



Movie Consumer Sentiment Analysis: A Systematic Literature Review

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Abstract

Sentiment analysis is the study of sentiments and viewpoints. Sentiment analysis of data is highly valuable for expressing the perspective of the general public, a subgroup, or an entity. This method is used to determine an individual's feelings on a certain piece of information. Internet or online platforms contain a massive quantity of data that comprises reviews of groups and individuals. These reviews have been studied and analyzed by several scholars for understanding the sentiments. The current study aims to systematically review the existing literature on sentiment analysis on movie reviews.

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Key Words: Sentiment Analysis, Text Mining, Machine Learning Approaches

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Introduction

Sentiments are nothing more than the customer's feelings. It might be good, excellent, poor, or indifferent. Sentiment analysis is the process of analyzing such feelings. It is also termed as language processing which employs a computational technique to detect the viewpoint of the reviewer and classify it as positive, negative, or neutral. The web provides disorganized textual information that frequently includes the opinion or feelings of the reviewers (Trivedi et al., 2018). The sentiment analysis aims to determine the reviewers' emotions and expressions of opinion. The classification of user evaluations depending on the nature of the

review is a simple way of sentiment analysis. As a result, determining the appropriate sentiment for each sentence is a challenging task (Bodapati et al., 2019). Sentiment analysis, which is also often researched in data mining, is one of the most active research subjects. Sentiment analysis is employed in practically every social and commercial arena since emotions are crucial to the bulk of human actions and behaviours. Because of its effectiveness, sentiment analysis is highly popular. Sentiment analysis may be performed on thousands of papers (Kalia, 2018). As a result of its efficiency and precision, it has a wide range of applications. Different scholars have used different tools and approaches to



conduct the sentimental analysis. The current study aims to review the varieties of tools and approaches used in more than 75 research papers. This also aids in understanding the prominent issues that impact the sentimental analysis of the movie reviewers. The aim of this study is to examine the related research works in order to determine the current status of research. The second objective is to use the evaluated research to analyze the key problems influencing sentimental analysis in terms of movie reviews. The current study also contributes towards the addition to the theory developments in the area.

Research Methodology

Systematic Literature Review (SLR) was created as a method for identifying and evaluating systematic analysis in the field of movie reviews. A systematic review is conducted

using a methodical, clear, and rigorous approach, with the goal of not just summarizing existing research on the issue but also incorporating some analytical critique.

Research Questions

The research questions chosen for the current study include:

R.Q1. What is the present state of chosen research? When was the publication made?

R.Q2. What are the most efficient SA techniques?

R.Q3. What are the most significant gaps and limitations in the research that have been reviewed?

R.Q4. What are the next and possible future research possibilities in sentimental analysis?

Conference(s)	Journal	Databases
International Conference on Recent Trends in Computing	International Journal of Computer Applications	ScienceDirect
International Conference on Innovative Computing & Communications	The International Journal of Innovative Research in Technology	Elsevier
International Conference on Soft Computing & Machine Intelligence (ISCMII)	International Journal of Applied Engineering Research	Emerald Insight
International Conference on Service Systems and Service Management	International Journal of Engineering Development and Research	IIETA (International Information and Engineering Technology Association)
International Conference on Research and Innovation in Information Systems (ICRIIS)	International Journal of Emerging Technologies in Learning	Semantic Scholar
International Conference on Software Engineering Research, Management and Applications (SERA)	Journal of Intelligent Systems	Springer
International Conference on Inventive Communication and Computational Technologies (ICICCT)	International Journal of Science and Research	
International Conference on Innovative Mechanisms for Industry Applications (ICIMIA)	International Journal of Applied Research	
International Joint Conference on Neural Networks (IJCNN)	International Journal of Emerging Trends & Technology in Computer Science	
International Conference on Cognitive Informatics &	Journal of Advances in Information Technology	



