

Predicting User Opinion in E-commerce Website Using Aggregate Ranking Algorithm

Pusarla.Divya Bharathi ¹, A.Gauthami Latha ²

P.G. Student, Department of Computer Engineering, Miracle Educational Society Group of Institutions,

Bhogapuram,Vizianagaram, Andhra Pradesh,India¹

Associate Professor, Department of Computer Engineering, Miracle Educational Society Group of Institutions,

Bhogapuram,Vizianagaram , Andhra Pradesh,India²

ABSTRACT: Online business is the easiest way of shopping. In online business, users can buy the products by viewing the feedbacks or reviews of the other users who are used the products earlier. Based on those opinions the product can get rank. But the user has to read a lot of reviews for a particular product in order to get the best product. It was the time taking process. In this paper we are supposed to propose a system that we can directly collect the reviews of the products from online and by comparing those reviews we can get the best product based on the good opinions given by earlier users of that product.

KEYWORDS: E-commerce; reviews; feature identification; opinion mining^[1].

I. INTRODUCTION

Online business, in other words it will be called as E-Commerce or Electronic business. In Online business all the transactions are going to be done through internet only. Users can easily get the desired products. The services, payments and guidance for the usage of the product will completely be done by using web based technologies. The online business is same as the ordinary business, But the only difference between is in E-business all the transactions are done by web based technology only. In online we can get all the services like banking, movie tickets, hotel booking, air tickets, E-booking, trading, etc. In online we can get any type of product. There are several websites for Online business example Amazon, Flipkart, Paytm, Snapdeal, etc. Each website is having a numerous type of product varieties. For example, Amazon website is one of the greatest website in E-commerce, firstly it started an online book store with a wide variety of books later it became a store for all the products. Now, Amazon will sell more than 200 million products in USA under 35 categories. In clothing it has 5 million items in Electronics it is having more than 24 million products. Today in India the average sale of products only from the Amazon is about 18 million products^[2]. For such online marketing, huge numbers of reviews are given by the users for the products they purchased from the site. Based on those reviews the other users can be able to know what is the good product. Such a user comments are having a high knowledge on the product. Every consumer wants the good quality product for them, so they must go with the reviews posted by others. These reviews are very much important for both the consumer and the firms. As the consumer can be able to know the quality of the product, whereas the firm can be able to get the feedback of the product. So the firm can update the product according to the consumer's requirement and they can get improve in online marketing, development of product and in maintaining the relationship with the consumer.

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Fig.1. Reviews of various consumers on IPHONE

Based on the observations of the reviews, in this paper we proposed a system that is based on the reviews given by the customer. Propose the ranking framework based on the important aspects of the products by using the probabilistic aspect ranking algorithm. In that, summarize the documents based on the rankings given by the user for the particular product and get the overall opinions of the product. In this, we just get the opinions and feedbacks of the users about some products. I work by implementing the recommendation systems. By using the rating and reviews of the particular products we can get the exact results of particular product or items using recommendation system. In this we combine the three methods for estimating the best products among various products. They are (a) Frequency-based method (b) Correlation-based method, and (c) Hybrid method.

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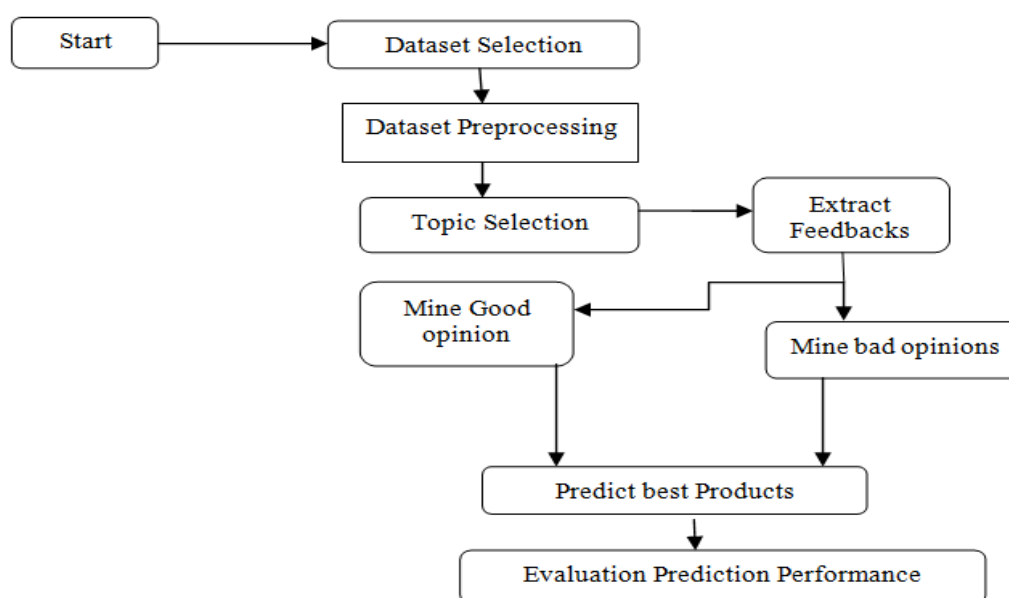


