Analysis and Prediction of Apple's iPhone Sales and Factors Causing Downfall using Deep Learning Techniques

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ABSTRACT: In today's world adults and children are leading a simple and easier life with the advent of smartphones, in specific Apple's iPhones. Life has become so taxonomical that by just instructing Siri through voice or text commands, everyday chores can be done with ease. This work aims at proposing deep learning techniques to analyse and predict the sales of Apple iPhone. Sentiment Analysis is also done using product reviews provided by customers from various countries. As virtual work has become the new normal as a consequence of COVID-19, the proposed techniques would help the sales data analysts' community in a large scale to spot the products which are on the fall and improve the sales. The proposed methodology also involves Text Mining techniques for companies from large scale to small scale to comprehend the customer reviews for Apple products better and to enhance the user experience. The results obtained as a result of deep learning techniques like CNN and Decision Tree models help to obtain a concrete conclusion for the analysis and prediction of the sales involving different versions of Apple iPhone.

KEYWORDS: Deep Learning; Convolutional Neural Network; Decision Tree; Apple; Text Mining; Sentiment Analysis

I. INTRODUCTION

iPhones have eased our lives to a great extent. Apple Corporation have consistently been enhancing the iPhone features to provide better user experience also ensuring that the release is economical. As a consequence of the thrive to achieve a stand in the market, Apple iPhone has managed to remain as a tough competitor in today's technological world. This section gives an introduction about the various sales downfall factors which certain iPhone releases have caused and explains in brief about the sales impact in economy.

1.1 Apple iPhone Sales and Economy

The global economy witnessed amelioration after the advent of iPhone by the tech giant Apple. Though the commencement stages of iPhone and the release seasons of iPhone 3GS were vacillating, it soon gained equilibrium in the later stages. Now, by implementing the corrections in each stage, it has left a great footprint in the technological market world, where it stands out as a great competitor to Google's Android versions. The release of iPhone 12 Pro Max did not accelerate the revenue in many parts of the world and the company had to stall the sales. Nevertheless, it came back with much powerful and easy to use features in iPhone 12 Mini which was burgeoning in the global economy. The existing techniques till date have accounted for sales forecasting using existing history of sales for Apple Corporation but not dealt with the factors causing the downfall using Decision Tree models and Deep learning algorithms like CNN. The proposed work is aimed at identifying this loophole and providing an effective solution for the same which could ameliorate the sales of the next Apple iPhone version globally.

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Each Apple iPhone version also comes with enhanced security and privacy features.

1.2 Factors affecting the downfall in iPhone Sales and iOS

Apple had developed many versions of iPhone ranging from the first version till iPhone 12 Mini. The existing techniques and theories proposed solutions only for the prediction of future sales but failed to analyse the reasons causing the downfall. Several features like design of the iPhone, camera, value for money, storage enhancement are few significant factors analysed in this work apart from the iOS performance. This factor when identified helps the Apple Corporation on the whole to make the sales of iPhone tractable and identifies the areas which should be enhanced in the next versions of iPhone.

1.3 Organisation of the work

Section 2 discusses about various existing studies and experiments carried out with an aim to identify the loopholes in the Sales of Apple products by analysing user activities using Sentiment Analysis, Deep learning techniques like RCNN and using prediction algorithms like linear regression. Section 3 gives an overview about a particular existing technique on which the proposed work is further enhanced. The description, flaws and possible solutions to overcome the existing flaws are also discussed in detail. The proposed technique with a simplified figure and explanation is discussed in brief in Section 4. Further, Section 5 is structured in four parts which gives a detailed description of the proposed work with algorithms used like Text Mining LDA Topic Modelling, Decision Tree and CNN model with the associated python

packages. Sample datasets used for the proposed work is attached as Appendix A. Section 6 gives an insight on the results obtained for all three algorithms along with germane inferences. Finally, in succinct Section 7 discusses about the conclusion of the proposed work and the future research which can be carried out to enhance the techniques.

II. SYSTEMATIC LITERATURE SURVEY

2.1 Online Sales Prediction Dependency SCOR Topic Sentiment (DSTS) – Sentiment Analysis

According to authors Lijuan Huang et.al, a model called 'Dependency SCOR Topic Sentiment' (DSTS) [1] helped to accurately predict the online sales of Apple products. The proposed model aided in the analysis of several online customer reviews and prediction of the performance of sales was done. The authors used the data of tea as evidence to validate the proposed model. The distribution of sentiment topic has been clearly explained in the work with the help of the study of SCOR distribution on predicted sales and its effect on text sentiment analysis. Thus, the work greatly contributed to the enhanced management of inventory in the e-commercial sector through prediction models.

