

# Enhancing Social Customer Relationship Management by Using Sentiment Analysis

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**Abstract:** *These days most people use social media sites like Facebook, Twitter, etc. to review, buying and complain about products or services. According to the previous, most companies changed from traditional CRM to SCRM to be able to retain the current Customers and also can compete with the others and get new Customers. Starting from the importance of Customer reviews about products or services for companies, we started working on this paper. Sentiment analysis model was used to get Customers opinions about product or service then manual analysis has been done on negative and positive reviews. The result of this research is beneficial reports for business decision makers to enhance SCRM.*

**Keywords:** Social Media, Customer Relationship Management, Social Customer Relationship Management, Sentiment analysis

## 1.Introduction

Social media has become a lifestyle for most people. Most people don't use it for making new friends, socializing with old friends only, but also for buying products or services and feedback and complain about them on companies pages on social media. Most companies now realized this benefit and changed from traditional CRM to SCRM to retain their customers and get new customers. SCRM defined as philosophy and a business strategy supported by a technology platform, business rules, workflow, processes and social characteristics, designed to engage the customer in a collaborative conversation in order to provide mutually beneficial value in a trusted and transparent business environment [1]. Most researchers focused on the transformation from traditional CRM to SCRM. We couldn't find many researchers focused on using sentiment analysis as a tool to enhance SCRM.

**Andry & Anindia** [2] investigated the dynamics and evolution of conversation network between bank customers using Social Network Analysis methodology. They performed sentiment analysis to classify customer's opinion into positive, negative and neutral class. They depend on twitter conversation for banking customers. Their result discovered a contradictive situation for sentiment analysis even though banks those have most active SCRM they have the smallest percentage of positive sentiment and vice versa. **Wu et al** [3] applied text mining to analyze unstructured text content on Facebook and Twitter sites of the three largest pizza chains. Their results from the text mining and social media competitive analysis show that these pizza chains actively engaged their customers in social media such as Twitter and Facebook. They used the social media not only to promote their services but also to bond with their customers. **Jitendra et al** [4] have built a system that mines conversations on

social platforms to identify and prioritize those posts and messages that are relevant to enterprises. They depended in clustering method to empower an agent or a representative in an enterprise to monitor, track and respond to customer communication while also encouraging community participation.

In this paper, sentiment analysis model that has built by Graplab was used to get sentiment or opinions for Hotel customers then manual analysis applied on sentiment results for three Egyptian Hotels InterContinental Cairo Semiramis, Ramses Hilton, and Conrad Cairo to prepare reports for the decision maker to enhance SCRM.

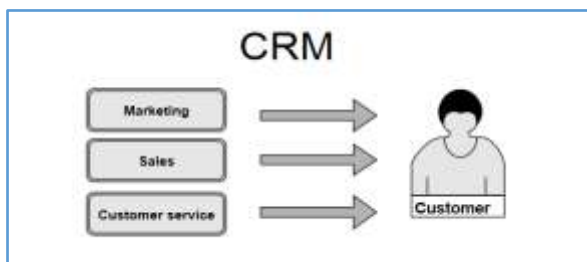
## 2.Social Media

There is many definitions for social media one of them consider it as media that people can use to be social or "the story is in the tactics of each of the hundreds of technologies, all of the tools that are available for you to connect with your customers and prospects, and the strategies necessary to use these tactics and tools effectively [5]. Simply we define it as the media that enable people to build interaction and connection with others via the internet. Social media include Facebook, Twitter, Linked In, Etc.

## 3.Customer Relationship Management (CRM)

CRM consists of sales, marketing and service/support-based functions. Traditional CRM was based on data and information that brands could collect on their customers such as past purchase information, contact history and customer demographics. This information is often sourced from email and phone interactions, commonly limited to direct interactions between the company and the customer.

As shown in figure 1.



**Figure 1: CRM**

#### 4.Social Customer Relationship Management (SCRM)

SCRM is social media services, techniques, and technology to enable organizations to engage with their customers. SCRM tools allow businesses to better engage with their customers.

Social CRM is a philosophy and a business strategy, supported by technology platform, business rules, workflow, processes and social characteristics, designed to engage the customer in a collaborative conversation in order to provide mutually beneficial value in a trusted and transparent business environment. It's the company's response to the customer's ownership of the conversation[5]. As shown in figure 2.



