

# MOVIE REVIEW USING NLP

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**Abstract:** Movie reviews play a major role not just because they are important or interesting it's because they influence people's mindsets. People chose movies based on these ratings or reviews. So, these ratings or reviews should be accurate or well-aimed. So, we will develop an application that collects tweets related to a movie from Twitter and prepares a dataset. We will send this dataset to a trained LSTM model. This model gives us a polarity of these tweets. Based on the polarity we calculate the average of the polarity of these statements. This average ranges from 0-5. This rating will be available to the user in the form of a web page.

**Keywords:** LSTM, USE.

## 1. INTRODUCTION

Humans are subjective creatures and their opinions are important because they reflect their satisfaction with products, services, and available technologies. Being able to interact with people on that level has many advantages for information systems; such as enhancing product quality, adjusting marketing and business strategies, improving customer services, managing crises, and monitoring performances.

A movie review is an article reflecting its writers' opinion about a certain movie and criticizing it positively or negatively, which enables everyone to understand the overall idea of that movie and make the decision whether to watch it or not. A movie review can affect the whole crew who worked on that movie. A study illustrates that in some cases, the success or failure of a movie depends on its reviews. Therefore, a vital challenge is to be able to classify movie reviews to capture, retrieve, quantify and analyze watchers more effectively.

Nowadays, if you want to a successful business, it is very important to act according to your viewers' comments. When we look at today's most prominent and successful companies like Amazon or Netflix, we can see that they are the companies that use data best and know their customers best. These days, people

have become smart enough to read or watch a movie review investing their money in a ticket. Movies shape the minds of many. Film reviewing is a creative job but is also a responsible one. A film critic cannot give biased opinions. film reviewers can manipulate the audience. Movie review classification into positive or negative reviews is connected with words occurrences from the text of the review, and whether those words have been used before in a positive or a negative context. These factors help enhance the review understanding process.

Before seeing a movie, we read public reviews. Priority is given to this movie rating. We will thus develop a service that gives a movie review. Based on the public tweets, this project rates the movies. So, we will develop an application that collects tweets related to a movie from Twitter and prepares a dataset. We will send this dataset to a trained LSTM model. We gather tweets on a certain movie and determine the polarity of each one. This model gives us a polarity of these tweets. The rating for the film is between 0 and 5, depending on the polarity. The movie's rating will be made publicly available through a web page.

## **2. LITERATURE SURVEY**

[1] This paper includes the details of two proposed deep learning architectures CNN-LSTM and LSTM-CNN method. The proposed system uses IMDB movie review data set which contains 1000 positive reviews and 1000 negative reviews. For training and validation, the full training examples have been arbitrarily split. Input dataset divided into two, training dataset and the validation dataset. Keras provide two methods to evaluate deep learning model. The first one is automatic verification of dataset and second is manual verification of dataset. Keras separates one portion of training data into validation data and then assesses the performance of model on that validation dataset on every epoch.

[2] Micro-blog has become an important place for people to talk , Sentiment analysis in the application of mass data will help to improve the Internet public opinion monitoring system. Therefore, the research scheme proposed in this paper is the use of deep learning CNN to avoid the explicit feature extraction, and implicitly learned from the training data. The practice proves that the deep learning method is feasible to improve the accuracy of emotion analysis.

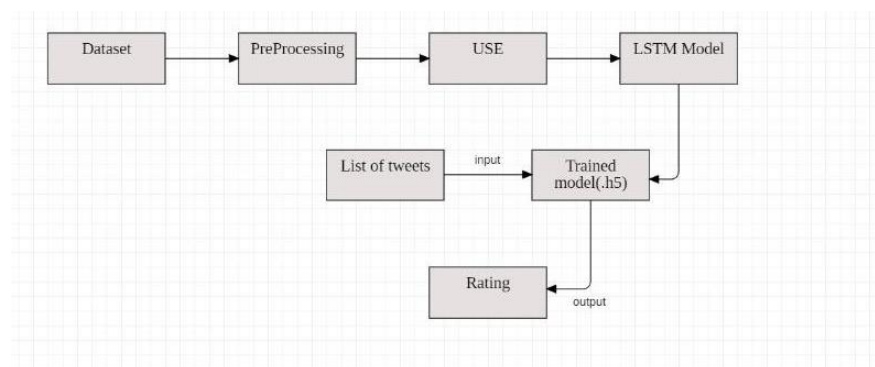
[3] Sentiment Analysis (SA) is the task of inferring polarity of an opinion in a text. Though most of the work in SA is for English, there has been work in other languages as well such as Chinese, Japanese, German and Spanish). To perform SA on these languages, cross-lingual approaches are often used due to the lack of annotated content in these languages. This paper presented an approach to cross-lingual SA that uses WordNet synset identifiers as features of a supervised classifier. The sense-based approach provides a