2.2 Apple's App Store Analysis and Survey

The authors William Martin et.al, have successfully performed a study on Apple's App Store Data which reveals information about the frequency of downloads of several software applications [2] The study helped to draw conclusions on the trends, common aspects and the future research techniques which could solve the real-time problems. The findings of the study include, impact on the software teams who designed the apps in App Store, requirement engineering for the future and realistic plans to augment the sales of Apple products.

2.3 iPhone Sales – Twitter Analysis

According to renowned authors like Lassen et.al, the analysis and prediction of the sales of Apple products was easily done using the tweets provided by users across the globe. The proposed methodology [5] involves the concept of social graphs and social text with the usage of Linear Regression model for prediction. A correlation was fund between the sales and the tweets and this factor was stronger after the implementation of sentiment analysis. Thus, the work successfully proposed a real-time solution to the world of Big Data and social marketing.

2.4 Stimulating User Activity to increase Sales

In the proposed work, 'Stimulating User Activity on Company Fan Pages in Online Social Networks' [6], the authors have drawn conclusions that the user activity in an online platform has a direct impact on the Sales Prediction. The proposed technique hypothesize certain factors for the prediction of user activity on fan pages in particular Facebook platform was considered for testing. Finally, both theoretical and practical implementations have been discussed with the help of commonly available and non-public data the number of fans a company can simulate and increase their sales globally by engaging users in several wall posts in a platform.

2.5 R-CNN iPad Apps for Sales Representatives

According to the author Sykes [7], there is a real need in the commercial world to monitor and augment the sales. Hence, a Fast R-CNN algorithm was proposed with the help of Computer Vision to address the problem. The work aims to increase the productivity of sales of Apple products and increase the efficiency which would aid the Sales Representatives. It is an iPad application and was tested on grocery store environment. An accuracy of 99% supporting 40 classifiers and usability score of 85 was successfully obtained. However, the disadvantage lies in the fact that the application can be run only on iPads future work may involve applications aiding any platform.

2.6 Sentiment Analysis and Deep Learning

In the work, 'Systematic Review in sentiment analysis: a tertiary study' [18], a detailed study is conducted and several challenges in the field of Sentiment Analysis is identified. The secondary studies are mapped with several deep learning algorithms with their datasets. The performance and the trend were observed. For the tertiary study, nearly 112 papers involving deep learning techniques was considered. Results of the tertiary study reveal that Convolutional Neural Network (CNN) and Long Short-Term Memory (LSTM) algorithm involving recurrent neural network architecture produced the best performance.

2.7 E-commerce and Sales Prediction

According to the authors, Chuanyu Xu et.al [22], a graph attention network-based sales forecasting helps in procuring accurate results. The work proposes new methodology of sales prediction with graph networks which aids the e-commercial sector on a large scale. Any new product's sales can be predicted with ease unlike the existing techniques which are based on historical sales data. To build an effective network, apart from the time-series data, the proposed work also considers a significant feature called the Category-Property Value (CPV). As a consequence, effective and accurate results were procured in the e-commercial sector.

2.8 Deep Learning and the future

In 'Review of deep learning: concepts, CNN architectures, challenges, applications, future directions' [25], a different approach is proposed to understand and analyse every algorithm in the field of Deep Learning. The authors have analysed each algorithm with large number of datasets through comprehensive study. To help the research community understand the shortcomings in the field, the authors proposed a solution starting with AlexNet up to High Resolution Network. Hence the work discusses and provides deeper insights on CNN models with accuracy percentage and the wide real-time applications of Deep Learning in the current scenario.

2.9 Online Sales Prediction and Optimization

The authors Z. Pirani et.al [26] have proposed a solution to accelerate the online sales of products. Today's world is edging towards a virtual world where academics, commerce, banking every sector has turned to the help of Internet. Moreover, the worst affected sectors post pandemic was commerce and trade as a result of lockdown. The proposed work aids the commercial sector in particular to augment their sales online. There is a need to monitor their sales on a regular basis. Hence, the proposed tool called 'Sales Analytical Tool' serves the purpose. Several data mining techniques such as Logistic Regression, Linear Regression, Affinity Analysis is employed in this work in order to make the sales transactions database a tractable one and to predict the results of sales with greater accuracy. The tool also aids in optimising the sales by taking into account the earlier sales transaction thereby, augmenting online sales.

