

# PROJECT PROPOSAL

## MARKETING MANAGEMENT COURSE

A PROPOSAL BY

**ROOZBEH DADASHZADEH**

PROJECT

**CUSTOMER EXPERIENCE  
MANAGEMENT (CEM) USING  
SENTIMENT ANALYSIS**

# Customer Experience Management Using Sentiment Analysis

By Roozbeh Dadashzadeh

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## Introduction

Customer experience is defined as your customers' perceptions – both conscious and subconscious – of their relationship with your brand resulting from all their interactions with your brand during the customer life cycle.

As for customer experience management, Gartner sums it up pretty well in its definition: “the practice of designing and reacting to customer interactions to meet or exceed customer expectations and, thus, increase customer satisfaction, loyalty, and advocacy.”<sup>1</sup>

Opinion mining also known as Sentiment analysis refers to the use of natural language processing, text analysis and computational linguistics to identify and extract subjective information in source materials. Sentiment analysis is widely applied to reviews and social media for a variety of applications, ranging from marketing to customer service. The aim of sentiment analysis is to determine the attitude of a speaker or a writer with respect to some topic or the overall contextual polarity of a document.<sup>2</sup>

This analysis type is done on document and sentence levels. In fact, most specialists use it to analyze sentences rather than whole documents. Sentiment Analysis

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<sup>1</sup> [https://www.sas.com/en\\_us/insights/marketing/customer-experience-management.html](https://www.sas.com/en_us/insights/marketing/customer-experience-management.html)

<sup>2</sup> <https://www.igi-global.com/dictionary/using-the-flipped-classroom-to-improve-knowledge-creation-of-masters-level-students-in-engineering/21327>

entails two coherent tasks: subjectivity classification and sentiment detection and classification.

1. Subjectivity classification:

First, it's necessary to determine whether a sentence is objective or subjective. An objective sentence contains some facts about an object or topic. A subjective sentence, as the name suggests, expresses someone's attitude regarding a subject.

2. Sentiment detection and classification:

The goal of this operation is to define whether a sentence has a sentiment or not and if it does, to determine whether the emotion is positive, negative, or neutral.<sup>3</sup>

## Publications

Anna Baj-Rogowska <sup>4</sup>in her article published on the 8th IEEE International Conference on Intelligent Computing and Information Systems has conducted research in which she tries to analyze the sentiments and opinions of Facebook posts on Uber.

“This article analyses the sentiment of opinions, i. e. its classification as phrases with a neutral, positive and negative emotional tone. Data used as a basis for the analysis were opinions expressed by Facebook users about Uber and collected in the period between July 2016 and July 2017. The primary objective of the study was to obtain information about the perceptions of Uber over thirteen consecutive months. The study confirms that this analysis type is of value to contemporary business.”

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<sup>3</sup> <https://www.altexsoft.com/blog/business/sentiment-analysis-types-tools-and-use-cases/>

<sup>4</sup> Anna Baj-Rogowska, “Sentiment Analysis of Facebook Posts: the Uber case”, The 8th IEEE International Conference on Intelligent Computing and Information Systems (ICICIS 2017)

## Methodology

### 1. Data Collection:

Customer reviews are extracted from [ConsumerAffairs](#) which provides consumer news that allows brands to connect with consumers called ConsumerAffairs for Brands.

Communitatively 1742 reviews have been extracted from the website. Below, There is a sample review from an Uber user on Nov. 8, 2019.

"I do not have Uber in the area where I live. But I use it whenever I travel to Mexico and the US. The worst experience I've had, in my 2 years of using Uber, was in San Francisco. I waited 14 minutes for a driver who didn't show up. He somehow canceled and went elsewhere, and I found out the hard way. It was annoying but didn't cost me anything but my time. The overwhelming majority of times I have used Uber were great. Nice drivers who showed up on time, drove safely and gave great service. Most Uber drivers go above and beyond. They are happy to give travel tips to tourists and help with luggage. I always feel safe with Uber as I have the Uber car's description and license tag, plus a picture of the driver."