Fig.2. Flow Chart for the proposed system

II. RELATED WORK

In this section, the details of the proposed system are going to be present. In fig.2. The flow chart is describing the overview of our proposed system. Firstly we are going to collected all the reviews of the consumer from those reviews the aspects are to be identified and opinions are collected and then data preprocessing is done to remove all the noisy words from the collected opinions. After data gets classified by using data classification, the most ranking products are to be collected according to term frequency and opinions collected. Simultaneously are going to get the best rated product.

Let us consider the set of consumer reviews^[5] for a desired product are $R=\{r_1, r_2, r_3, \dots, r_{|R|}\}$ for all $r \subseteq R$ and by considering multiple aspects of the product the overall rating can be given Let us consider the reviews are O_{\min} and O_{\max} this rating is a numerical score that indicates the overall opinion of the product in a particular review r , i.e., $O_r \subseteq [O_{\min}, O_{\max}]$. Whereas O_{\min} and O_{\max} are the minimum and maximum ratings respectively. Generally the ratings are from 1 to 5 and for some websites it will be from 1 to 10. In the next subsections we are going to introduce the algorithms which are used in the proposed system.

Aggregate ranking algorithm

In this algorithm we combine the three techniques.

- (a) Frequency-based method
- (b)Correlation-based method, and
- (c)Hybrid method

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a. Frequency based method

Frequency-based method is the method which is used in our aggregate ranking algorithm, in which it gives the features according to term frequency of the product. This method takes only the frequency of the term and which will impact on the customer opinions on the particular product, it helps in rating the product. There are some usual features of the product will appear frequently those are considered as the important features.

b. Correlation- based method

Correlation-based method, which measures the correlation between the reviews on particular products and the final rankings. It ranks the aspects based on the number of cases when such two kinds of opinions are consistent. Correlation-based method ranks the aspects by simply counting the consistent cases between reviews on particular products and the final rankings. It ignores to model the uncertainty in the generation of overall ratings, and thus cannot achieve satisfactory performance.

c. Hybrid method

Hybrid method, that captures both aspect frequency and the correlation. The hybrid method simply aggregates the results from the frequency-based and correlation-based methods, and cannot boost the performance effectively.

Advantages

By aggregating these things we can achieve the high accuracy and efficiency and we can classify the items in efficient manner.

We are going to give the highest ranking product directly without reading all the reviews.

III. PROPOSED SYSTEM

The Existing system contains, feature identification^[3] include both the supervised and unsupervised methods. In the supervised method, by using the labeled reviews extract the collection of words. Existing aspect identification include the supervised and unsupervised methods. Most existing supervised methods are based on the successive learning mechanism such as Hidden Markov Models and Conditional Random Fields. HMM model to extract aspects and opinion expressions. All these Existing methods require sufficient labeled samples for training. The next approach is unsupervised approach. In this product aspects are nouns and noun phrases. First all the nouns and phrases are going to be collected in this approach. The term frequency is going to be calculated and the most frequent terms are taken as the features of the products^[8]. To overcome the Disadvantages in the existing system i.e., in supervised approach.

Supervised method is time-consuming and labor intensive to label samples. It has no content related to mining aspect importance and ranking aspects according to their importance. In the paper proposed system, they propose the ranking framework based on the important aspects of the products by using the probabilistic aspect ranking algorithm. In that, summarize the documents based on the rankings given by the user for the particular product and get the overall opinions of the product. In this, we just get the opinions and feedbacks of the users about some products. We will enhance the work by implementing the recommendation systems. By using the rating and reviews of the particular products we can get the exact results of particular product or items using recommendation system. In this we combine the three methods for estimating the best products among various products. They are

- (a) Frequency-based method,
- (b) Correlation-based method and
- (c) Hybrid method as discussed in the above section.

In the proposed we are also comparing the products similarities by a model-based algorithm i.e., an item based collaborative filtering model. This is used in giving recommendations to the user about the good opinioned products which are having high ranking. In the algorithm, we calculate the similarities among the various products in the dataset. The similarity values among the various products are taken by seeing all the users who have rated both the items. As

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shown in the fig.3. The similarities between different products are totally depending upon the rankings given by the users.