III. EXISTING TECHNIQUES

The foundational analyses and predictions have been carried out with respect to iPhone sales. Though the methodologies served to obtain successful results with regard to sales using Regression algorithms, it failed to account for certain flaws with respect to the factors causing the downfall of iPhone sales in the past decade. This section discusses in brief about the flaws and possible solutions which can be implemented to overcome it.

3.1 Description and Flaws

Researchers in the past decade have accomplished the sales forecast using just Linear Regression models on Twitter analysis of iPhones [5] or with the help of visualisation tools like Tableau. This methodology has its own advantages and disadvantages. The Regression model aided to solve the inscrutable sales forecast for iPhone on a quarterly basis. This was indeed a breakthrough when there were no means to predict the sales but, no concrete results with respect to the downfall or factors affecting the downfall in sales was provided. Furthermore, the technical specificities on what factor like performance, hardware, camera etc should be ameliorated in order to augment iPhone sales is found to be missing in the existing work.

3.2 Possible solutions to overcome the shortcomings in the existing technique

Though the existing methodology provided an overall prediction results of iPhone sales, it failed to give detailed results in accordance with factors which is supplementing the sales. This loophole is identified and to overcome the flaws in the existing technique, the proposed work enhances and gives a concrete solution. The proposed work to overcome this involves, analysis and prediction of iPhone Sales considering factors like performance, value for money with the release of each version, battery life, software, display, design and camera quality. A decision tree model is built to predict the accurate sales prediction and is found that enhancing the camera quality can ameliorate the iPhone future sales. The reviews from customers are also analysed and LDA topic modelling is done to predict the areas to focus on in the next version of release. The unit sales are considered for the performance of CNN model and the model loss during training and testing is visualised as a graph.

IV. MODEL DIAGRAM FOR ANALYSIS AND PREDICTION OF IPHONE SALES AND FACTORS CAUSING DOWNFALL

The model diagram as depicted in figure 1, describes the workflow of the proposed technique. The process begins with collecting the datasets comprising of various factors affecting the iPhone Sales like value of money, design of each version of iPhone, display, software performance, camera, battery life and many more for iPhone's first version up to the newly released iPhone 12 Mini. The Linear Discriminant Analysis (LDA) for topic modelling is applied on the training and test data set. The dataset used for this technique consists of customer reviews for iPhone, country id, user details, etc procured from Amazon customer reviews. The graph obtained from the Linear Discriminant model gives a clear idea of the topic into which the review comments are categorised, from topic 0 to topic 3, followed by word count and weightage of words in each topic. This is visualised as frequency graphs using pyplot package. The results obtained are also clustered using t-Distributed Stochastic Neighbour Embedding (t-SNE). The interactive clustering plot is further used to infer the number of times users have used a particular word, among which words like battery, camera, good service are few words which was observed under frequently used ones in the iPhone Reviews by customers worldwide. The Inter-Topic Distance Mapping is also obtained using this visualisation. As a consequence, these analytical results help the Apple corporation to understand their customers better and to improve sales globally. Security fixes is also a word often appeared in the results hence with each version release of iPhone the privacy and support can be increased with the help of these insightful visualisations.

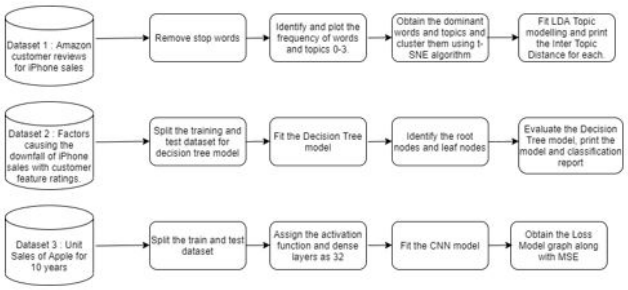

Figure 1. Model diagram for Analysis and Prediction of iPhone Sales and factors causing downfall

The dataset is split as training and test dataset (25%) then the input and target features from the dataset is chosen for deep CNN model. The dataset comprises of attributes like the unit sales of iPhone and the revenue obtained from the year 2007 to 2018 above. The CNN model consisting of 32 dense layers is proposed to predict and infer trend in the sales of iPhone in the past decade. A loss model graph is also obtained for the training and test dataset. The mean square error is observed to decrease with increase in the number of epochs or iterations. Here, in the proposed methodology, 50 epochs are considered.