cross-lingual classification accuracy of 72% and 84% for Hindi and Marathi respectively, which is an improvement of 14% - 15% over the baseline based on a cross-lingual approach using a naïve translation of the training and test corpus.

[4] Presents recent research on Automation Control Theory Perspectives in Intelligent Systems Proceedings of the 5th Computer Science On-line Conference 2016 (CSOC2016), Vol2 Automation Control Theory Perspectives in Intelligent Systems. The proceedings are divided in three volumes Vol1: Artificial Intelligence Perspectives in Intelligent Systems, Volume 2: Automation Control Theory Perspectives in Intelligent Systems, and Volume 3: Software Engineering Perspectives and Application in Intelligent Systems. It contains publications on theory, applications, and design methods of Intelligent Systems and Intelligent Computing.

### 3. PROBLEM DEFINITION

People usually decide to watch a movie based on its reviews, but nowadays as there are lots of different opinions being posted it's difficult to understand the correct review of the movie. So, we are trying to build a model which helps in rating a movie based on all the different reviews



**Fig1:** Flow chart of our capstone project. In the above flow chart, we described the model workflow in this project.

### 4. DATASET AND ATTRIBUTES

We collected the dataset from Kaggle. We use the same dataset for training and testing. The dataset consists of a total of 20,000 texts or statements.

#### Input features:

##### Training dataset:

The training dataset consists of 15,000 statements or reviews related to web series and movies. This dataset consists of two columns. The first column consists of text and the second

column consists of the polarity of the text.

First column: **Text**

This column includes the statements or comments.

Second column: **Polarity**

This column includes the polarity of the text.

### Testing dataset:

The training dataset consists of 5,000 statements or reviews related to a webseries and movie. This dataset consists of two columns. Same as the training dataset.

First column: **Text**

This column includes the statements or comments.

Second column: **Polarity**

This column includes the polarity of the text.

### Output Feature:

- Rating
- Value: ranges from 0 to 10.

