbalance of results is that the mapping from quality to progress is curved, prompting what has been known as the whiz impact, or victor take all business sectors. Since models of this sort, be that as it may, accept that the mapping from quality to progress is deterministic and that quality is known, they can't represent the watched unusualness of results. Another clarification that records for both disparity and flightiness attests that people don't settle on choices freely, but instead are affected by the conduct of others. Stochastic models of aggregate choices that fuse social impact can display outrageous variety both inside and crosswise over acknowledge, notwithstanding for objects of indistinguishable quality. Shockingly, exact trial of these expectations requires examinations between different acknowledge of a stochastic procedure, while, as a general rule, just a single such history is ever watched.

[5]Diffusion procedures of new items and administrations have turned out to be progressively unpredictable and multifaceted lately. Shoppers today are presented to a wide scope of impacts that incorporate informal interchanges, arrange externalities and social sign. Dissemination displaying, the examination field in promoting that tries to comprehend the spread of advancements for an incredible duration cycle, has adjusted to depict and show these impacts. The creator talks about endeavors to demonstrate these impacts between and crosswise over business sectors and brands. With regards to a solitary market and spotlight on informal communities, arrange externalities, departures and seats, and innovation ages. With regards to cross-markets and brands and talk about cross-country impacts, contrasts in development crosswise over nations, and the impacts of rivalry on development. Based on our audit, the creator recommends that the dissemination structure, in the event that it is to stay a best in class worldview for market development, must expand in degree from concentrating on relational correspondences to incorporate the accompanying definition. In spite of the fact that dissemination demonstrating has been investigated widely for as far back as 40 years, the creator said to accept that this field of study has substantially more to offer as far as portraying and consolidating current market patterns, which incorporate the opening of business sectors in developing economies, electronic administrations, online informal organizations, and complex item administration structures.

III. PROPOSED SYSTEM ON CALCULATING EFFECTIVE PRODUCT MARKETING

In the Existing System, the data is associated with ratings where it can make the result less effective. In these existing methods only, a selected review is being taken and only considering the ratings with necessary average values of it. Whereas these methods take lots of time in calculating and making it too complex to understand.

Here in this proposed system, the important aspects of the products by using the Aggregate ranking algorithm, we can get the major keywords rather than considering the ratings. In this, we are giving the priority for rating and then comes the ratings. By using the rating and ratings of the products we can extract the results from the system. In the proposed system, we are comparing the similarities of the product. By filtering the best rating, we can get a good rating from the products. We check the basic good review keywords in the dataset and the similarities of each keyword are taken by seeing all the customers who posted these data on such demanding products as well as non-demanding products.
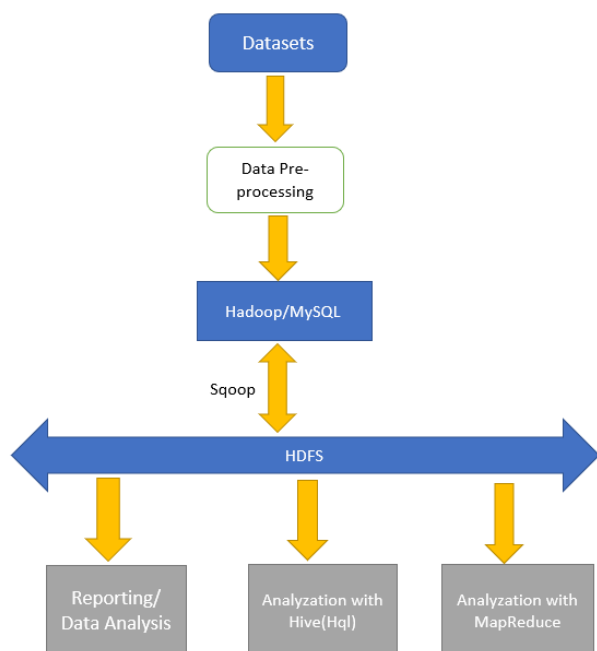

Fig. 1.Proposed Flow of Process

As in Fig.1 shows, the relationship between different components, here the datasets are collected, and the data is pre-processed that transforms raw data into an understandable format which are later stored in Hadoop or MySQL. Sqoop is a tool that is used to transfer data from relational databases to Hadoop Distributed File System. Systems design is the process of defining the architecture, modules, interfaces, and data for a system to satisfy specified requirements. Systems design could be seen as the application of systems theory to product development.

