

Literature Review (Secondary Research) Template

Student Name	G.Kausthub Rao
Project Topic Title	Emotion recognition from text and feedback analysis using deep learning

1		
Reference in APA format		
URL of the Reference	Authors Names and Emails	Keywords in this Reference
https://ieeexplore.ieee.org/document/8940267	Qi Wang Lei Sun Zheng Chen	Sentiment analysis, Natural language processing, Deep learning, Neural Network
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/ ... etc)	The Goal (Objective) of this Solution & What is the problem that need to be solved	What are the components of it?
Proposed a fusion model, made by combining the convolutional neural network and Bi-LSTM	The goal of this solution is to propose a deep learning model for sentiment analysis of movie reviews. The problem that needs to be solved is to find the best performing model for emotion recognition.	Preprocessing of text Splitting of movie reviews Using fusion model to get the results and accuracy Comparing the accuracy of fusion model with other models

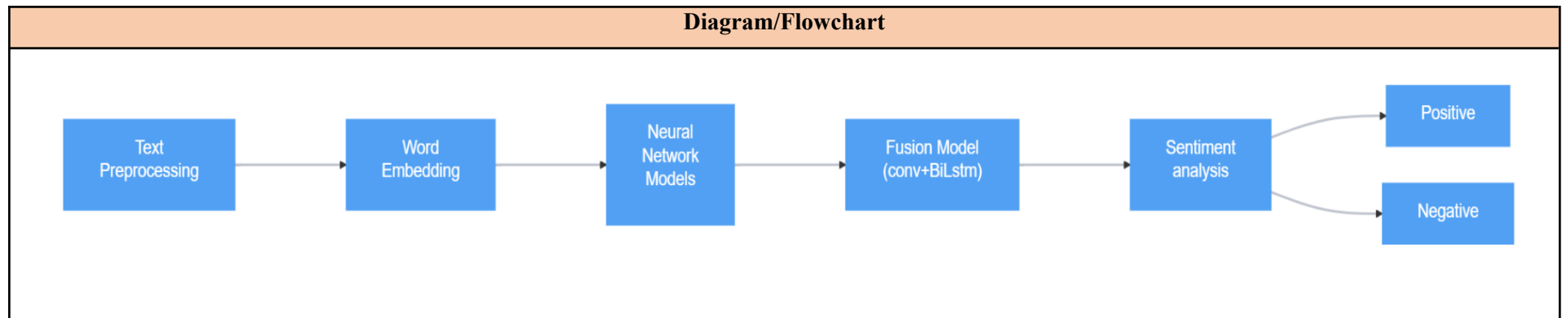
The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	We are using large Movie Review Dataset by Mass et al from its original Stanford AI Repository contains 25k movie reviews for training and 25k for testing		.
2	The starting step of this solution is preprocessing of text by using Glove technique.	Helped in achieving better accuracy	Poor performance for rare words
3	Used many different algorithms to analyse the accuracies and performance	Understood different algorithms and their limitations for emotion recognition in text	Most of the algorithms are resource intensive
4	Found the better performing model in the combination of cnn and bi-lstm		

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
Sentiment polarity(Positive or negative)	The text given as input which are the movie reviews		

Relationship Among The Above 4 Variables in This article							
Input and Output		Feature of This Solution	Contribution & The Value of This Work				
<table><tr><th>Input</th><th>Output</th></tr><tr><td>Textual reviews are given as an input</td><td>Emotion classification into positive or negative</td></tr></table>		Input	Output	Textual reviews are given as an input	Emotion classification into positive or negative	This solution is a combination of convolution neural network with Bi-directional LSTM which shows that fusion models can help in achieving better accuracies	It is a good thought of combining the two different models and opting a different vectorization method to get better accuracy
Input	Output						
Textual reviews are given as an input	Emotion classification into positive or negative						
Positive Impact of this Solution in This Project Domain		Negative Impact of this Solution in This Project Domain					
Better accurate results is the positive impact of this solution in this project domain		Could have used different datasets and many other fusion models formed by different combination of existing models to get a better idea					
Analyse This Work By Critical Thinking	The Tools That Assessed this Work		What is the Structure of this Paper				
The work done by authors gives a new way of approaching the problem. It do not focus only on the algorithm but focuses on each and every step to improve the overall accuracy	Accuracy		Abstract <ol style="list-style-type: none">1. Introduction2. Text preprocessing3. Neural networks models4. Experiment-based results5. Conclusion				