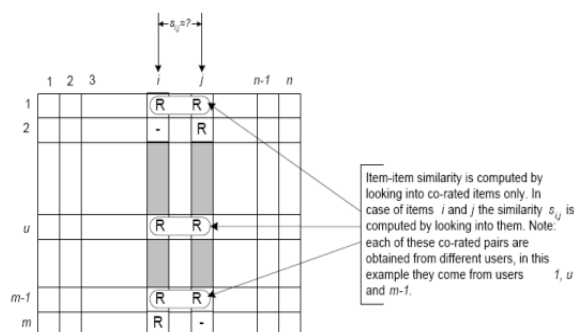


Fig.3. Item-Item Similarity Computing

Item to Item similarity is done by taking the reviews from all the users of different products.

IV. DATA SETS AND EXPERIMENTAL RESULTS

In our proposed system, the review datasets of the products are directly taken^[6] in online from the amazon website www.amazon.com by using the import.io tool After feeding the online data set we have to download a .csv file of our desired product, We can collect the reviews of numerous users for the product and now these reviews can be viewed by product wise. With the help of online review data sets, the user's opinions are getting collected and we can get the users feedback for the products. After applying the data preprocessing technique and the stop words are removed .Now the wordlist is going to be viewed comparing this word list with a bag of words containing Good opinions and Bad opinions after this opinion mining^[4] we can get the high opinioned products .Those products can be viewed in the browser.

A. Data sets for mobile

Tab.1. Data Set for Mobile

Product	Consumer Name	Review Date	Colour	Comments
Meizu m2 Note	M.Ganesan	23sep2015	White	9of9 found review helpful
Meizu m2 Note	Sonu Biradar	20sep2015	Grey	216of241 found review helpful
Meizu m2 Note	Anx	20sep2015	White	532of608 found review helpful
Meizu m2 Note	VenkataTapseya Manthenea	27sep2015	Grey	22of25 found review helpful

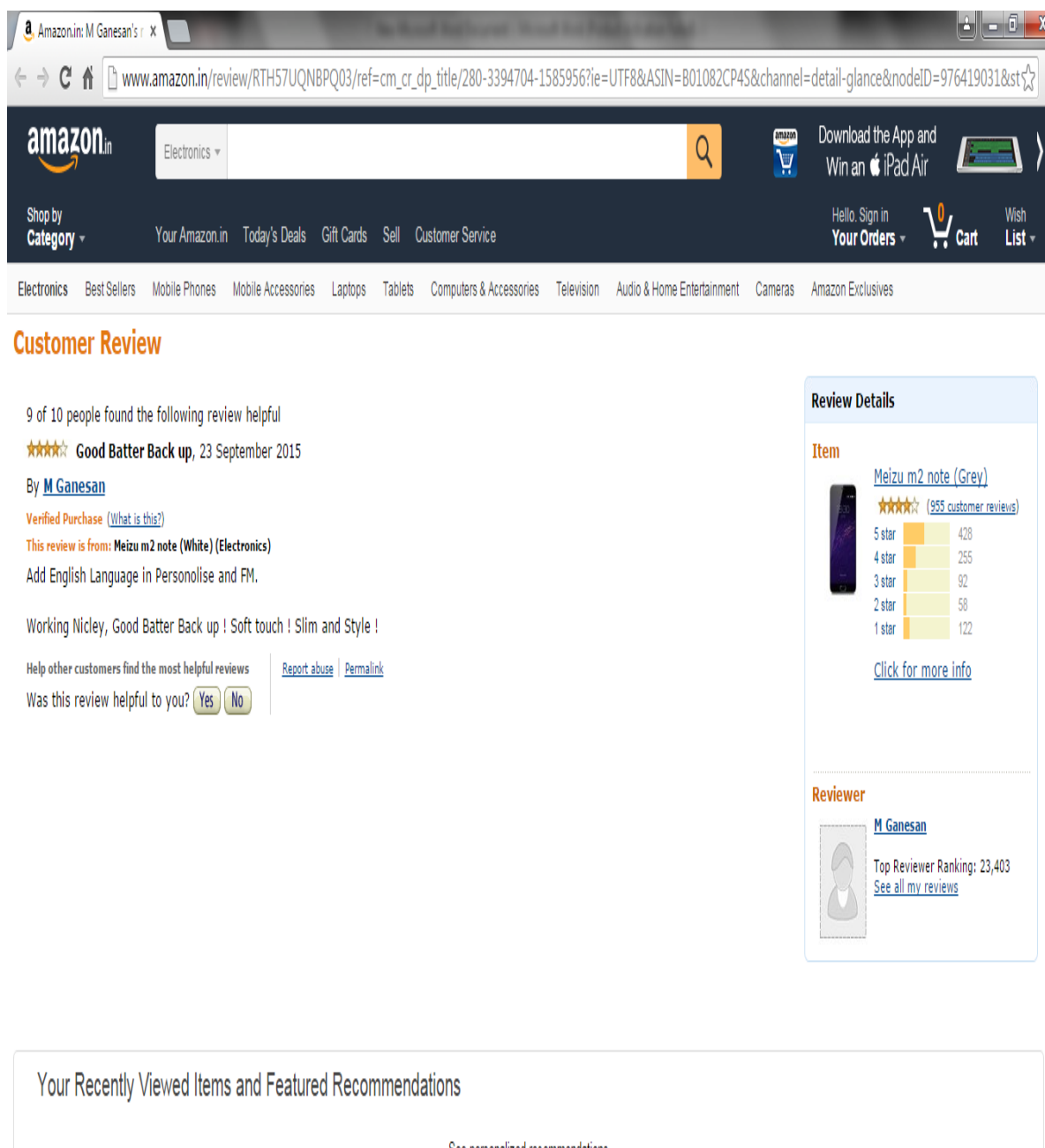
The above data set is the sample data set for the product mobiles containing the reviews of four consumers for two different models. This is the data set of reviews downloaded from the amazon website in the form of .csv file. For this data set we have to implement the Data preprocessing and the data classification techniques in order to get the good opinioned product directly. The four customer reviews for the product mobile are shown in fig.4. Collected from the amazon website for the mobiles of different varieties. And various number of other users also gave their feed back to the product in the form of rating, Here the users can able to give the textual reviews in the paragraphs by writing .These reviews contains the pros and cons of the product, with the help of these reviews others can take the decision which is the best product and the firm can improve the product by the feedback given by other users. In the particular paragraph