### 2. Data Processing:

All the reviews were analyzed using VADER. VADER (Valence Aware Dictionary and sEntiment Reasoner) is a lexicon and rule-based sentiment analysis tool that is specifically attuned to sentiments expressed in social media.<sup>5</sup> VADER uses its lexicon to determine a sentence's score in terms of negativity or positivity.

VADER Output Examples:

```
VADER is smart, handsome, and funny.-----  
{ 'pos': 0.746, 'compound': 0.8316, 'neu': 0.254, 'neg': 0.0 }
```

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<sup>5</sup> <https://github.com/cjhutto/vaderSentiment>

```
VADER is smart, handsome, and funny!-----  
{'pos': 0.752, 'compound': 0.8439, 'neu': 0.248, 'neg': 0.0}  
  
VADER is very smart, handsome, and funny.-----  
{'pos': 0.701, 'compound': 0.8545, 'neu': 0.299, 'neg': 0.0}  
  
VADER is VERY SMART, handsome, and FUNNY.-----  
{'pos': 0.754, 'compound': 0.9227, 'neu': 0.246, 'neg': 0.0}  
  
VADER is VERY SMART, handsome, and FUNNY!!!-----  
{'pos': 0.767, 'compound': 0.9342, 'neu': 0.233, 'neg': 0.0}  
  
VADER is VERY SMART, uber handsome, and FRIGGIN FUNNY!!!-----  
{'pos': 0.706, 'compound': 0.9469, 'neu': 0.294, 'neg': 0.0}  
  
VADER is not smart, handsome, nor funny.-----  
{'pos': 0.0, 'compound': -0.7424, 'neu': 0.354, 'neg': 0.646}
```

The compound score is computed by summing the valence scores of each word in the lexicon, adjusted according to the rules, and then normalized to be between -1 (most extreme negative) and +1 (most extreme positive). This is the most useful metric if you want a single unidimensional measure of sentiment for a given sentence.

The pos, neu, and neg scores are ratios for proportions of text that fall in each category (so these should all add up to be 1... or close to it with float operation). These are the most useful metrics if you want multidimensional measures of sentiment for a given sentence.

## Results

Figure 1 shows the distribution of different values of compound sentiment calculated by VADER. The average of compound sentiments is -0.063 which indicates reviewers have relatively neutral perception over Uber brand over this set of data.

Figures 2 and 3 also show positive and negative sentiment distributions in which the positive and negative average sentiment respectively are 0.098 and 0.087 while

neutral sentiment average is 0.81. This result supports the later statement on Uber users' perception of its brand.