	A	B	C
1	review	review_type	
2	I grew up (b. 1965) watching and loving the Thunderbirds. All my mates at school watched. We played "Thunderbirds" before school, during lunch and after school. We all wanted to be Virgil c		bad
3	When I put this movie in my DVD player, and sat down with a coke and some chips, I had some expectations. I was hoping that this movie would contain some of the strong-points of the first i		bad
4	Why do people who do not know what a particular time in the past was like feel the need to try to define that time for others? Replace Woodstock with the Civil War and the Apollo moon-land		bad
5	Even though I have great interest in Biblical movies, I was bored to death every minute of the movie. Everything is bad. The movie is too long, the acting is most of the time a joke and the scri		bad
6	I'm a die hard Dad's Army fan and nothing will ever change that. I got all the tapes, DVD's and audiobooks and every time I watch/listen to them it's brand new.   The film. The film is a good		good
7	A terrible movie as everyone has said. What made me laugh was the cameo appearance by Scott McNealy, giving an award to one of the murdered programmers in front of a wall of SUN logos		bad
8	Finally watched this shocking movie last night, and what a disturbing mindf**ker it is, and unbelievably bloody and some unforgettable scenes, and a total assault on the senses. Looks like a r		good
9	I caught this film on AZN on cable. It sounded like it would be a good film, a Japanese "Green Card". I can't say I've ever disliked an Asian film, quite the contrary. Some of the most incredible I		bad
10	It may be the remake of 1987 Autumn's Tale after eleven years, as the director Mabel Cheung claimed. Mabel employs rock music as the medium in this movie to express her personal attitude		good
11	My Super Ex Girlfriend turned out to be a pleasant surprise for me, I was really expecting a horrible movie that would probably be stupid and predictable, and you know what? It was! But this		good
12	I can't believe people are looking for a plot in this film. This is Laurel and Hardy. Lighten up already. These two were a riot. Their comic genius is as funny today as it was 70 years ago. Not a film		good
13	If you haven't seen the gong show TV series then you won't like this movie much at all, not that knowing the series makes this a great movie.   I give it a 5 out of 10 because a few th		bad
14	I have always been a huge fan of "Homicide: Life On The Street" so when I heard there was a reunion movie coming up, I couldn't wait.   Let me just say, I was not disappointed at all		good
15	Greg Davis and Bryan Daly take some crazed statements by a terrorists, add some commentary by a bunch of uber-right reactionaries, ascribe the most extreme positions of the most fundame		bad
16	A half-hearted attempt to bring Elvis Presley into the modern day, but despite a sexy little shower scene and a pseudo-Playboy magazine subplot, Presley is surrounded by the same old coy, i		bad
17	If you want a fun romp with loads of subtle humor, then you will enjoy this flick.   I don't understand why anyone wouldn't enjoy this one. Take it for what it is: a vehicle for Dennis I		good
18	I really wanted to be able to give this film a 10. I've long thought it was my favorite of the four modern live-action Batman films to date (and maybe it still will be--I have yet to watch the Schu		good
19	The main problem with "Powers" is that it features way too many pointless characters and subplots that add absolutely nothing to the movie whatsoever. It gets boring after awhile, sitting arou		bad
20	The folks at Disney have a lot to explain. First and foremost, why anyone thought this lesser-sitcom material would ever make even a half-decent motion picture. In the kooky 60's teleplay, it		bad
21	A friend told me of John Fante last summer after we got into a conversation about Charles Bukowski. I did not know that Fante was a favorite writer of Bukowski's - an author with similar edge		bad
22	Ever since I heard of the Ralph Bakshi version of "The Lord of the Rings" I wondered: What the hell is 'rotoscope' animation?!! Well... I finally found out... I saw this movie about three years a		good
23	I sat through this film and I have to say it only just managed to keep my attention. The film would have been a bit more bearable if I did not have to watch the awful CGI, for future reference t		bad
24	I don't care if some people voted this movie to be bad. If you want the Truth this is a Very Good Movie! It has every thing a movie should have. You really should Get this one.		good
25	I never really understood the controversy and hype this movie caused. Especially in French and the neighboring countries (in Belgium, where I am located, for example), "Baise-Moi" was ann		bad
26	Sweet, entertaining tale of a young 17-12 year old boy, controlled by an overbearing religious mother and withdrawn father, and how he finds himself through his reticent, coto		good
27	First, I should mention that I really enjoyed ISHII Katsuhito's previous film "Samehada Otoko to Momojiri Onna" ("Shark Skin Man and Peach Hip Girl"). Although it owed a debt to Tarantino's "bad		bad

Fig2: Dataset.

## 5. DATASET PREPROCESSING

We have used a python inbuilt model i.e re and universal sentence encoder to complete this process, where the main goal is to convert the data into a vector and perform embedding on it. These are the steps taken for data Pre-processing.

### ➤ Text cleaning

In any machine learning task, cleaning or pre-processing the data is as important as a model building

if not more and when it comes to unstructured data like text, this process is even more important. The objective of this kernel is to understand the various text pre-processing steps with code examples. Some of the common text pre-processing / cleaning steps are:

- Lower casing
- Removal of Punctuations
- Removal of Stop words
- Removal of Frequent words
- Removal of Rare words
- Stemming & Lemmatization
- Removal of emojis
- Conversion of emoticons to words
- Conversion of emojis to words
- Removal of URLs
- Removal of HTML tags
- Chat words conversion

	review	review_type
0	I grew up (b. 1965) watching and loving the Th...	bad
1	When I put this movie in my DVD player, and sa...	bad
2	Why do people who do not know what a particula...	bad
3	Even though I have great interest in Biblical ...	bad
4	Im a die hard Dads Army fan and nothing will e...	good
...	...	...
19995	I was required to watch the movie for my work,...	bad
19996	"White Noise" had potential to be one of the m...	bad
19997	The Five Deadly Venoms is a great kung-fu acti...	good
19998	All G Indahouse has got to be one of the funni...	good
19999	I found myself at sixes and sevens while watch...	good

20000 rows x 2 columns

**Fig3: Before Pre-Processing.**

	review_type	review
0	bad	i grew up b 1965 watching and loving the thund...
1	bad	when i put this movie in my dvd player and sat...
2	bad	why do people who do not know what a particula...
3	bad	even though i have great interest in biblical ...
4	good	im a die hard dads army fan and nothing will e...
...	...	...
19995	bad	i was required to watch the movie for my work ...
19996	bad	white noise had potential to be one of the mo...
19997	good	the five deadly venoms is a great kung - fu ac...
19998	good	all g indahouse has got to be one of the funni...
19999	good	i found myself at sixes and sevens while watch...

20000 rows x 2 columns

**Fig4:** After Pre-Processing.

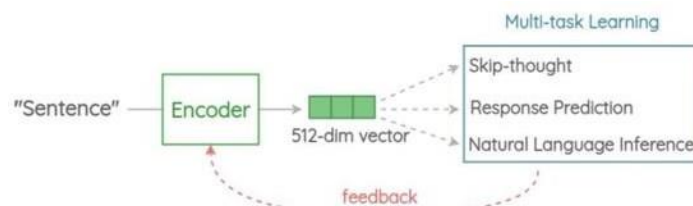
## 6. ALGORITHMS

This section talks about the Universal sentence encoder and LSTM models used for the project.

### ▪ UNIVERSAL SENTENCE ENCODER

The universal sentence encoder makes looking up embeddings at the sentence level as simple as it has previously been to look up embeddings at the word level. Then, using less supervised training data, the sentence embeddings can be easily employed to compute sentence-level meaning similarity and improve performance on subsequent classification tasks. The universal sentence encoder model converts textual information into numerically represented, high-dimensional vectors called embeddings. It aims to transfer learning, especially to other NLP tasks like text categorization, semantic similarity, and clustering. The freely accessible universal sentence encoder is listed in the Tensor flow hub. To learn for a wide range of jobs, it is trained on a number of data sources.

On a high level, the idea is to design an encoder that summarizes any given sentence to a 512-dimensional sentence embedding. We use this same embedding to solve multiple tasks and based on the mistakes it makes on those, we update the sentence embedding. Since the same embedding has to work on multiple generic tasks, it will capture only the most informative features and discard noise. The intuition is that this will result in a generic embedding that transfers universally to a wide variety of NLP tasks such as relatedness, clustering, paraphrase detection, and text classification.



**Fig5:** Architecture.

### ▪ LSTM

Long short-term memory (LSTM) is an artificial neural network used in the fields of artificial intelligence and deep learning. Unlike standard feedforward neural networks, LSTM has feedback connections. Such a recurrent neural network (RNN) can process not only single data points (such as images) but also entire sequences of data (such as speech or video). For example, LSTM is applicable to tasks such as unsegmented, connected handwriting recognition, speech recognition, machine translation, robot control, video games, and healthcare. LSTM has become the most cited neural network of the 20th century.

The name LSTM refers to the analogy that a standard RNN has both "long-term memory" and "short-term memory". The connection weights and biases in the network change once per episode of training, analogous to how physiological changes in synaptic strengths store long-term memories; the activation patterns in the network change once per time-step, analogous to how the moment-to-moment change in electric firing patterns in the brain store short-term memories. The LSTM architecture aims to provide a short-term memory for RNN that can last thousands of timesteps, thus "long short-term memory". A common LSTM unit is composed of a cell, an input gate, an output gate and a forget gate.