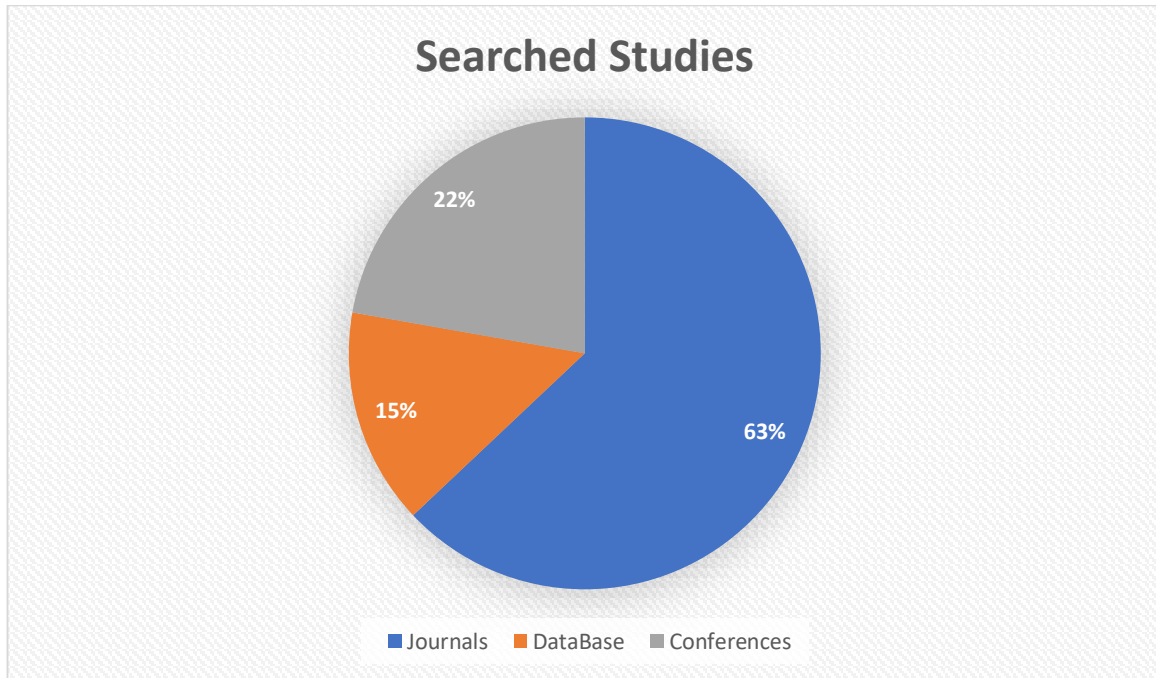
Cognitive Computing (ICCI*CC)		
International Advance Computing Conference (IACC)	Journal of Engineering Science	
International Conference on Network and Information Systems for Computers (ICNISC)	International Journal of Recent Technology and Engineering	
International Conference on Advanced Computing (IACC)	International Journal of Innovative Science and Research Technology	
International Conference on Advances in Electrical, Electronics, Information, Communication and Bio-Informatics (AEEICB)	International Journal of Innovative Research in Science, Engineering and Technology	
	Journal of Applied Science and Computations	
	International Journal of Pure and Applied Mathematics	
	International Journal of Applied Engineering and Management Letters	
	VIVA-Tech International Journal for Research and Innovation	

Literature Selection

The first step taken as a part of the research is to find the relevant papers, studies and articles. A total of 50 papers were considered for this review after thoroughly studying many papers on movie review sentiment analysis. This step of screening and filtering the papers involved the removal of irrelevant and repeated studies by reviewing the abstracts and the titles. The pertinent papers were searched on the internet with the use of related keywords and understanding the SEO algorithm. In addition, only the papers that

focused entirely on sentiment analysis, SA categorization and opinion mining were chosen. Furthermore, to narrow down the screened papers, the ones emphasizing on the movie reviews were filtered. The fundamental key point for the selection was also the language, only those in the English language were chosen; however, the origin of the movies reviewed were not considered as a barrier. It was also ensured that the selected papers include a particular or various tools and methods of sentimental analysis with regard to movie reviews.





Data Extraction & Analysis

The chosen papers were studied to gather the relevant data required for the current literature review. The content of each paper was skimmed to extract the necessary information such as the techniques used, the pre-processing methods adopted, the sources from which the sample data were gathered, and finally the accuracy rate attained in the result. This information has been presented in the tabular columns below for better analysis.