A. Data Pre-processing

In this processing, as shown in Fig.2, analyzing the data with different kinds of fields in excel then it converted into text or comma-delimited format which is said to be comma separator value file and moved to Hadoop database.
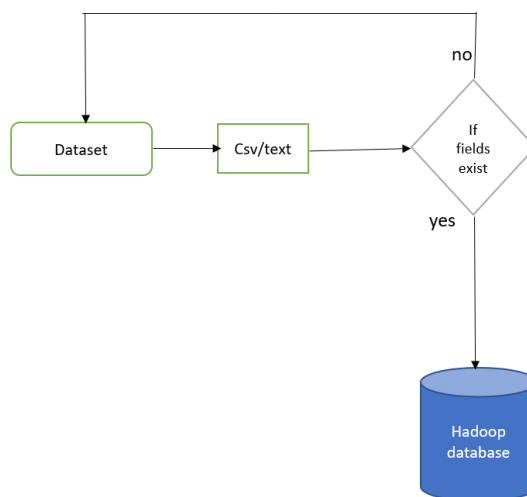

Fig. 2.Data Pre-Processing

B. Data Analysis

Data analysis is done as in Fig.3 using hive query language, it can be analyzed in different functions like partitioning, structuring the table and produce output according to queries.
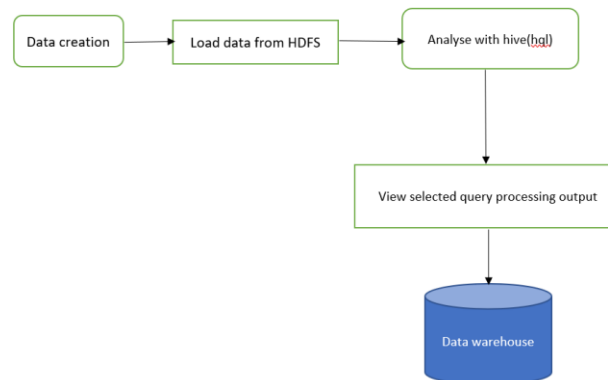

Fig. 3.Data Analysis

C. Data Storage Process

The data is taken into the Hadoop software tool by fetching the data through Sqoop and store in HDFS Hadoop Distributed File System as in Fig.4.
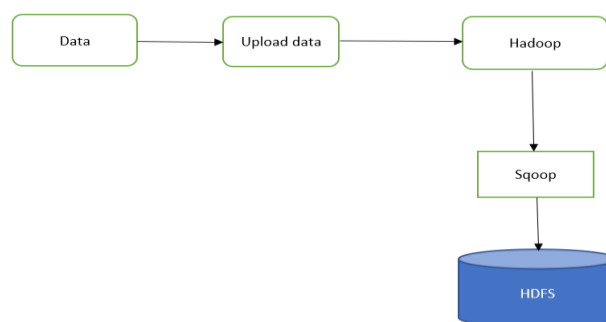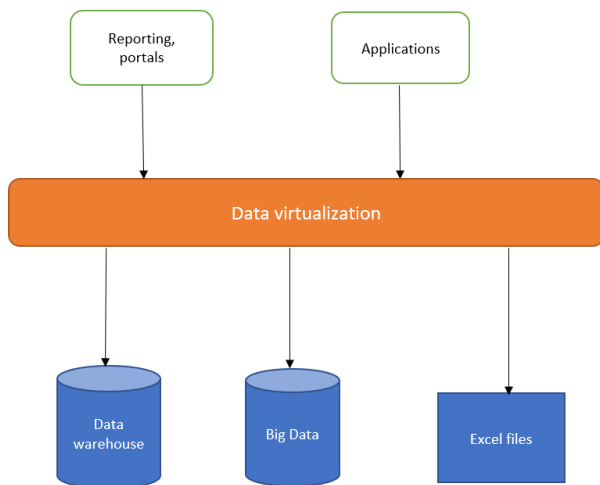

**Fig. 4.Data Storage Process**

D. Data Virtualization

In this module, the process of data is stored in virtual view of information so that it can be accessed by applications and portals without having to know the data's exact storage location as in Fig.5.