The Decision Tree model represented in figure1 gives a clear conclusion as to what factor should be considered and

improved that would aid in the augmentation of iPhone sales. The dataset used to train the model consists of iPhone versions with the ratings by global Apple users for design, camera quality and many more. For a particular version of iPhone, the Decision Tree model predicts the dominant factors to be considered to prevent downfall of sales using the ratings. The dataset is split into training and testing with test size as 50%. The next process is carried on with the training of model using Gini index and entropy functions. The Classification report is then displayed with precision, accuracy, f-1 score, recall and support values. The accuracy of the predicted Decision Tree model is also printed. The scores obtained suggest the extent to which the actual values are predicted correctly and the values which are incorrectly predicted. Thus, the root node (i.e.) camera quality is chosen and is mapped further according to Gini index for various updated versions of iPhone and is experimentally predicted using Decision-Tree model with high accuracy.

V. PROPOSED METHODOLOGY

The algorithms used for analysis and prediction like LDA Topic Modelling, Decision Tree and CNN model is discussed in detail. The results of LDA topic modelling done with the aid of amazon iPhone reviews helps to figure out the significant areas that Apple Corporation should focus to augment the iPhone sales. Further enhancements which the existing methodologies failed to account for such as the primary factor is identified for the downfall of iPhone sales with Decision Tree classification report and the CNN loss model is also procured.

5.1 Text Mining LDA Topic Modelling

The proposed technique involves the analysis and prediction using Text Mining, Deep Learning and Decision Tree model. Sentiment Analysis is done on the reviews obtained from several iPhone customers across the world who had ordered using the e-commercial website Amazon. The dataset used comprises of attributes like profile name, review date, review text, product, review country, helpful count, total comments and review rating. The initial steps involve the removal of stop words, bigrams, trigrams and lemmatization. LDA (Latent Dirichlet Allocation) a statistical topic modelling is applied. The dominant topic columns like 'Document No', 'Dominant Topic', 'Topic Percentage Contribution ', 'Keywords', 'Text' are found. Graphical visualisations for each of the topic obtained is obtained for the review comments on iPhone from Topic 0 to Topic 3. Using the 'Word Cloud' package, the dominant words in the review comments is analysed with larger text. This helps to draw deeper insight for the iPhone Sales Analysis. Using Collections package, Word Count and Importance of Topic Keywords visualisations is obtained. For each document from document one to document 11 the sentence topic colouring is done. Topic Distribution by topic weight helps to comprehend the average distribution of words in each topic with respect to the review comments. Topic Clusters are plotted using the array of topic weights and by employing tSNE Clustering. The pyLDAvis package helped to visualise the Inter-Topic Distance Map and 30 most Salient Terms often used in iPhone reviews.

5.2 Decision Tree model

The Decision Tree model is proposed to predict the significant factor which causes the augmentation or downfall in iPhone sales. The dataset used **(mentioned in Appendix A)**, consists of the rating of iPhone users in the past decade from 2006-2020. It comprises of attributes like iPhone Rating for design, performance, software, display, Camera, Battery Life and Value for Money. Model is obtained considering the versions from iPhone to iPhone 12 Pro Max. A heat map is initially visualised to find out the relationship between the attributes and the most dominant factor. Label encoding is done for further manipulations. The target variable is chosen as iPhone here and the ratio of training to testing dataset is 70:30. The decision tree classifier is then initialised with criterion as Gini index and precision as 4. The decision tree model graph is obtained with the classification report. From the obtained model, it is found that Camera has been a crucial factor hence chosen as the root node. Hence it was predicted that this factor is identified to augment sales of iPhone.

5.2.1 Decision Tree algorithm

Input: dataset containing factors affecting iPhone sales
Output: Decision Tree model with iphone's camera as significant factor

a) Begin the tree with the root node, says S, which contains the complete dataset.
b) Determine the simplest attribute within the dataset using Attribute Selection Measure (ASM).
c) Divide the node S into subparts that covers possible values for the simplest attributes.
d) Implement the decision tree node, which contains the important factor (i.e.,) Camera in this case.
e) Iteratively create new decision trees using the subsets of the dataset created in step 3. Repeat this process until a stage is reached where no more classification is possible.