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References	Techniques	Sources
(Baid et al., 2017)	Naïve Bayes, K-Nearest Neighbour and Random Forest	Newsgroups, Blogs. Social Media
(Nehra, 2014)	Support Vector Machine with Natural Language Processing	Blogs, Twitter,
(Brar & Sharma, 2018)	Machine learning technique	Open Movie Database
(Yadav, 2014)	Machine learning, lexicon-based, statistical and rule-based approaches.	Forums and online communities
(Goyal & Parulekar, 2015)	Logistic Regression, Naïve Bayes, SGD Classifier, Random Forest Classifier, kNN Classifier	Large Movie Review Dataset, AI department at Stanford University
(Tripathy et al., 2015)	Naive Bayes (NB and Support Vector Machine (SVM)	Polarity movie review dataset
(V.Uma Ramya & K. Thirupathi Rao, 2018)	Multinomial Logistic Regression, Naïve Bayes, and SVM	Twitter
(Anoop & Asharaf, 2018)	Machine learning techniques	Social Media sites
(Trivedi et al., 2018)	Bayesian, naïve Bayesian and support vector machine [SVM]	Indian review data
(Dorothy & Rajini, 2016)	Lexicon-based and Machine learning approach	Blogs and Twitter
(Yasasvi, 2017)	Naïve Bayes and Bayesian Network	Twitter and web reviews



(Sivagami & Punitha, 2013)	Domain ontology	IMDB corpus reviews
(Sivagami & Punitha, 2013)	SVM, KNN and Naive Bayes.	IMDb reviews
(Chitla, 2021)	Naïve Bayes (NB), Support Vector Machine (SVM), Random Forest (RF)	Web reviews
(Chitla, 2021)	Naïve Bayes, Bernoulli's, Logistic Regression, Stochastic Gradient Descent, and Support Vector Machine	Yelp dataset
(Karan, 2013)	Support Vector Machine	Twitter dataset
(Bodapati et al., 2019)	LSTM (long short-term memory) algorithm	IMDB bench mark dataset
(Kalaivani & Shunmuganathan, 2013)	SVM Classifier	Blogs, review sites and micro blogs
(Dey et al., 2016)	K-NN Classifier	IMDB reviews
(Kalia, 2018)	Document Level Approach	Twitter
(Aleqabie et al., 2020)	Deep Learning Technique	IMDB reviews
(Ashok Tholusuri et al., 2019)	LSTM (long short-term memory) algorithm	IMDB movie review dataset.
(Aleqabie et al., 2020)	Support vector machine (SVM)	Online reviews
(Roberts & Yan, 2014)	SVM	Online movie reviews
(Sharma et al., 2016)	SentiWordNet approach	Online reviews and comments
(Mtetwa et al., 2018)	Machine learning, SVMP, Multinomial NB & Random Forest	Stanford University's ACL IMDB movie review dataset
(Kurnaz, S. and Mahmood, M.A., 2019)	AI & ML	Twitter Reviews
(Ligthart et al., 2021)	LSTM and CNN algorithms	Facebook, Twitter and Tumblr
(Bo Pang et al., 2002)	Naïve Bayes classification, maximum entropy classification, support vector machines	Online movie reviews
(Dhar et al., 2018)	AI, SVM, NLP	Twitter API, Weibo, movie review, IMDb, Chinese micro-blog database
(Nasim et al., 2017)	TF/IDF, Random Forest and SVM.	Movie comments in online portal
(Zhang Xiangyu et al., 2017)	SVM	Movie comments from Cornell Univ-Facebook
(Krishna et al., 2017)	SVM	Reviews from ecommerce sites
(Yadav & Pandya, 2017)	Lexicon-based and Machine learning approach	Twitter API Weibo
(Yazhi Gao et al., 2016)	CNN Model	IMDB Movie Reviews
(Duncan & Zhang,	Neural network.	Twitter API