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review we first split the textual reviews into the sentences and these sentences are splitted into nouns and phrases then these are classified into the good opinions and bad opinions by comparing^[9] with the bag of words.



Customer Review

9 of 10 people found the following review helpful

★★★★★ **Good Batter Back up**, 23 September 2015

By **M Ganesan**

Verified Purchase (What is this?)

This review is from: **Meizu m2 note (White) (Electronics)**

Add English Language in Personalise and FM.

Working Nicely, Good Batter Back up ! Soft touch ! Slim and Style !

Help other customers find the most helpful reviews | [Report abuse](#) | [Permalink](#)

Was this review helpful to you? ☐ Yes ☐ No

Review Details

Item

Meizu m2 note (Grey)

★★★★★ (955 customer reviews)

5 star	428
4 star	255
3 star	92
2 star	58
1 star	122

[Click for more info](#)

Reviewer

M Ganesan

Top Reviewer Ranking: 23,403

[See all my reviews](#)

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See personalized recommendations

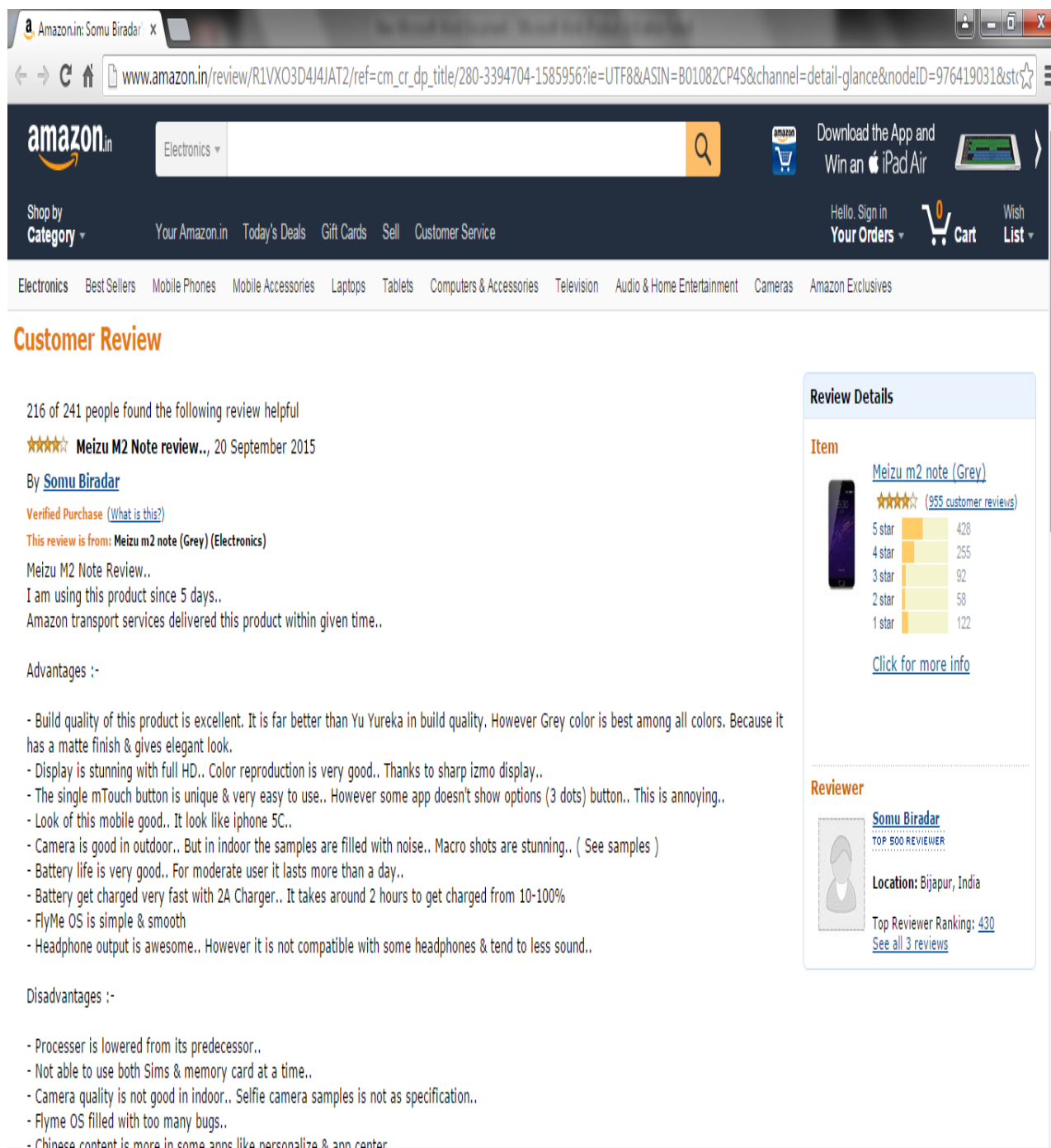
Mr.Ganesan's review on the Meizu m2 note(white)