—End of Paper 1—

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Reference in APA format		
URL of the Reference	Authors Names and Emails	Keywords in this Reference
https://ieeexplore.ieee.org/abstract/document/9913586	Gourank Jain Satyam Verma Honey Gupta Saloni Jindal Mr. Mukesh Rawat, Mr. Kapil Kumar	Text classification, emotion detection, BERT,NLP, Neural Network
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/ ... etc)	The Goal (Objective) of this Solution & What is the problem that need to be solved	What are the components of it?
Proposed a new way,BERT, which helps in emotion detection of text in social media platforms.	The goal is to get more accurate predictions of emotion in a text. The problem that needs to be solved is to create a better emotion prediction model.	Undersampling Technique Splitting of dataset Preprocessing BERT Regularization Classification

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	The first step of this process deals with making the dataset balanced by using undersampling technique followed by the splitting of dataset	This step prepares data for the BERT model and ensures that the data is consistent and representative which avoids the biased results	This step may lose some information or can remove the necessary words
2	The pre-trained BERT model is used to encode the input text into contextual embeddings. The output is a pooled output that represents the whole input sequence as an embedding.	Helps in achieving the the best prediction of emotion in a given text	May require lots of computational resources and memory to run.
3	A dropout layer is applied to regularize the data	This step helps in avoiding overfitting problem	
4	The final step is to classify the emotion in text		Classifies emotions into positive or negative

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
Sentiments in the text (Positive or Negative)	Social media platforms text given as input		

Relationship Among The Above 4 Variables in This article									
Input and Output		Feature of This Solution		Contribution in This Work					
<table><tr><th>Input</th><th>Output</th></tr><tr><td>Textual data extracted from social media and many other sources is given as input.</td><td>The emotion of the text is expected as output,which is either positive or negative</td></tr></table>		Input	Output	Textual data extracted from social media and many other sources is given as input.	The emotion of the text is expected as output,which is either positive or negative	Unlike other approaches, this solution uses a balanced dataset their by avoiding the bias in result generation or emotion recognition		This work explains the necessity of having a balanced dataset for emotion recognition in text. Got to know about the technique to achieve a balanced dataset.	
Input	Output								
Textual data extracted from social media and many other sources is given as input.	The emotion of the text is expected as output,which is either positive or negative								
Positive Impact of this Solution in This Project Domain			Negative Impact of this Solution in This Project Domain						
Using BERT is one of the best choices for binary emotion classification. Accuracy can be improved by using different activation functions and mainly by using balanced dataset.			This solution is only for binary classification of emotions and trained only on movie review dataset.						
Analyse This Work By Critical Thinking		The Tools That Assessed this Work		What is the Structure of this Paper					
The author's work primarily focused on identifying the challenges faced by other researchers in this field, which mainly revolve around datasets. This helped in achieving better accuracy and best results		Precision Accuracy Support		Abstract 1. Introduction 2. Literature Review 3. Proposed Work 4. Experiment & Result 5. Performance 6. Conclusion					