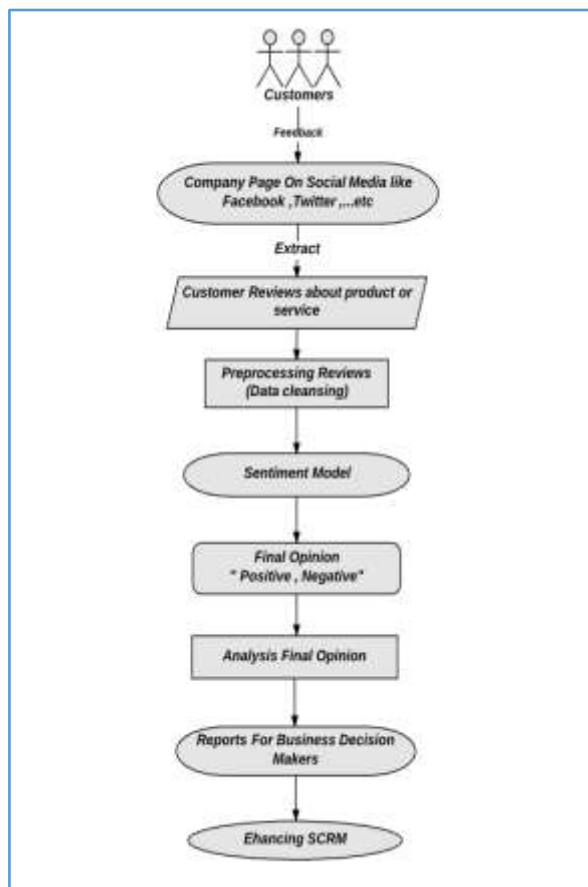
**Figure 2: Social CRM**

#### 5.Sentiment Analysis

Simply sentiment analysis is the way of extracting people's opinions about topics, products or services. Sentiment analysis, also called opinion mining, is the field of study that analyzes people's opinions, sentiments, evaluations, appraisals, attitudes, and emotions towards entities such as products, services, organizations, individuals, issues, events, topics, and their attributes [6]. Sentiment analysis tools are very useful for massive social data or reviews like on Facebook and twitter to get opinions of customers about products or services to help individuals and companies to take right decisions. Sentiment analysis can be used as a tool to monitor and enhance SCRM.

#### 6.Implementation Methodology

The proposed framework depends on a preprocessed Hotel reviews dataset. Sentiment Analysis model was built by using Graphlab to get a final opinion then manual analysis applied on positive and negative reviews of three Egyptian hotels for preparing reports for business decision makers to enhance SCRM and got more engagement with their Customers. The proposed framework is shown in figure 3.



**Figure 3: The proposed framework to enhance SCRM by using Sentiment model**

The proposed framework to enhance SCRM by using sentiment analysis mode as above consists of the following stages.

##### A. Customer's feedback on company page on Social media.

Now customers not only use social media sites to review or sale products or services but also to feedback or complain after bought product or services. Here we depended on reviews for hotel customers on social media sites like Facebook and Trip advisor about the hotel services.

##### B. Extract Customer reviews about product or services.

Hotel reviews dataset was extracted for three Egyptian hotels InterContinental Cairo Semiramis, Ramses Hilton, and Conrad Cairo from Facebook and Trip advisor to be

used in that study. 5000 reviews were extracted for the above three mentioned hotels.

**C. Preprocessing dataset “Data cleansing”.**

The extracted dataset were in HTML format by downloaded them from Facebook and Trip Advisor sites. Using the Linux shell scripts the data was converted from HTML format to CSV format. Data cleaning was run in the CSV data to remove the empty rows and corrupted data.

Shell script “awk” command was used to organize the dataset and convert it to CSV format. Used the SFrame to get the required column that will be used in the study like “Hotel name and review“ Table-1 contains a brief description about dataset after organization.

**Table 1:** Dataset Description

Attribute	Type	Description
Hotel	String	Hotel name
Review	String	Customer opinion

**Table 2:** Results of Final sentiment for three Hotel

Hotel Name	Total Reviews	Positive Reviews	Negative Reviews
InterContinental Cairo Semiramis	1850	1600	250
Ramses Hilton	2000	1702	298
Conrad Cairo	1150	983	167

**F. Analysis the Final Opinion**

Manual Analysis was used to prepare reports about most positive and negative points to prepare reports can help decision makers to enhance SCRM which will be reflected on business overall. We focused here to get main positive points that made Customer love those hotels also the main Negative points that made those customers hate those hotels and let them think of not coming or reserving at them again.

**D. Sentiment analysis model.**

In this framework we depended on sentiment analysis model that was built by using SVM algorithm with N-grams features selection techniques to get the final opinion of customers whether positive or negative. The sentiment analysis Model was built by using Grapghlab. For more details refer to [7].