Review given by Ganesan on the meizu m2 note white colour in the amazon website which was taken in our dataset.

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Amazon.in: Sonu Biradar / X

www.amazon.in/review/R1VXO3D4J4JAT2/ref=cm_cr_dp_title/280-3394704-1585956?ie=UTF8&ASIN=B01082CP4S&channel=detail-glance&nodeID=976419031&str

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Customer Review

216 of 241 people found the following review helpful

★★★★★ **Meizu M2 Note review..**, 20 September 2015

By **Sonu Biradar**

Verified Purchase (What is this?)

This review is from: **Meizu m2 note (Grey) (Electronics)**

Meizu M2 Note Review..

I am using this product since 5 days..

Amazon transport services delivered this product within given time..

Advantages :-

- Build quality of this product is excellent. It is far better than Yu Yureka in build quality. However Grey color is best among all colors. Because it has a matte finish & gives elegant look.
- Display is stunning with full HD.. Color reproduction is very good.. Thanks to sharp izmo display..
- The single mTouch button is unique & very easy to use.. However some app doesn't show options (3 dots) button.. This is annoying..
- Look of this mobile good.. It look like iphone 5C..
- Camera is good in outdoor.. But in indoor the samples are filled with noise.. Macro shots are stunning.. (See samples)
- Battery life is very good.. For moderate user it lasts more than a day..
- Battery get charged very fast with 2A Charger.. It takes around 2 hours to get charged from 10-100%
- Flyme OS is simple & smooth
- Headphone output is awesome.. However it is not compatible with some headphones & tend to less sound..

Disadvantages :-

- Processor is lowered from its predecessor..
- Not able to use both Sims & memory card at a time..
- Camera quality is not good in indoor.. Selfie camera samples is not as specification..
- Flyme OS filled with too many bugs..
- Chinese content is more in some apps like personalize & app center

Review Details

Item

Meizu m2 note (Grey)

★★★★★ (955 customer reviews)

5 star	428
4 star	255
3 star	92
2 star	58
1 star	122

[Click for more info](#)

Reviewer

Sonu Biradar

TOP 500 REVIEWER

Location: Bijapur, India

Top Reviewer Ranking: 430

[See all 3 reviews](#)