5.3 Deep CNN Model

The CNN model is implemented to analyse and predict the future prospectus in the iPhone products for Apple corporation. The epochs considered is 50 and the activation function is relu. The dataset used comprises of attributes like Category, iPhone and yearly growth in sales. The Neural network model loss is depicted in the form of graph with training and the testing set. The Mean Square Error is also found for all the iterations. The CNN model diagram with the number of layers is depicted in Figure 1.

5.3.1 Algorithm for Deep CNN Model

Input: csv file containing unit sales of Apple iPhone
Output: Loss model graph, MSE error and accuracy in each epoch.

i) Read the dataset using dataset = pd.read_csv
ii) Train the dataset using x_train, x_test, y_train, y_test = train_test_split (x, y, test_size=0.77, random_state=1)
iii) Fit the model using model = Sequential ([Dense (32, activation='relu',

input_shape=(None,14)), Dense (32, activation='relu'), Dense(1, activation='sigmoid'),])

iv) Set optimiser and loss function: optimizer='sgd', loss='binary_crossentropy'

v) Evaluate using model.evaluate (x_test, y_test) [1]

vi) Plot the obtained results using plt. plot (hist. history['loss'])

plt.plot(hist.history['val_loss'])

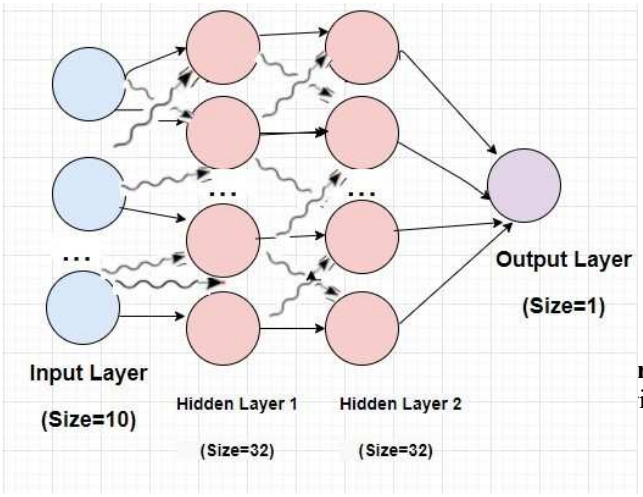

Figure 2. CNN Model diagram

Figure 2 represent the Neural Netwrok Architecture diagram for iPhone sales Prediction and Analysis with the varying neuron size such as input layer of size "10", output layer of size "1" and two hidden layers of size "32" each as intermediatary layer.

5.4 Software packages used

The results are procured with the help of several in-built packages in Python. The functions of the packages used and its role in obtaining the results of the proposed work is discussed in brief.

5.4.1 sklearn

- The package sklearn in python helps in implementing many ML algorithms.
- In this work modules like train_test_split, DecisionTreeClassifier and accuracy_score is used.

5.4.2 NumPy

- For faster and efficient arithmetic calculations, the numeric python module NumPy is used.
- Large number of numpy arrays can be read and manipulations are also performed using this package.

5.4.3 Pandas

- This package is used for the purpose of reading from and writing to different files.
- Data frames are helpful in performing manipulations.

5.4.4 pyLDAvis

- The purpose of this package is to visualize LDA Topic models.

VI. RESULTS AND DISCUSSIONS

- The Text Mining LDA model paved way to procure insightful observations on the reviews on iPhone provided by customers all over the globe. Figure 3 gives a clear perspective on the Topic modelling strategy employed to observe the negative and positive comments. The most dominant topic, topic percentage contribution, Keywords and Review is shown for documents from 0-11.
- Distribution of dominant word count in each topic from Topic 0 to Topic 3 is obtained with density in Figure 4.
- Figure 5 depicts the word cloud visualisation for iPhone reviews.

re 3. Dominant Topics with Document No, Topic Percentage ibution, Keywords and Text