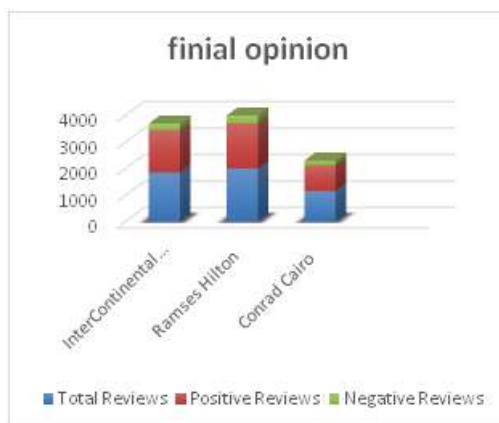
**E. Final opinion**

The dataset evaluated by sentiment Model to get final opinion of it whether positive or negative.

We passed 5000 reviews for the above mentioned three Hotels through the Model. The result of positive and negative was as shown in below table-2 and figure 4.

**G. Reports for business decision makers**

The reports include the positive point, reasons beyond it and count of reviews that have mentioned the positive or negative point. Table 3, 4 and 5 show the report of our case study for three Egyptian hotel InterContinental Cairo Semiramis, Ramses Hilton, and Conrad Cairo.



**Figure 4:** Positive and Negative sentiment for three Hotels

**Table 3: Positive and negative report for Hotel InterContinental Cairo Semiramis**

<b>Hotel - InterContinental Cairo Semiramis</b>		
<b>Positive Point</b>	<b>Reason</b>	<b>Count of Reviews</b>
<b>Location</b>	The location is perfect as a central location in downtown Cairo, looking over the Nile, near El-Tahir square, near to a metro station and to the Egyptian museum	930
<b>Pane Vino Restaurant</b>	The views of the Nile from Pane Vino (one of their restaurants) are beautiful and service great. They serve all types of cuisines and buffet style is great.	91
<b>Thai restaurant</b>	The Thai restaurant is outstanding with uniquely presented dishes. dinner is delicious	156
<b>Club Lounge</b>	The lounge is a wonderful place to wind up or wind down with while in Cairo and the historical Nile. The professional and Friendly attitude of the club lounge staff	55
<b>Room service</b>	Super clean rooms and all over the place. Cleaning rooms changing everything daily The response to every request by phone with number .big and quit rooms. Very nice staff in room service	300
<b>Nile View room mini bar</b>	Nile view room in high floor is very good and not noisy.	250
<b>guest relations</b>	The mini bar inside the room is very nice. There are many drinks on it	55
<b>The health club</b>	Staff is very helpful and loyal with guests.	80
	The health club has cardio machines. The health club and lobby will not leave you bored at all.	167
<b>Negative Point</b>	<b>Reason</b>	<b>Count of Reviews</b>
<b>Old Hotel</b>	The hotel as such is an old place and looks like it needs a revamp.	189
<b>Club Lounge</b>	Do not respond timely to guests. Did not receive fruit basket .The Club Lounge was predominately smoking. Clup lounge respond very slow	25
<b>Children</b>	Not allowed for children in all restaurants only one restaurant. children are upset because they feel unwanted and excluded	4
<b>Rooms</b>	Not cleaned. Room services do not respond to guests calls.	56
<b>pool area</b>	The pool area was a mess with cigarette butts lying on the ground and 2 empty chips packets that many staff members walked past	31
<b>Reception</b>	reception not organized during check-in or checkout for many guests	5
<b>Smoking</b>	Several of the staff allow guests to smoke everywhere in the Hotel even in the buffet	67
<b>Noisy</b>	Noise in the hotel is too high, Music too loud into the night .Loud music until 2 AM every night	11