Diagram/Flowchart



—End of Paper 2—

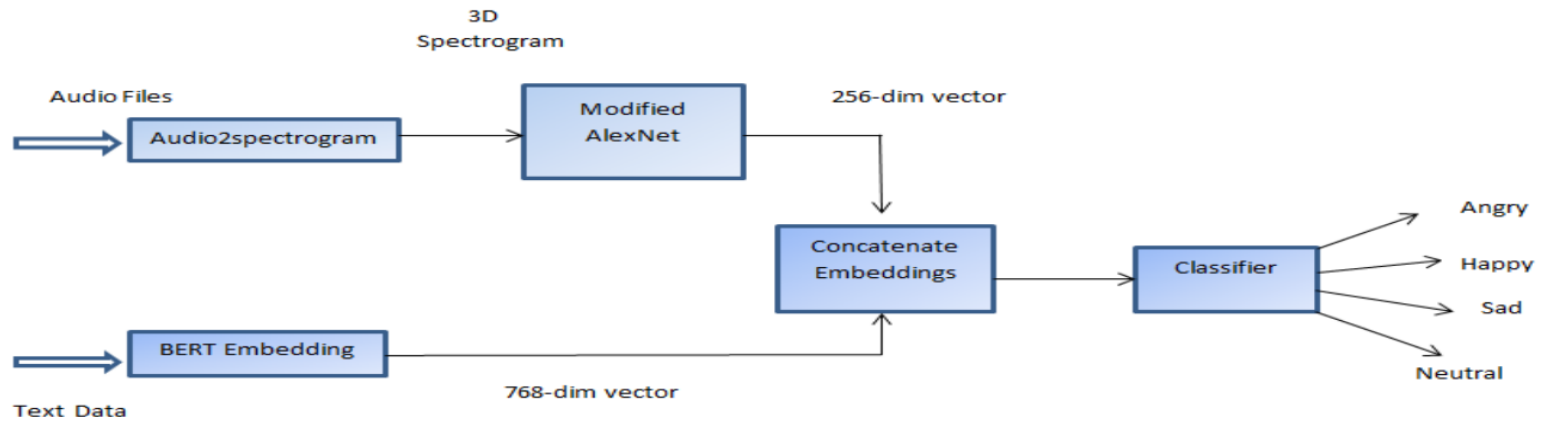
3

Reference in APA format			
URL of the Reference		Authors Names and Emails	Keywords in this Reference
https://ieeexplore.ieee.org/document/9917655		Asiya U A, Mr Kiran V K	Audio Emotion Recognition, Text Emotion Recognition, AlexNet, BERT
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/ ... etc)		The Goal (Objective) of this Solution & What is the problem that need to be solved	What are the components of it?
The current solution is an unique attempt in achieving the better accuracy in recognising emotions from text		The goal of this solution is to get better accurate emotion prediction by changing the entire system's modality.The problem solved is improved classification of given input	Data Preprocessing Feature Extraction Audio Emotion Recognition Text Emotion Recognition Multimodal emotion recognition
The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process			
	Process Steps	Advantage	Disadvantage (Limitation)
1	The first step is taking the dataset unnamed IEMOCAP and process it by selecting only the required attributes.	This helps us to reduces the data size and complexity	

2	Capturing the required features for emotion recognition which are spectrogram from audio signals and lexical features from text		Requires the domain knowledge to perform this step												
3	Using a CNN(named AlexNet) and transformers model(named BERT) to process the spectrogram of audio signal and lexical features of text	This step allows to learn contextual relationship between words and helps in reducing the problem of overfitting	Requires lot of computation power for training and testing along with huge amounts of data for training the models												
4	Concatenating the audio and text embeddings to form a combined embedding for emotion recognition.	By performing this step we can achieve better emotion predictions													
Major Impact Factors in this Work															
<table> <tr> <th>Dependent Variable</th><th>Independent Variable</th><th>Moderating variable</th><th>Mediating (Intervening) variable</th></tr> <tr> <td>The emotion label predicted.</td><td>The text and audio signals which are given as input</td><td></td><td></td></tr> <tr> <td></td><td></td><td></td><td></td></tr> </table>				Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable	The emotion label predicted.	The text and audio signals which are given as input						
Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable												
The emotion label predicted.	The text and audio signals which are given as input														
<table> <tr> <th colspan="4">Relationship Among The Above 4 Variables in This article</th></tr> <tr> <td colspan="4"></td></tr> </table>				Relationship Among The Above 4 Variables in This article											
Relationship Among The Above 4 Variables in This article															

Input and Output		Feature of This Solution	Contribution & The Value of This Work			
<table><tr><th>Input</th><th>Output</th></tr><tr><td>The speech signal is given as input which is the combination of text and audio</td><td>The emotion which is been classified is the output</td></tr></table>	Input	Output	The speech signal is given as input which is the combination of text and audio	The emotion which is been classified is the output	The proposed work explains the tremendous change in the accuracy by shifting our idea from uni modality to multi modality which is an important and useful feature of this solution	Demonstrates the effectiveness of a multimodal approach combining audio and text models for improved emotion recognition compared to unimodal models.
Input	Output					
The speech signal is given as input which is the combination of text and audio	The emotion which is been classified is the output					
Positive Impact of this Solution in This Project Domain		Negative Impact of this Solution in This Project Domain				
The positive impact of this solution is that it iImproved emotion recognition accuracy to 98% from audio and text models. This can enable more effective applications.		The negative impact of this solution is that everytime we need to provide the speech signal to get better accurate results which is acceptable by few people. This also raises privacy concerns too.				
Analyse This Work By Critical Thinking	The Tools That Assessed this Work		What is the Structure of this Paper			
All the papers till now read were able to improve the accuracy by just few percentage.On the other hand, this proposed system were able to improve the accuracy by large percentage	Precision Accuracy Recall		Abstract 1. Introduction 2. Related works 3. Proposed works 4. Dataset 5. Result analysis 6. Conclusions			