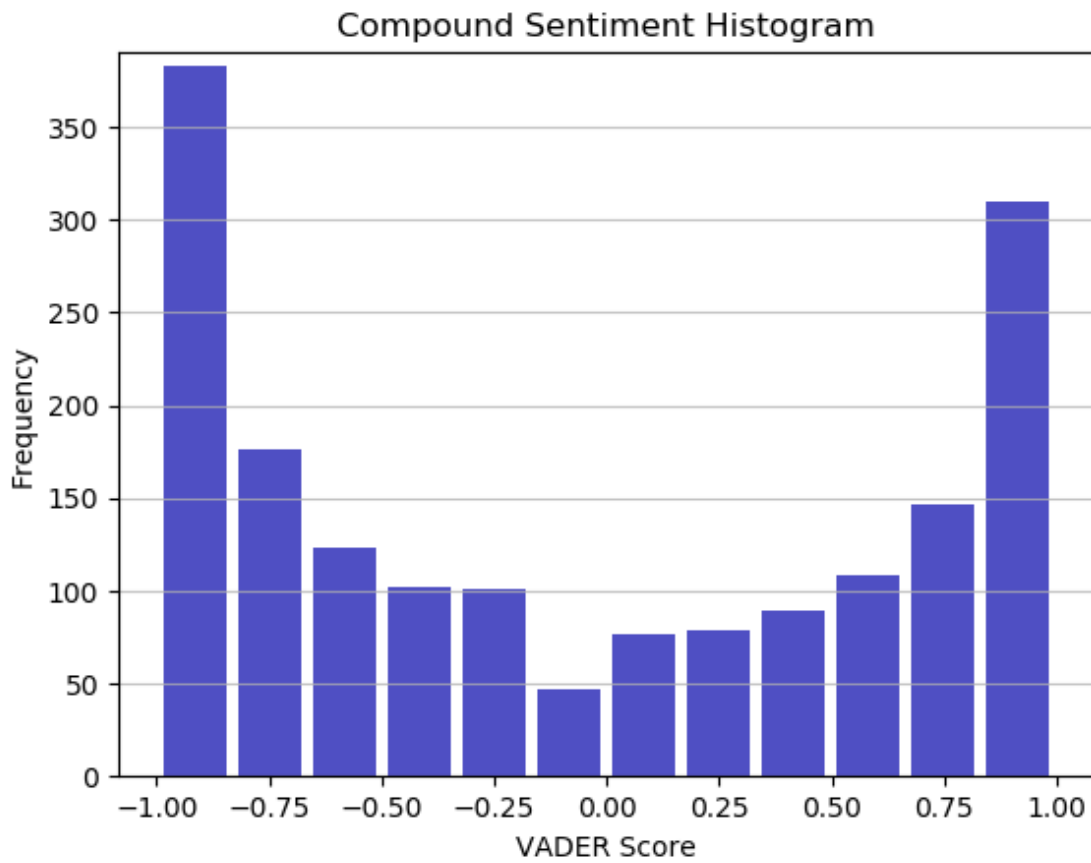


Figure 1 - Compound Sentiment Histogram

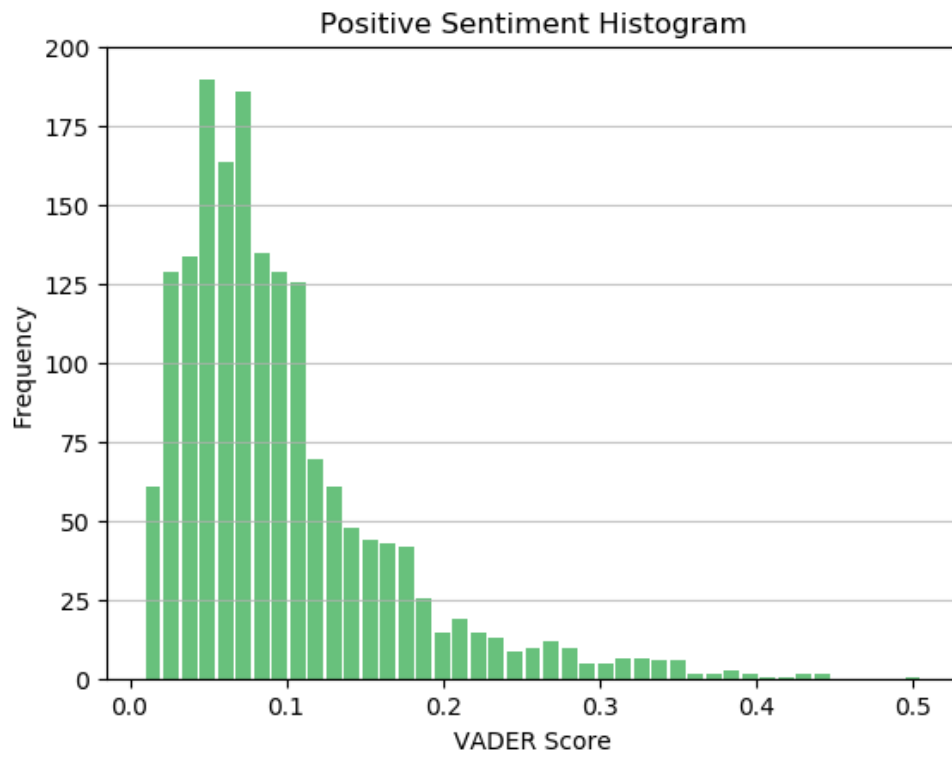


Figure 2 – Positive Sentiment Histogram

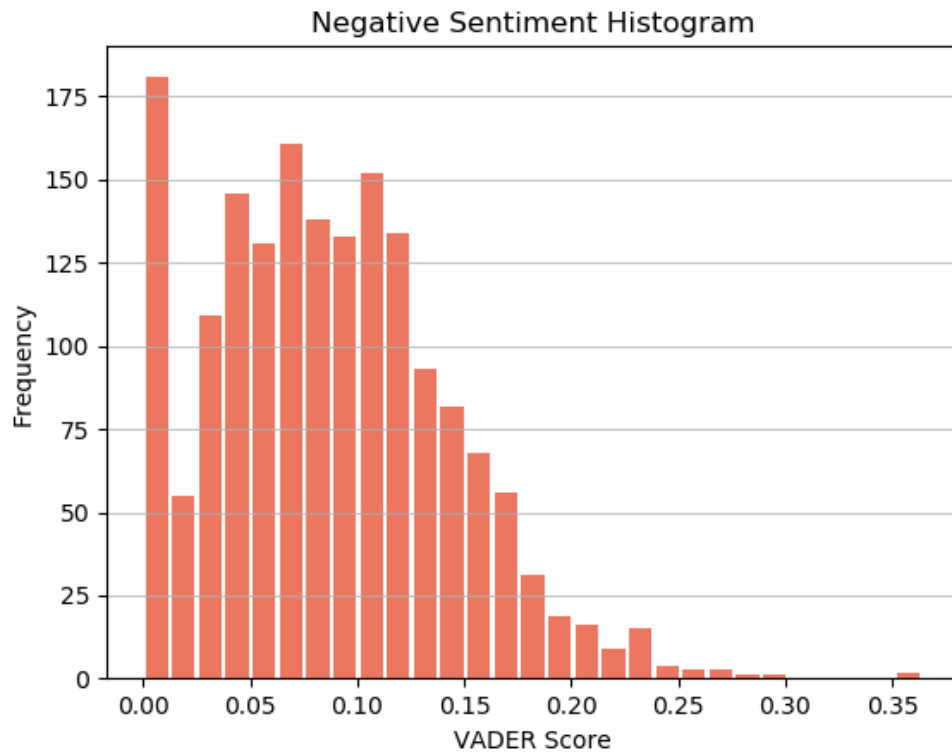


Figure 3 - Negative Sentiment Histogram

Here are some example reviews and their VADER outputs:

### **Review 1**

“Original review: March 15, 2019

I have always been skeptical about rideshare services because of the news reports of assaults and robberies. I used this company for the first time earlier this year during a trip to a conference in Las Vegas. My first ride was excellent and was completed without a problem. My second ride was a little scary. I requested a ride but then my phone died. I was with a friend. While I was trying to recharge my phone, my friend came to me to tell me that our ride had arrived. As we got in the car, I had an uneasy feeling. I started asking the driver "who" he was there to pick up and if he knew where we were going. He never gave me a straight answer and my friend had already told him where we were going.