2015)		
(Trupthi et al., 2017)	Naive Bayes	Twitter API
(Liu et al., 2016)	Convolution Neural Network	Chinese Micro blog database
(Devi et al., 2016)	Support Vector Machine (SVM)	Online Reviews
(Anwar Hridoy et al., 2015)	Rapidminer	Twitter API
(Hegde & Seema S., 2017)	SVM & Naive Bayes.	General Data
(Wang & Liu, 2016)	Morphological Sentences Pattern model	Movie reviews from IMDb, Rotten Tomatoes, Twitter and YouTube
(Ashok Tholusuri et al., 2019)	LSTM	IMDB movie reviews
(Roberts & Yan, 2014)	KNN	Online movie reviews
(Govindarajan, 2014)	Naive Bayes (NB) and Support Vector Machine (SVM)	Bo Pang's web page
(Govindarajan, 2014)	Vector Space Feature Extraction Techniques	Rotten Tomatoes – Movie Review
(Thorat & Priya, 2018)	Machine learning algorithm	Online reviews
(Kumar et al., 2019)	SVM	IMDb movie review dataset
(Amolik et al., 2016a)	Support vector machine and Naive Bayes	Twitter
(Sahu & Ahuja, 2016)	Structured N-grams	IMDB movie review database

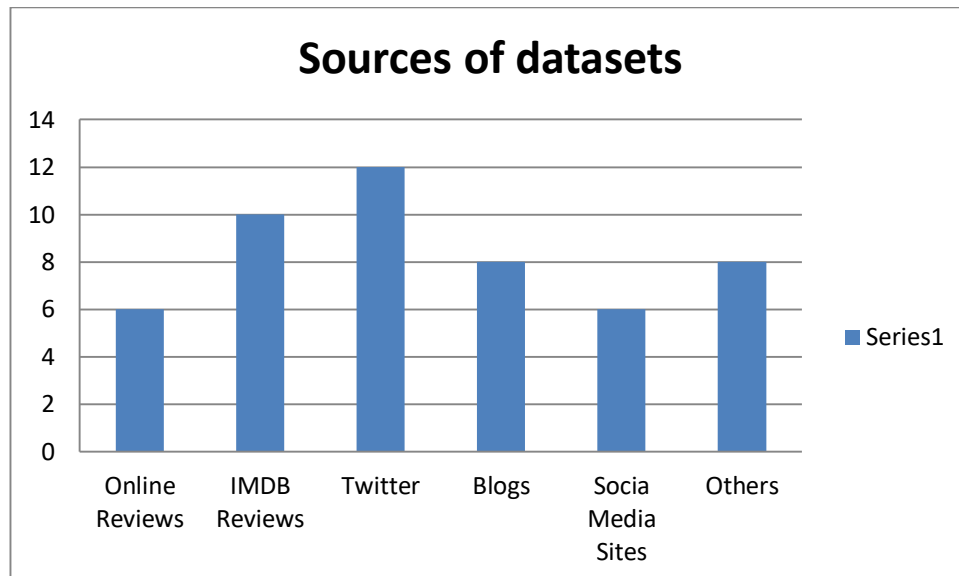
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Reference	Pre-Processing	Data Set	Accuracy
(Baid et al., 2017)	WEKA tool.	2000	81.4 %
(Nehra, 2014)	SentReP	-	-
(Brar & Sharma, 2018)	Natural Language Processing Toolkit for Part of Speech Tagging.	500	81.22%
(Yadav, 2014)	Text categorization	410	74%
(Goyal & Parulekar, 2015)	Regular expression matching	50,000	88%
(Tripathy et al., 2015)	Vectorization of textual data to numerical vector	2000	94%
(V.Uma Ramya & K. Thirupathi Rao, 2018)	Tweepy- A Python library	-	80%
(Anoop & Asharaf, 2018)	Topic modelling (LDA)	1000	81 %
(Trivedi et al., 2018)	Natural language processing	1200	81.3%
(Dorothy & Rajini, 2016)	Regular expression matching	-	-
(Yasasvi, 2017)	Natural language processing and text mining	-	-
(Sivagami & Punitha, 2013)	FCM clustering process	300	90%
(Sivagami & Punitha, 2013)	Regularized Locality Preserving Indexing	1000	71%
(Chitla, 2021)	Python library	-	-