Diagram/Flowchart



—End of Paper 3—

4

Reference in APA format			
URL of the Reference	Authors Names and Emails	Keywords in this Reference	
https://ieeexplore.ieee.org/document/9058128	Dr. Shailendra Narayan Singh Twinkle Sarraf	Sentiment analysis, product reviews, random forest classifier, bag-of-words	
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/ ... etc)	The Goal (Objective) of this Solution & What is the problem that need to be solved	What are the components of it?	
The current proposed solution uses machine learning approach along with natural language processing techniques to help users/customers take the best decisions.The proposed solution is an user centric	The goal of this solution is to help users reduce the time of analysing a product. The problem of the user taking the decision to buy/not buy is solved.	Data Preparation Review Analysis Sentiment classification	
The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process			
	Process Steps	Advantage	Disadvantage (Limitation)
1	The initial step is data collection which is also a differentiator step from existing works	We can train our model from live and real data from popular sites.	The system depends on the availability and structure of the website,which are temporary
2	The system cleans and parses the data to extract the reviews and assigns an ID to each review. The system also removes irrelevant data such as the reviewer's name and date.	The system reduces the noise and redundancy in the data and makes it ready for analysis.	

3	The system uses natural language processing techniques and Vader sentiment analyzer to process the reviews and assign sentiment scores. The system also uses a bag-of-words model to represent the text as a document vector of word frequencies.		Bag of model will ignore the word order which can be really important for a few cases.
4	The formed vector is sent to the model and random forest algorithm is used to classify the text as positive and negative review	This allows to hide the bias or incorrect result of one model by taking the result which is predicted by majority of the models	
5	The final step is classify the sentiments of each and every text or review then give a final score of number of positive and negative reviews	This step of providing the positive and negative scores helps the users to make best decisions.	

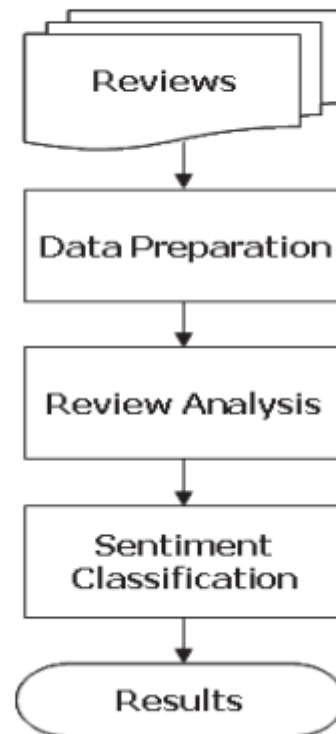
Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
Sentiment scores of the product	Product name given as input		

Relationship Among The Above 4 Variables in This article

Input and Output		Feature of This Solution	Contribution & The Value of This Work				
<table><tr><th>Input</th><th>Output</th></tr><tr><td>The product name is given as input</td><td>The number of positive and negative reviews of a product is given as output</td></tr></table>		Input	Output	The product name is given as input	The number of positive and negative reviews of a product is given as output	The proposed work has a best feature of using live data extracted from website rather than using existing dataset for training	The proposed solution helped me to know the value of the real time data which can be extracted from popular websites.
Input	Output						
The product name is given as input	The number of positive and negative reviews of a product is given as output						
Positive Impact of this Solution in This Project Domain		Negative Impact of this Solution in This Project Domain					
The positive impact of this solution it helps to save the time of the user been spent on researching the reviews by directly giving the number of positive and negative reviews		The negative impact of this solution is that it does not provide the detailed reasons of problems or negative reviews provided to the product which can affect the buyers satisfaction					
Analyse This Work By Critical Thinking	The Tools That Assessed this Work		What is the Structure of this Paper				
The proposed work is very effective in the view of the user. This work is not widely appreciable to use by the business owner as it does not provide any reason for negative reviews.But for users it saves a lot of time and helps to decide whether to buy a product or not.			Abstract <ol style="list-style-type: none">1. Introduction2. Structural Design of Opinion Mining3. Related Work4. Proposed Approach5. Implementation and Result6. Conclusion7. Future Enhancements				