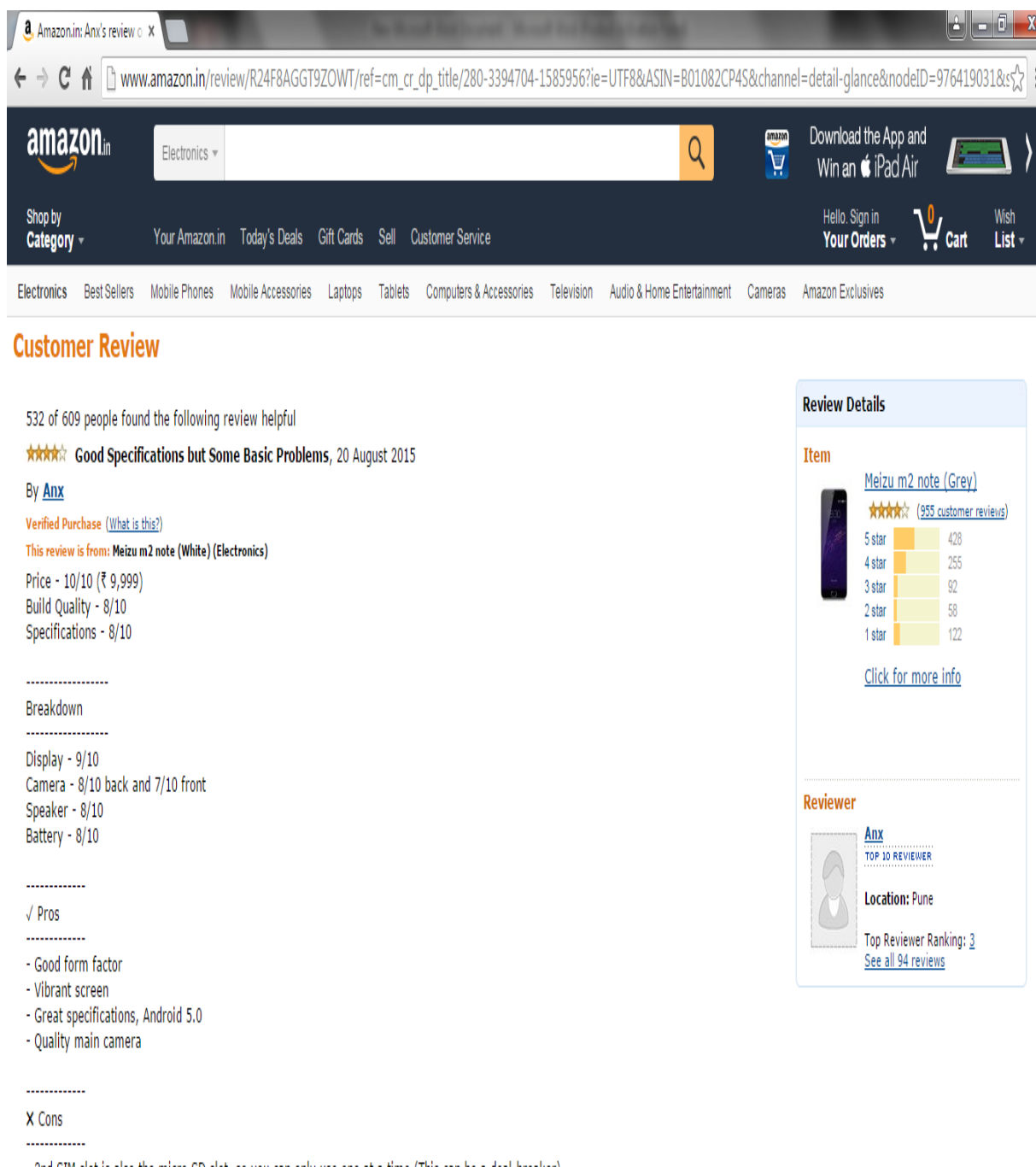
Mr.Sonu Biradar's review on the Meizu m2 note(Grey)

Review given by Sonu Biradar on the meizu m2 note grey colour in the amazon website which was taken in our dataset.

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Amazon.in: Anx's review of Meizu m2 note (White)

www.amazon.in/review/R24F8AGGT9ZOWT/ref=cm_cr_dp_title/280-3394704-1585956?ie=UTF8&ASIN=B01082CP4S&channel=detail-glance&nodeID=976419031&...

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Customer Review

532 of 609 people found the following review helpful

★★★★☆ **Good Specifications but Some Basic Problems**, 20 August 2015

By [Anx](#)

Verified Purchase (What is this?)

This review is from: **Meizu m2 note (White)** (Electronics)

Price - 10/10 (₹ 9,999)
Build Quality - 8/10
Specifications - 8/10

Breakdown

Display - 9/10
Camera - 8/10 back and 7/10 front
Speaker - 8/10
Battery - 8/10

✓ Pros

- Good form factor
- Vibrant screen
- Great specifications, Android 5.0
- Quality main camera

X Cons

2nd CMM slot is also the micro SD slot, so you can only use one at a time. (This can be a deal breaker)

Review Details

Item

Meizu m2 note (Grey)

★★★★☆ (955 customer reviews)

5 star	428
4 star	255
3 star	92
2 star	58
1 star	122

[Click for more info](#)

Reviewer

[Anx](#)

TOP 10 REVIEWER

Location: Pune

Top Reviewer Ranking: 3

[See all 94 reviews](#)