(Chitla, 2021)	Text analysis	-	97%
(Karan, 2013)	Python library	-	84%
(Bodapati et al., 2019)	Text mining and word embedding	50000	88.46%
(Kalaivani & Shunmuganathan, 2013)	Traditional text processing	2000	84.80%
(Dey et al., 2016)	Natural language processing, text analysis and computational linguistic	10000	70%
(Kalia, 2018)	Aspect-Level Approach	-	81.93%
(Aleqabie et al., 2020)	Embedding words approach	-	80%
(Ashok Tholusuri et al., 2019)	Natural Language Processing	25000	86.85%
(Aleqabie et al., 2020)	Text Classification	2000	84%
(Roberts & Yan, 2014)	Natural language processing	2000	80%
(Sharma et al., 2016)	Natural language processing	-	-
(Mtetwa et al., 2018)	Natural language processing	25,000	88%
(Kurnaz, S. and Mahmood, M.A., 2019)	Rule-based approach	-	98%
(Lighthart et al., 2021)	Deep learning-based	228	88%
(Pang et al., 2002)	Document Classification	2000	82.9%
(Dhar et al., 2018)	Convolution neural network, morphological sentence pattern model and IML algorithm	-	-
(Nasim et al., 2017)	Hybrid model.	1230	93%
(Zhang Xiangyu et al., 2017)	Word similarity and word sentiment	-	45%
(Krishna et al., 2017)	Coreference resolution	-	-
(Yadav & Pandya, 2017)	Sentiment polarities	-	-
(Yazhi Gao et al., 2016)	Adaboost algorithm	2500	89.4%
(Duncan & Zhang, 2015)	Reducing input sequence	5000	74.15%
(Trupthi et al., 2017)	NLTK for tokenization	3200	75%
(Liu et al., 2016)	Content analysis	2000	83.4%
(Devi et al., 2016)	Feature based approach	1500	88.13%
(Anwar Hridoy et al., 2015)	Sentiword	4300	80.5%
(Hegde & Seema S., 2017)	Incremental decision tree for data classification.	1200	90%
[42](Wang & Liu, 2016)	Sentiment pattern analyzer	6000	91%
(Ashok Tholusuri et al., 2019)	Text mining	500	93%
(Roberts & Yan, 2014)	Model of word compositions	22348	70%
(Govindarajan, 2014)	Arcing classifier and Sentiment Mining	2000	92%
(Govindarajan, 2014)	Natural Language Processing	1500	67%
(Thorat & Priya, 2018)	Text Mining	25000	81%
(Kumar et al., 2019)	Chi Square FS Method	5000	78%
(Amolik et al., 2016b)	Text mining and classification	200	75%
(Sahu & Ahuja, 2016)	Classification Algorithms	-	88.95%





Machine Learning (ML) or Support Vector Machine (SVM) is found to be the most common approach employed for the sentimental analysis of movie reviews. In terms of pre-processing methods, Natural language processing and text mining are the most commonly used. Out of the papers reviewed, even the ones that were not directly related to movie reviews, had adopted SVM (Nehra, 2014; Tripathy et al., 2015; V.Uma Ramya & K. Thirupathi Rao, 2018; Trivedi et al., 2018; Sivagami & Punitha, 2013; Chitla, 2021; Karan, 2013; Kalaivani & Shunmuganathan, 2013; Aleqabie et al., 2020; Roberts & Yan, 2014) and ML (Brar & Sharma, 2018; Yadav, 2014; Anoop & Asharaf, 2018; Dorothy & Rajini, 2016) for the sentimental analysis of book reviews and similar cases.

Discussion and Future Research

This Systematic Literature Review takes into account a thorough examination of a variety of sentiment analysis methodologies and procedures. In this study, LSTM approaches, SVM, SentiReview, Deep Learning approaches, ML, and the K-NN Classifier model are investigated. Each approach has its own set of capabilities and yields various outcomes. In the past, methods such as lexicon-based approaches and SVM were employed, but as sentiment analysis has progressed, new methods such as Deep Learning and ML are being used more frequently for better results. When it comes to reviewing any product, system, or service, sentiment analysis is critical. The approaches

described in the article have benefits and drawbacks, and they may be utilized in different ways depending on the system. This study contributes to the existing literature on the sentimental analysis of movie reviews gathered from a wide range of sources such as IMDB reviews, blogs, newsgroups and most importantly twitter. The future studies can focus entirely on a certain source of dataset on movie reviews and study the sentimental analysis of the positive, negative and neutral comments and reviews.

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