Diagram/Flowchart



—End of Paper 4—

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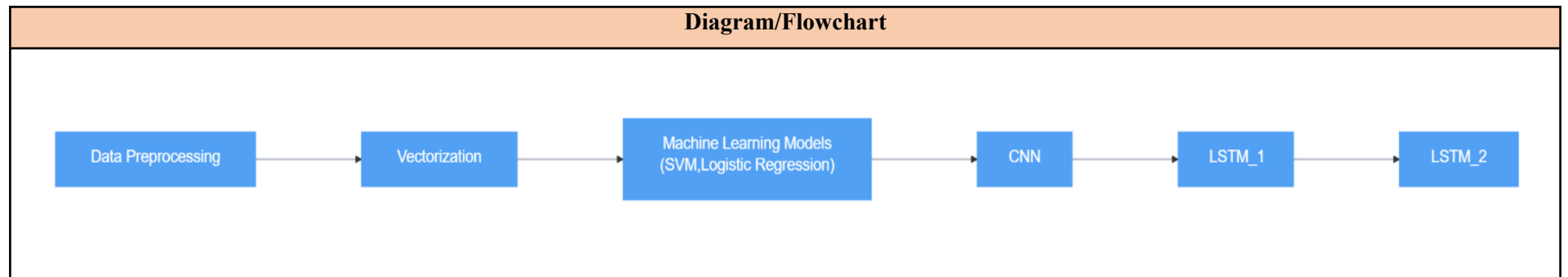
5			
Reference in APA format			
URL of the Reference	Authors Names and Emails	Keywords in this Reference	
https://aclanthology.org/S19-2039.pdf	Arik Pamnani Rajat Goel Jayesh Choudhari Mayank Singh	SVM, Logistic Regression, Convolutional neural network, Long short term memory	
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/ ... etc)	The Goal (Objective) of this Solution & What is the problem that need to be solved	What are the components of it?	
The current solution is the comparison of all the available methods for emotion recognition	The goal of this solution is to compare the better emotion prediction model.	Data Preprocessing Machine Learning Model (SVM,Logistic Regression) CNN LSTM	
The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process			

2	The next step is to use the machine learning models which are SVM and Logistic regression	Machine learning models are easy to implement and proved to be very fast	The emotion prediction accuracy has scope for improvements
3	For the next step we use the CNN to get our predictions		The training of convolutional neural networks requires lot of hardware resources for training
4	Now we use the long short term memory neural networks,especially LSTM-1 to get our scores in test and dev data	Performs better than machine learning models,CNN and lstm-2.	
5	For the final step we are using the LSTM-2 neural network.		Slightly performed worse than the lstm-1

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
Emotion Predictions by models	Textual Dialogues		

Relationship Among The Above 4 Variables in This article							
Input and Output		Feature of This Solution	Contribution & The Value of This Work				
<table><tr><th>Input</th><th>Output</th></tr><tr><td>The text is given as input</td><td>Emotion of the text is predicted as output</td></tr></table>		Input	Output	The text is given as input	Emotion of the text is predicted as output	The feature of this solution is its data preprocessing and the way the solution handled the challenges of the textual emotion recognition like elongated words etc	The contribution of this work is it way to handle the challenges of the textual data set and their results which helped me to decide which is better for textual emotion recognition
Input	Output						
The text is given as input	Emotion of the text is predicted as output						
Positive Impact of this Solution in This Project Domain		Negative Impact of this Solution in This Project Domain					
The positive impact of this solution is that it helped me to solve few of the challenges related to preprocessing of the text like elongated words etc		The negative impact of this solution can be found by analysing the dataset statistics which tells that the it is not a well balanced dataset which can lead to biased prediction					
Analyse This Work By Critical Thinking	The Tools That Assessed this Work		What is the Structure of this Paper				
This proposed solution discussed all the possible ways of emotion recognition from the text.From all the way from machine learning models like SVM and logistic regression to deep learning models like CNN,LSTM along with the little variations, have been used and their accuracies have been compared	F1 Score		Abstract <ol style="list-style-type: none">1. Introduction2. Dataset3. Experiment4. Results5. Conclusion6. Future Work7. References				