Fig. 5.Data Virtualization

E. Scripting process

As in Fig.6 using R programming language and a software environment to perform better statistics, data analysis, and graphical modules. The files in the HDFS are imported to R studio to calculate and generated.
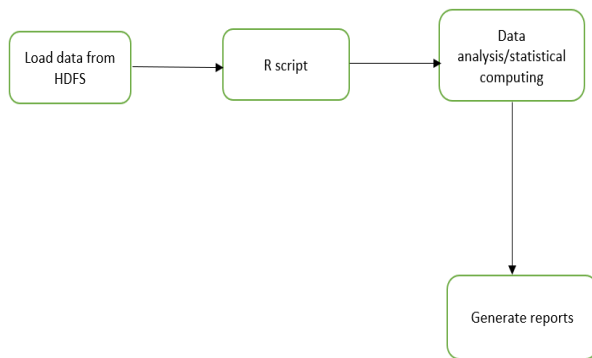
Fig. 6.Scripting Process

IV. PRODUCT MARKETING METRICS

Measuring the success of product marketing is not a simple task. The moving of the market is in the direction of data-driven process and results, where it becomes unable to predict situations in the organization. There is a lot of efforts from several companies where their product takes more time to roll out in the hands of customers. The metrics help in understanding the complexity of market sustainability. There is a word called retention which means it estimates the customers stick around to a product for a period, where it means a lot with the relationship between the product and customer, whereas it also implies the trustworthy of organization or industry or company to the customers. If the customers don't like the product automatically the price of the product decreases and can increase of wanting goods. The average length of sale which is initial contact by a qualified buyer to when the sale is completed. It is another metric used to know about the sales capacity.

Overall Revenue in any organization or a company has reflection and diverse efforts that are revenue metrics among them, it allows every organization to keep their track of revenue status. The most important metrics to be focused on average customer value. Win rates or prizes are also a contributor to the company's right fit for the respective

laptop. Product usage is the major metrics that should tell the data to be more specified and correlate. Tracking project usage is the most scalable and shares responsibility, it also improves the key features to generate more revenue. Customer satisfaction is the major hit for any product to be sustainable in the market. Some products have more sales compared to the most available products, for example, basic and daily needs of a products like milk, food, soap, chair, book, pen, bags, clothes, etc. cannot be concentrated to such realistic measures, we are mainly focusing on few products such as smartphones, gadgets, laptops, electric goods, etc. these products cannot be purchased as many as customer needs, there can be a limit in it, no customer uses more than two phones, indeed he goes with better version for his satisfaction. In such cases, the previously produced products can decrease in sales, whereas it leads to production waste and loss for the producers or the company that is manufacturing. Product marketing asset is the direct usage to measure datasheet or case study. Frequently usage of sales collateral can lead to success for the sales team. Similar conclusions can be made if the product team implements the product marketing analysis based on the input provided to them.

Close-ratio is what we need in such situations to calculate the percentage of sales that customers are expecting about the product. A low ratio is possible to occur in such cases as a poor product, not knowing about the potential buyers, ineffective sales enablement. It can be calculated on the bases of the total number of purchases(X) and a total number of demands in the market(Y).

Let us consider a scenario is the total number of purchases be 5000 and still, the customers demanding for the product are 15000, then the close-ratio is:

$$X / Y = 5000 / 15000 = .3333$$

So, the close-ratio is 33.33%, a perfect close-ratio would be 100% where the customers demand is more, close-ratio increases the performance of sales and their team to motivate for producing better products based on customer needs.

Retention Rate explains about the customers who are interested in the same product after renewal also. The major focus here is never losing existing customers. Considering a retention rate of 120%, tells there are 1200 new customers are added at the end of a year, in this process even small changes can lead to big returns.

V. DATASETS

In the proposed system, the datasets of the product and its rating are taken from amazon.com. The datasets are available in .csv format of desired products, in these datasets, there are different products with several customer rating, their ratings, review votes, etc. Applying data pre-processing we sort the data with good and bad opinions based on keywords, the high opinion products can be extracted.