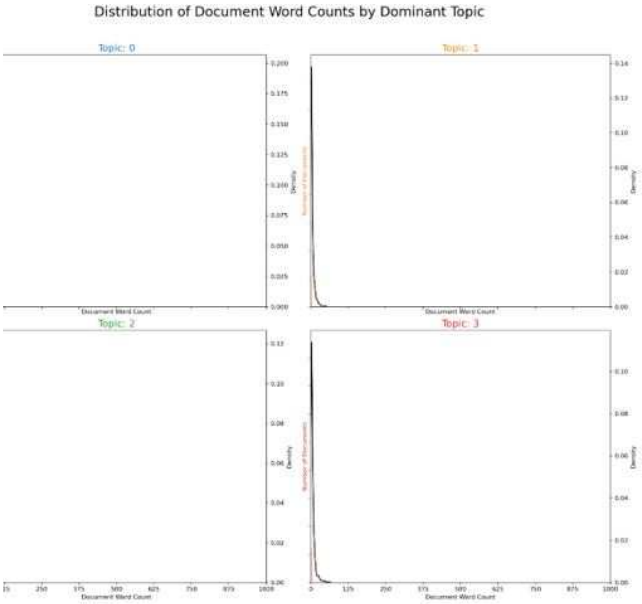

Figure 4. Distribution of Document Word Counts by Dominant Topic

Figure 5. Word Cloud

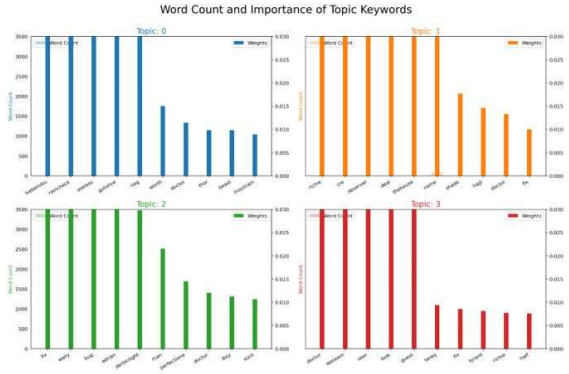

Figure 6. Word Count and Importance of Topic Keywords

- The graphical representations in Figure 6, helps to find the weightage obtained for each word in the topic. Figure 7 and Figure 8 graphical representations depicts the Topic colouring with distinguished Document and Sentence colouring. The words in the topics are also clustered using t-Distributed Stochastic Neighbour Embedding (tSNE) clustering as shown in Figure 9.