My suspicions were confirmed when the driver rolled down his window to yell out to a group of women who appeared to be streetwalkers. Also, when we arrived at our hotel, he quoted a price higher than the Uber app quoted. I was subsequently charged a "missed ride" fee by Uber because they showed to get us after we had left with the "imposter". I explained what happened to the customer service rep and they kindly changed their fee to credit towards my next ride.”

### **Output 1**

{'neg': 0.1, 'neu': 0.786, 'pos': 0.114, 'compound': 0.6784}

### **Review 2**

“Original review: Nov. 8, 2019

I do not have Uber in the area where I live. But I use it whenever I travel to Mexico and the US. The worst experience I've had, in my 2 years of using



Uber, was in San Francisco. I waited 14 minutes for a driver who didn't show up. He somehow canceled and went elsewhere, and I found out the hard way. It was annoying but didn't cost me anything but my time. The overwhelming majority of times I have used Uber were great. Nice drivers who showed up on time, drove safely and gave great service. Most Uber drivers go above and beyond. They are happy to give travel tips to tourists and help with luggage. I always feel safe with Uber as I have the Uber car's description and license tag, plus a picture of the driver."

## **Output 2**

```
{'neg': 0.065, 'neu': 0.729, 'pos': 0.207, 'compound': 0.9795}
```