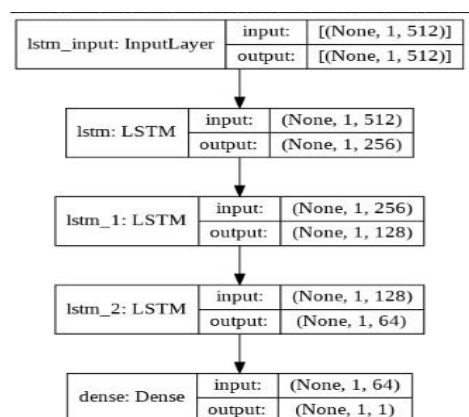
LSTM networks are well-suited to classifying, processing, and making predictions based on time series data since there can be lags of unknown duration between important events in a time series. LSTMs were developed to deal with the vanishing gradient problem that can be encountered when training traditional RNNs. Relative insensitivity to gap length is an advantage of LSTM over RNNs, hidden Markov models, and other sequence learning methods in numerous applications.

### Model Architecture:

Model: "sequential"

Layer (type)	Output Shape	Param #
=====		
lstm (LSTM)	(None, 1, 256)	787456
lstm_1 (LSTM)	(None, 1, 128)	197120
lstm_2 (LSTM)	(None, 1, 64)	49408
dense (Dense)	(None, 1, 1)	65

**Fig6: Model Parameters.**



**Fig7: Model Layers.**

## 7. RESULTS

We used 3 LSTM layers to improve the accuracy of the model. The accuracy of the LSTM model was 84%. As the model has good accuracy, we use this model to give ratings to movies or series.

```
Model: "sequential"
Layer (type)                Output Shape                Param #
=====
lstm (LSTM)                  (None, 1, 256)             787456
lstm_1 (LSTM)                (None, 1, 128)             197120
lstm_2 (LSTM)                (None, 1, 64)              49408
dense (Dense)                (None, 1, 1)               65
=====
Total params: 1,034,049
Trainable params: 1,034,049
Non-trainable params: 0

157/157 [=====] - 1s 5ms/step - loss: 0.3971 - accuracy: 0.8452
```

**Fig8:** Accuracy.

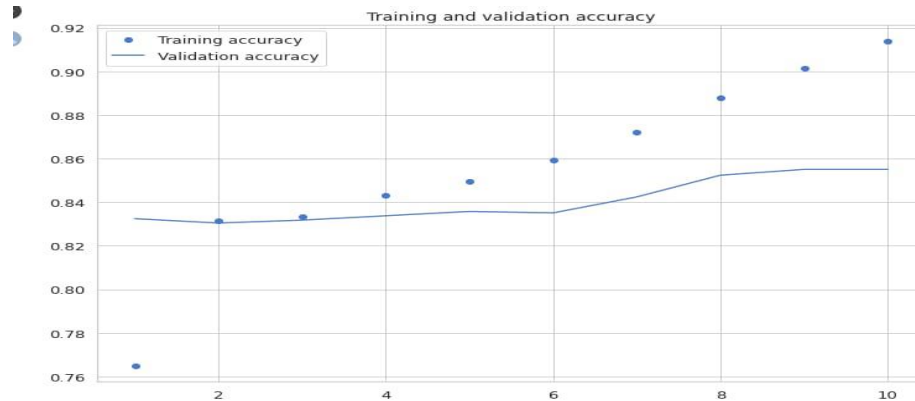


**Fig9:** Model Results.



## 8. GRAPHS

In the below graph, we plot model training accuracy vs testing accuracy.



**Fig10:** Training and validation accuracy.

In the below graph, we plot training loss vs validation loss.



**Fig11:** Training and validation loss.

## 9. CONCLUSION

Movies are widely appreciated and criticized art forms. They are a significant source of entertainment and lead to web forums like IMDB and amazon reviews for users to give their feedback about the movies and web series. These reviews and feedback draw incredible consideration.

Although this information is unstructured, it is very crucial. We were inspired to work on this project to resolve this problem of unstructured movie reviews and that people need not spend a lot of time reading the whole review to understand whether the reviewer thinks about the movie in a positive or negative view.

## 10. REFERENCES

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