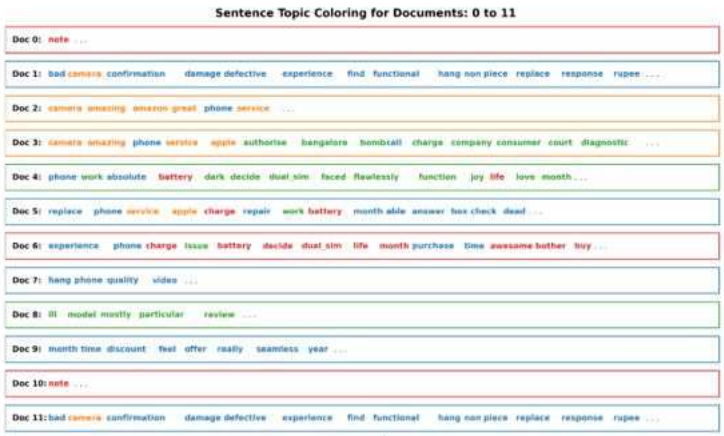

Figure 7. Sentence Topic Colouring for Documents: 0 to 11

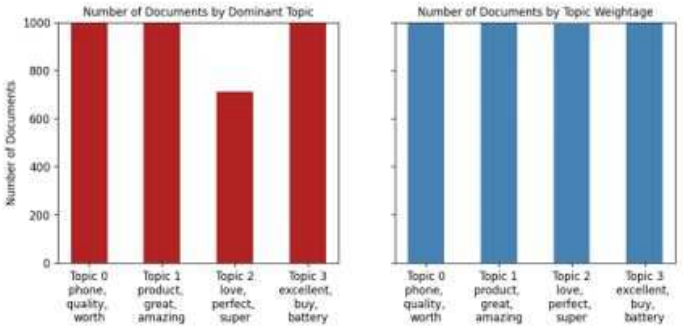

Figure 8. Number of Documents vs Dominant Topic and Topic Weightage

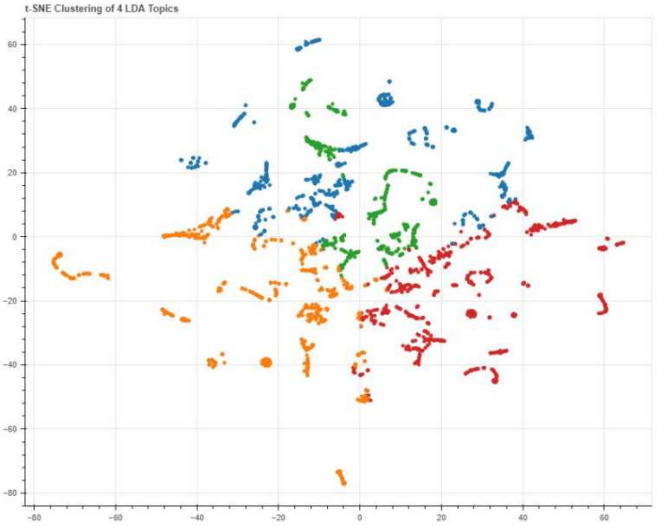

Figure 9. t-SNE Clustering for 4 LDA Topics

- Figure 10 gives a clear insight about the Top 30 Salient terms used in the text mining along with an interactive inter-topic distance model obtained using pyLDAvis package, gensim library. The frequency of words like perfect, user-friendly can also be seen as the most frequently used words in topic 4 as shown below.

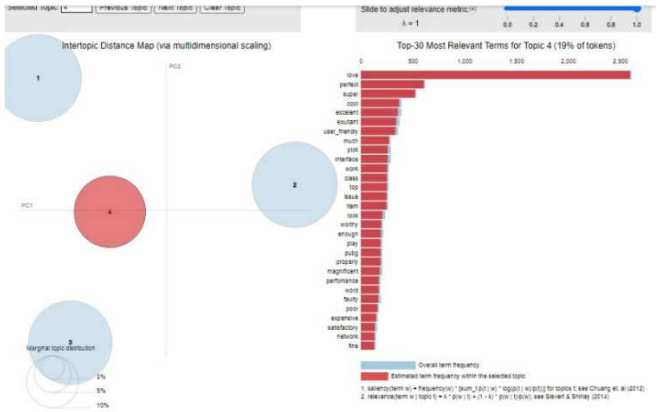

Figure 10. Inter-topic Distance Map and Top-30 Most Salient Terms

- The classification report of the Decision Tree model with precision, recall, f-1 score and support values are obtained in Figure 11.
- Figure 12 depicts that if the Apple Corporation improves the quality of the camera in each versions the sales can be improved to a certain extent as shown in the predicted results. Hence it is chosen as the root node with Gini-index values.
- Figure 13, gives a deeper insight upon which the factors for Apple Sales depend on using the Heatmap with correlation values ranging from 0.2 to 10. The deep CNN model results are depicted for each epoch till 50 epochs.
- Figure 15 shows the results of epochs from 36-50 along with RMSE values.
- Figure 14, uses the loss values to plot a graph between the training and testing dataset of Apple iPhone's unit sales. The blue line graph indicating the

training loss and the orange indicating the test loss. As the epochs increase the loss is said to decrease which indicates that the procured CNN model has predicted correctly and is good.

Classification report -

	precision	recall	f1-score	support
2	1.00	1.00	1.00	2
3	1.00	1.00	1.00	5
accuracy			1.00	7
macro avg	1.00	1.00	1.00	7
weighted avg	1.00	1.00	1.00	7