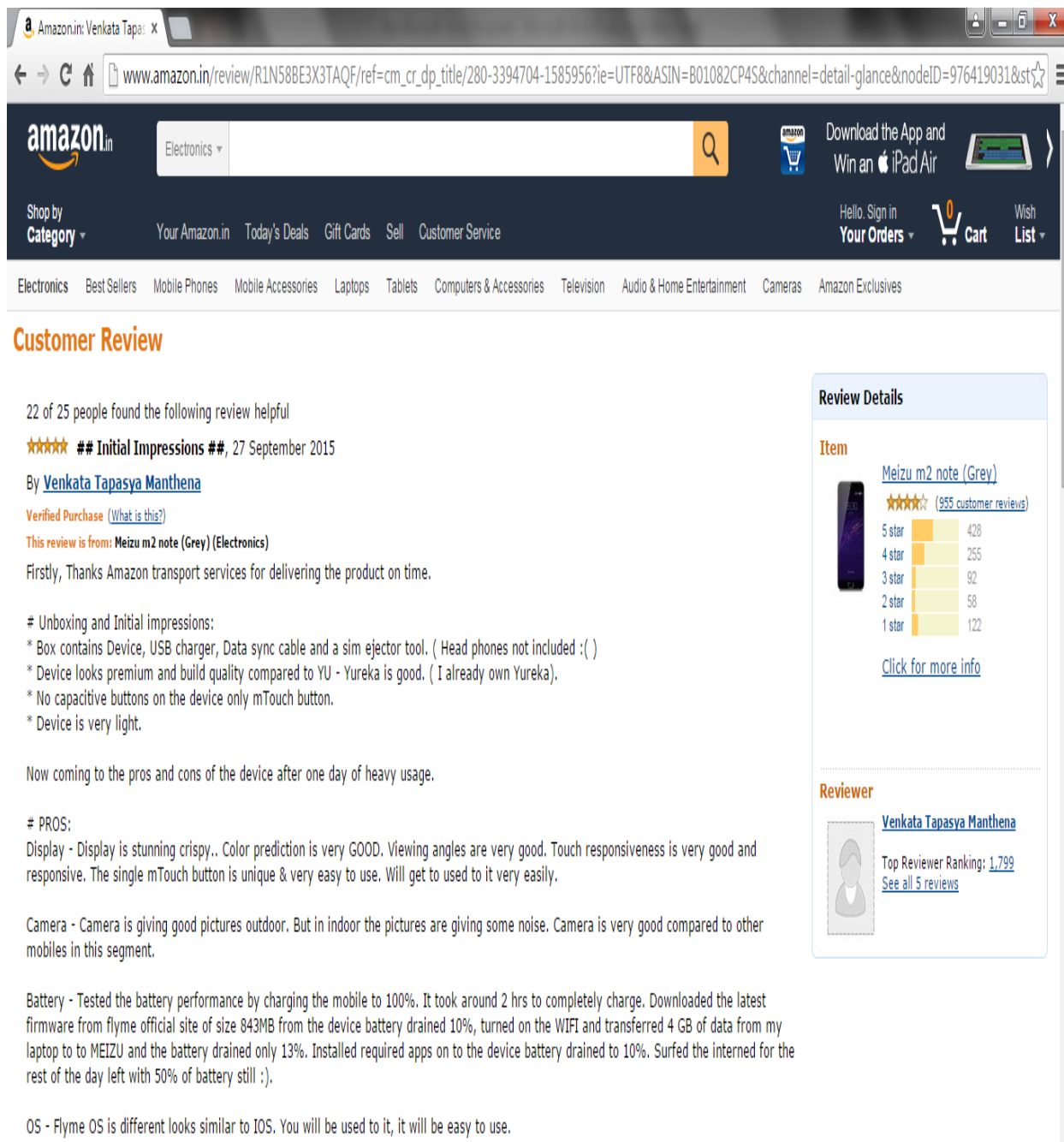
Mr.Anx's review on the Meizu m2 note(white)

Review given by Anx on the meizu m2 note white colour in the amazon website which was taken in our dataset.

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Amazon.in: Venkata Tapasya X

www.amazon.in/review/R1N58BE3X3TAQF/ref=cm_cr_dp_title/280-3394704-1585956?ie=UTF8&ASIN=B01082CP4S&channel=detail-glance&nodeID=976419031&st=...

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Customer Review

22 of 25 people found the following review helpful

★★★★★ ## Initial Impressions ##, 27 September 2015

By [Venkata Tapasya Manthena](#)

Verified Purchase (What is this?)

This review is from: **Meizu m2 note (Grey)** (Electronics)

Firstly, Thanks Amazon transport services for delivering the product on time.

Unboxing and Initial Impressions:

- * Box contains Device, USB charger, Data sync cable and a sim ejector tool. (Head phones not included : ()
- * Device looks premium and build quality compared to YU - Yureka is good. (I already own Yureka).
- * No capacitive buttons on the device only mTouch button.
- * Device is very light.

Now coming to the pros and cons of the device after one day of heavy usage.