Table.1. Data Set of Mobiles

Product	Brand	Rating	Rating
Galaxy s09	Samsung	5	Good product liked the design.

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Galaxy s09	Samsung	4	Nice product.
Galaxy s09	Samsung	4.5	Excellent!!! Mobile, loved a lot.
Galaxy s09	Samsung	2.5	Bad experience, the display has gone within a week.

The above data set as shown in Table. 1 is a sample data of showing the product of mobiles and containing different types of ratings from different customers. For this dataset we sort the data based on the keywords like "good product", "nice product", "Excellent" etc. whereas we eliminate the negative opinions, we calculate the different keywords and their count in the following dataset to get a conclusion to proceed with predicting the product sustainability in the market.

3.1 Data Cleaning

The data is being cleaned by the following methods to remove null data values and to sort the data according to the order.

3.1.1 Preprocessing

Each user posts rating of products, in some cases random words or incorrect sentences are being included in the rating. The data should be removed to get better and accurate results. For review column, such infrequent and negative words are removed.

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VI. RESULTS AND DISCUSSION

As discussed, collected data is being associated with each other rows and columns where the desired results are being extracted. First, the keywords are being detected and count the appearance of each keyword in the review data set as in Fig.7.

Love it	Perfect	excelent	great	I love it	Nice
791	769	685	610	537	507
exelente	Ok	Good phone	perfect	EXCELENTE	nice
484	476	419	415	395	371
Excellent!	muy bueno	love it	bueno	Awesome	excellent product
368	364	354	342	341	335
Great!	great phone	bien	Nice phone	Great product	Love it!
330	327	305	295	291	283
Works great	GOOD	Perfect!	Great phone!	excelente producto	Thanks
270	268	261	254	236	222
Excellent product	Great phone.	Good product	EXCELLENT	OK	good product
213	212	211	196	192	186
good phone	Excelente producto	Excellent phone	fine	works great	Very Good
184	178	169	168	165	153
thanks	Thank you	nice phone	Very nice	Muy bueno	Excellent.
151	150	148	148	147	146
Excelent!	EXCELENT	Awesome phone	Good!	great product	Works great!
136	135	134	134	132	132
Excelente.	VERY GOOD	Bueno	Very good phone	Excelente!	i love it
131	131	125	125	122	121
very nice	Love this phone	Very good!	Yes	Fine	I like it
119	118	114	113	111	111
Love it.	Exelente	Amazing	A+	???\x8d	Excelente!!!
111	110	108	104	103	103
muy bien	I love it!	thank you	awesome	Excellent!!!	Great product.
102	101	101	99	97	97
very good phone	Excellent!!	Exelent	GREAT	excellent phone	I love this phone
96	94	94	94	91	91

Fig. 7.Count of Keywords in the rating

All types of positive data are picked which also contains other characters like "!","!!","!!!", and even some of the review contains spelling mistakes, we identified and picked those keywords for better analysis.
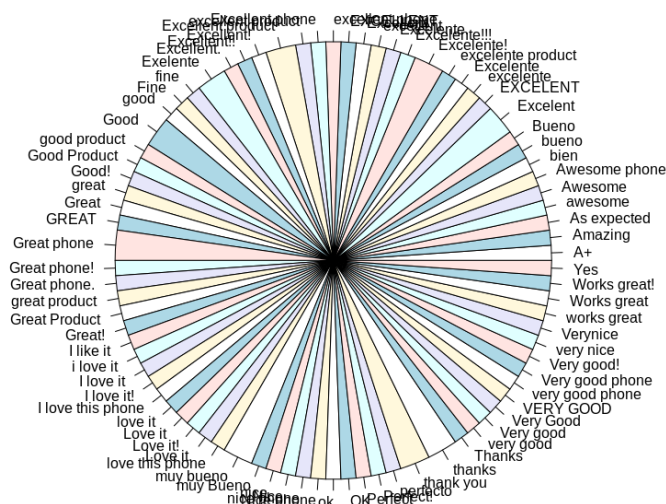
Fig. 8.Pie chart of selected keywords