—End of Paper 5—

Work Evaluation Table

<Use the same factors you have used in "Work Evaluation Table" to build your own "Proposed and Previous comparison table ">

	Work Goal	System's Components	System's Mechanism	Features /Characteristics	Cost	Speed	Security	Performance	Advantages	Limitations /Disadvantages	Platform	Results
Qi Wang, Lei Sun, Zheng chen(2019)	The goal of this solution is to propose a deep learning model for sentiment analysis of movie reviews.	<p>Preprocessing of text</p> <p>Splitting of movie reviews</p> <p>Using fusion model to get the results and accuracy</p> <p>Comparing the accuracy of fusion model with other models</p>	<p>RNN</p> <p>LSTM</p> <p>GRU</p>	This solution is a combination of convolution neural network with Bi-directional LSTM which shows that fusion models can help in achieving better accuracies	-	-	-	The fusion model Glove+CNN/Conv+Bi-lstm gave best results compared with other models	It helps in understanding different algorithms and their limitations for emotion recognition in text	Most of the algorithms are resource intensive	Python	<p>GloVe + Conv + BiGRU gave accuracy 0.88</p> <p>Glove+CNN/Conv+Bi-lstm gave accuracy of 0.89</p>

Gourank Jain, Satyam Verma, Honey Gupta, Saloni Jindal, Mr. Mukesh Rawat, Mr. Kapil Kumar(2022)	The goal is to get more accurate predictions of emotion in a text.	Undersampling Technique Splitting of dataset Preprocessing BERT Regularization Classification	BERT	Unlike other approaches, this solution uses a balanced dataset their by avoiding the bias in result generation or emotion recognition	-	-	-	BERT is performing better than many other existing models	Prepares data for the BERT model and ensures that the data is consistent and representative which avoids the biased results Helps in avoiding overfitting	May require lots of computational resources and memory to run.	Python	BERT succeeded in getting an accuracy of 75%
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Asiya U A, Mr Kiran V K(2022)	The goal of this solution is to get better accurate emotion prediction by changing the entire system's modality	Data Preprocessing Feature Extraction Audio Emotion Recognition Text Emotion Recognition Multimodal emotion recognition	AlexNet BERT	The proposed work explains the tremendous change in the accuracy by shifting our idea from uni modality to multi modality which is an important and useful feature of this solution	-	-	-	Multimodal helped in getting the accurate results or prediction	Allows to learn contextual relationship between words and helps in reducing the problem of overfitting	Requires lot of computation power for training and testing along with huge amounts of data for training the models	Python	AlexNet gave 55% accuracy, BERT gave 69% whereas combination has given 98% accuracy
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Dr. Shailendra Narayan Singh Twinkle Sarraf(2020)	The goal of this solution is to help users reduce the time of analyzing a product. The problem of the user taking the decision to buy/not buy is solved.	Data Preparation Review Analysis Sentiment classification	Random Forests	The proposed work has a best feature of using live data extracted from website rather than using existing dataset for training	-	-	-	This is a use case of sentiment analysis therefore not compared with any other existing models	This allows to hide the bias or incorrect result of one model by taking the result which is predicted by majority of the models	The system depends on the availability and structure of the website, which are temporary	Python	The result is that we get a final score of number of negative and positive reviews for a product
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Arik Pamnani Rajat Goel Jayesh Choudhari Mayank Singh(2019)	The goal of this solution is to compare the better emotion prediction model.	Data Preprocessing Machine Learning Model (SVM, Logistic Regression) CNN LSTM	Logistic Regression CNN LSTM	The feature of this solution is its data preprocessing and the way the solution handled the challenges of the textual emotion recognition like elongated words etc	-	-	-	SVM, Logistic Regression has given a score of 0.46, 0.48 while LSTM, CNN has given a score of 0.68, 0.63	The emoji's and elongated words are a major challenges which have impact on the model. These are handled by this solution efficiently	The training requires lot of hardware resources and computing power	Python	Among any other model available for comparison LSTM has given the best score
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