PROS:

Display - Display is stunning crispy.. Color prediction is very GOOD. Viewing angles are very good. Touch responsiveness is very good and responsive. The single mTouch button is unique & very easy to use. Will get to used to it very easily.

Camera - Camera is giving good pictures outdoor. But in indoor the pictures are giving some noise. Camera is very good compared to other mobiles in this segment.

Battery - Tested the battery performance by charging the mobile to 100%. It took around 2 hrs to completely charge. Downloaded the latest firmware from flyme official site of size 843MB from the device battery drained 10%, turned on the WIFI and transferred 4 GB of data from my laptop to to MEIZU and the battery drained only 13%. Installed required apps on to the device battery drained to 10%. Surfing the internet for the rest of the day left with 50% of battery still :).

OS - Flyme OS is different looks similar to IOS. You will be used to it, it will be easy to use.

Review Details

Item

[Meizu m2 note \(Grey\)](#)

★★★★★ (955 customer reviews)

5 star	428
4 star	255
3 star	92
2 star	58
1 star	122

[Click for more info](#)

Reviewer

[Venkata Tapasya Manthena](#)

Top Reviewer Ranking: [1,799](#)

[See all 5 reviews](#)

Mr. VenkataTapaseya Manthena's review on the Meizu m2 note(Grey)

Review given by Venkata Tapaseya Manthena on the meizu m2 note grey colour in the amazon website which was taken in our dataset.

FIG.4. Reviews of Consumers

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The Comparison results of existing system to the proposed system are shown in the fig.5. the existing system is having low efficiency in time whereas the proposed system is having the higher efficiency of time i.e., the time taken by the proposed system to give the best product is low when comparing to the existing system.

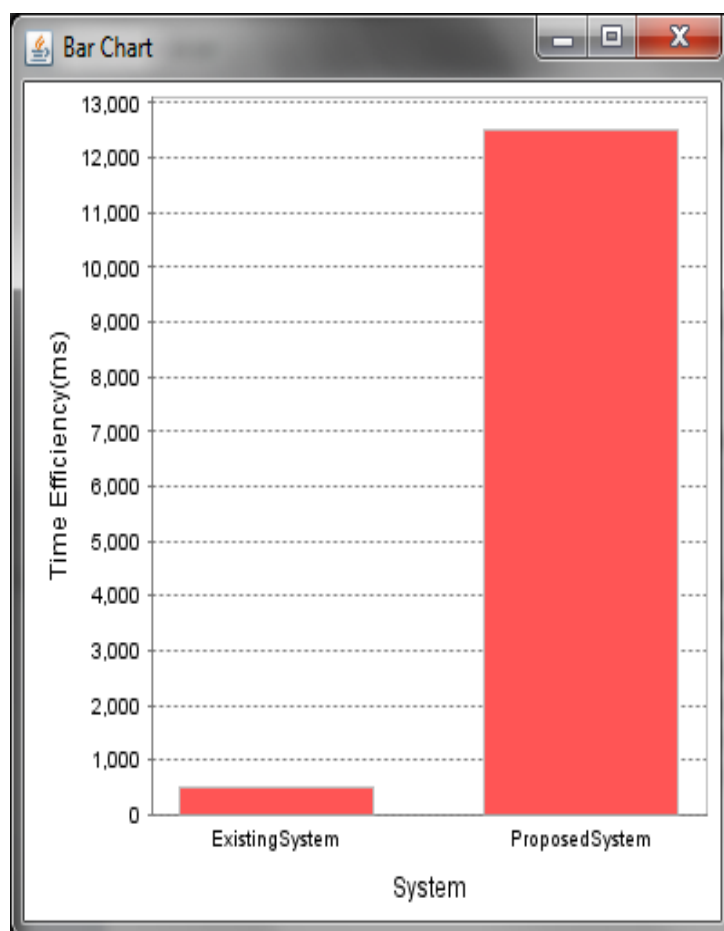


Fig.5. Time Efficiency Comparison

In this time comparison graph, we proved that the time efficiency of our proposed system is better than the existing system.

V. CONCLUSION

In this paper, we have proposed a framework to predict the best product in the e-commerce website by taking all the important aspects and opinions given by various customers. The framework mainly contains five components, i.e., product feature identification, opinion collecting, opinion mining^[7], classification, and Product Rating. We utilize the *Pros* and *Cons* opinions for improve the feature identification and opinion classification on text reviews. We then developed an aggregate ranking algorithm to summarize the importance of various features of a product from numerous users' reviews. The algorithm simultaneously inspects the aspect frequency and the influence of customer opinions are given to each feature over collected opinions. More over in this paper we implemented the comparison of products belonging to only one website, In future we will enhance this work to implement in comparing the product in different websites in order to get the best product with good quality, cost and more to satisfy the user requirements.

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