There is a lot of rating as we are considering nearly 4,13,787 rating in the dataset, after removing the negative and infrequent rating, we found such an amazing collected data with the necessary. Here we are counting the number of customers posted positive rating based on the keywords we selected. Now for each data, we associate most of the rating given by those raters, for supposing we calculate the mean, inner quartile, upper quartile range of these ratings and integrate with the given keyword data. Sometimes people be in a hurry to post rating about the products they buy, considering such situations we are extracting the spelling mistake key words also to make the result efficient, the rating scale from 1-5 and some websites uses scale of 1-10, as we are considering the ratings in amazon which is scaled to 1-5. Some people post good rating but with fewer ratings,

in such scenarios the lower level which means the ratings that are under the lower quartile where the Retention ratio is analyzed for the old customers to take a chance of considering such data, now we the plots of such data based on their rating as in Fig. 9.
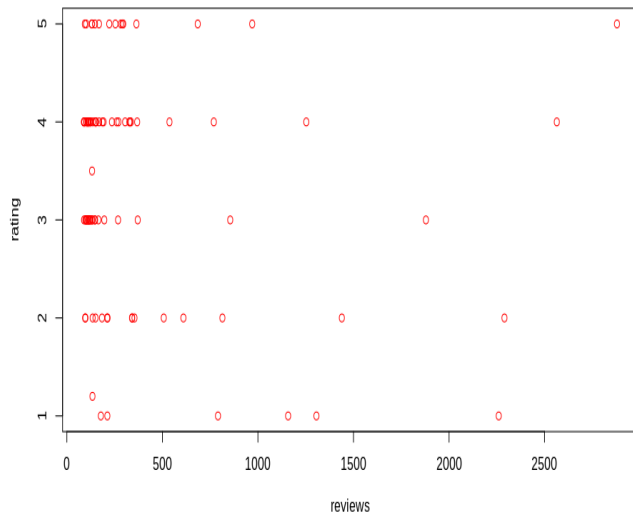
Fig. 9.Plot diagram for customer rating and ratings

As in Fig.9. the rating which is more than 2,500 posted 5 scale rating to the products based on a keyword called "Good", normally the lower quartile and upper quartile range starts from 2.5 to 5, the maximum value. These data are passed on including only positive rating. Even in such conditions, we can see the positive raters posting low rating which is under the lower quartile. We also calculated the percentage of ratings based on the total number of positive numbers.
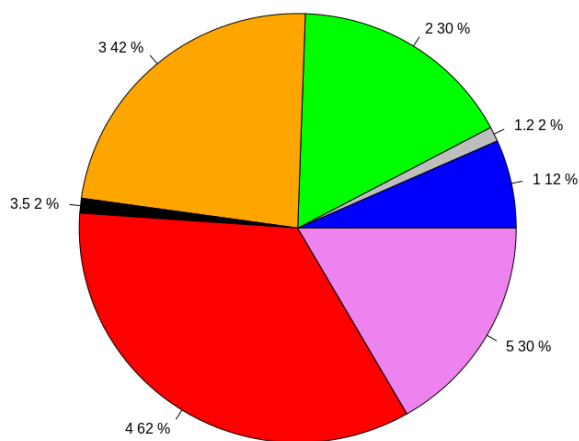
Fig. 10.   Pie Diagram of rating with the percentage

The most given rating is 4 which consists of 62% of good rating, as even every rating is considered as good ratings, but few customers write better rating and posting low rating which leads the product to be marketed in low conditions, we can see 30% of 5 scale rating and low 1 rating consists of 12% of rating. As of now, we predict the information about product marketing based on this information we can the product have good sales and better sustainability in the market.

VII.   CONCLUSION

In this paper, proposed the prediction on the customer opinions and their ratings to be followed for making effective product metrics and customer requirements. In our

experiments, the data which is processed and removed negative rating can help organizations and companies to plan on product release and even on producing units based on retention rate. Here, extracted all the data using keywords in the rating from the dataset and calculated the amount of necessary information available in it. We then followed the aggregate ranking algorithm to extract the data and its importance of various features of various products and several customers rating. In the future, we will extend the work in considering the customer requirements as well as considering different products from different websites or e-commerce applications to make the best product with high quality and more user satisfaction.

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