**Table 3: Positive and negative report for Hotel Ramses Hilton**

<b>Hotel - Ramses Hilton</b>		
<b>Positive Point</b>	<b>Reason</b>	<b>Count of Reviews</b>
<b>location</b>	The location is great for visiting the Egyptian museum. Egyptian Museum just opposite the hotel .The Hilton located in the heart of Cairo and on the Nile River and Cairo tower	1231
<b>Terrace Cafe</b>	The service was most gracious and hospitable. Food selection is excellent and tasty. The friendly staff who greeted people with a smile upon entering every morning.	87
<b>executive lounge</b>	The executive lounge was a beautiful reading place .the Executive Lounge Manager who was welcoming, professional and friendly. The service at the lounge is just impeccable	266
<b>Indian restaurant</b>	Everything is fantastic service, breakfast, dinner in an Indian restaurant. The impressive choice at breakfast - all very good quality too - and its very helpful restaurant staff. The breakfast buffet is very good	98
<b>Front Office team</b>	The Front Office Manager for his great assistance and co-operation. The front office manager is very patient, accommodating and helpful and great to deal with him.	79
<b>Duty managers</b>	Duty managers very professional and helpful and facilities all process on guests	31
<b>Negative Point</b>	<b>Reason</b>	<b>Count of Reviews</b>
<b>drunk people</b>	Mostly hit by wasted drunk people in your walk through the lobby. Not recommended for families or couples	70
<b>Bathrooms</b>	Bathrooms is old and need renewal.	250
<b>Rooms</b>	Room was dirty. There is mold growing in the shower/bathrooms, and the carpets are awful. not very well maintained with poor service and crowded	201
<b>Smoking</b>	Guests are allowed to smoke in public spaces making it unpleasant for a non-smoker, especially kids	156
<b>Reception</b>	Reception is a bit chaotic and queues are not maintained	64
<b>The coffee and tea cups</b>	The coffee and tea cups and pot were not clean	101
<b>The staff</b>	the staff respond slowly and some of them not helpful for guests	31
<b>WIFI</b>	Wifi is so slow.	20

**Table 4:** Positive and negative report for Hotel Conrad Cairo

Hotel - Conrad Cairo		
Positive Point	Reason	Count of Reviews
location	It is a beautiful hotel on the bank of the famous Nile River. Quite close to the Egyptian Museum and Zamalek and Tahrir square.	550
the executive lounge	The executive lounge has a superb view over river Nile. It is offering free beverages and light dinner options until 8 pm. it is amazing and there is offers all day.	230
Solana restaurant	It has a beautiful atmosphere. Branch served on Friday. Staff is so kind	170
Asian restaurant	Food very delicious. Best meals. people are very welcoming	201
Breakfast buffet	The breakfast buffet was excellent. Very tasty food varieties served on it. Breakfast buffet includes a good variety of food including healthy corner.	322
room Service	A very good service and very good staff. Room service is very quick to give guests the proper service. Rooms cleaned well.	165
housekeeping staff	Some of them are very helpful. The housekeeping staff is also great	75
Negative Point	Reason	Count of Reviews
Old Hotel	Old hotel and furniture need to renew	123
Lobby and rooms	Lobby and rooms smell very bad. Room size is good but smells bad, all furniture smelled so bad.	55
staff	Some of them not engaged with guest and not helpful. Unprofessional front-line employees. Dirty all employees asking for money bad reception bad room service rude	35
paying methods	the Hotel forced guests to pay by their home currency	76
smoking	The Hotel allowed guests to smoke which upset the other guests who are not smoking	105
rooms	Some rooms have Damaged light, Damaged coffee table, Dirty stained and worn sofa. Also no hotel supplies in the room. The rooms not cleaned.	25
Emails	no response to customer complaints through email	11

## H. Enhancing SCRM

Hotel decision maker can use the above-mentioned reports to take decisions that can lead to improving the social customer relationship management starting from marketing and sales till Customer service and support.

## 7. Conclusion and Future Work

The explosion of social media changed the business and forced companies to change from traditional CRM to SCRM to be able to retain their customers and also compete to get new customers, from here the importance of our research, appeared for using sentiment analysis to get customers emotions about products or services then analysis those emotions to get reports about the reasons behind those emotions which allowed the business decision makers to take decisions which lead to enhance SCRM in all stages from marketing and sales to customer services. In our future work, we will work on finding an automated way to do the analysis of final opinion instead of the manual method.

## References

- [1] C. R. Management, "Social CRM."
- [2] A. S. Letters, S. N. Application, B. View, and N. Topology, "Social Network and Sentiment Analysis for Social Customer Relationship Management in Social Network and Sentiment Analysis for Social Customer Relationship Management in Indonesia Banking Sector," no. October 2016, 2017.
- [3] W. He, S. Zha, and L. Li, "International Journal of Information Management Social media competitive analysis and text mining : A case study in the pizza

industry," vol. 33, pp. 464–472, 2013.

- [4] S. Dill and M. Denesuk, "A CRM system for Social Media," pp. 49–58, 2013.
- [5] A. Van Looy and C. B. Value, *Social Media Management*. .
- [6] B. Liu, "Sentiment Analysis and Opinion Mining," no. May, 2012.
- [7] A. H. Mona Nasr, Essam Shaaban, "Building Sentiment analysis Model using Graphlab," vol. 8, no. 6, pp. 1155–1160, 2017.