Figure 11. Decision Tree Classification Report

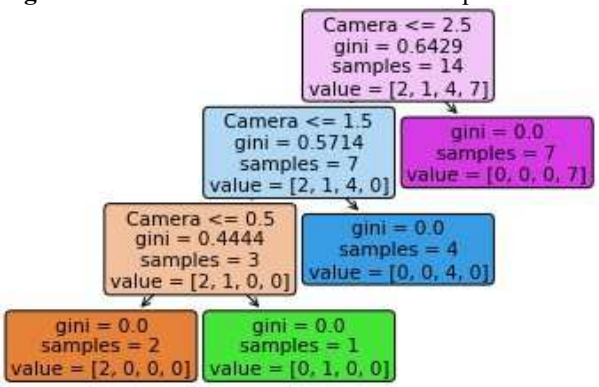

Figure 12. Decision Tree model

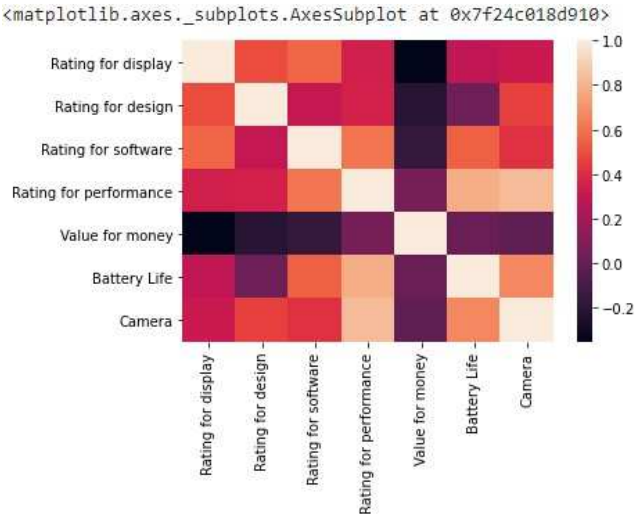

Figure 13. Correlation Heatmap

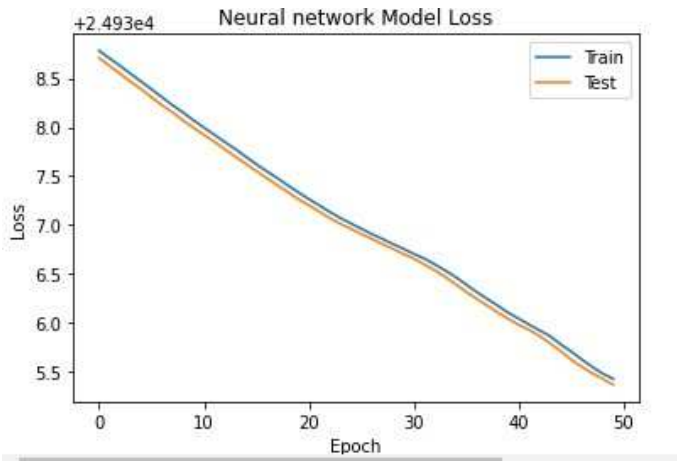

Figure 14. Neural Network Model Loss

```
Epoch 36/50
2/2 [==============================] - 0s 19ms/step - loss: 25188.2845 - val_loss: 24936.3145
Epoch 37/50
2/2 [==============================] - 0s 19ms/step - loss: 25109.9850 - val_loss: 24936.2441
Epoch 38/50
2/2 [==============================] - 0s 21ms/step - loss: 25019.3438 - val_loss: 24936.1738
Epoch 39/50
2/2 [==============================] - 0s 21ms/step - loss: 25120.1250 - val_loss: 24936.1035
Epoch 40/50
2/2 [==============================] - 0s 20ms/step - loss: 25183.4447 - val_loss: 24936.0391
Epoch 41/50
2/2 [==============================] - 0s 21ms/step - loss: 25192.8424 - val_loss: 24935.9785
Epoch 42/50
2/2 [==============================] - 0s 24ms/step - loss: 25190.7676 - val_loss: 24935.9258
Epoch 43/50
2/2 [==============================] - 0s 27ms/step - loss: 21115.6751 - val_loss: 24935.8633
Epoch 44/50
2/2 [==============================] - 0s 26ms/step - loss: 25161.6445 - val_loss: 24935.7871
Epoch 45/50
2/2 [==============================] - 0s 23ms/step - loss: 21115.5423 - val_loss: 24935.7090
Epoch 46/50
2/2 [==============================] - 0s 24ms/step - loss: 25193.9115 - val_loss: 24935.6211
Epoch 47/50
2/2 [==============================] - 0s 25ms/step - loss: 25161.4049 - val_loss: 24935.5488
Epoch 48/50
2/2 [==============================] - 0s 27ms/step - loss: 25194.8717 - val_loss: 24935.4824
Epoch 49/50
2/2 [==============================] - 0s 20ms/step - loss: 25156.8047 - val_loss: 24935.4258
Epoch 50/50
2/2 [==============================] - 0s 25ms/step - loss: 25178.9993 - val_loss: 24935.3652
```

Figure 15. Sample Epoch 36-50 CNN result

Hence in the end, various essential use of Learning algorithms has been included in [27-30] with explanation of essential issues with learning algorithms, challenges towards using these algorithms in many useful areas like healthcare, agriculture, etc. The researchers are recommended to refer these research works for identifying a research problem for their research work. In the last, in [31-55], researchers can find related work of machine learning/ deep leaning and smart technologies for solving real world problems.

VII. CONCLUSION AND FUTURE WORK

COVID-19 situation was a nightmare to many of the growing sectors, among which Sales and Technology were the most impacted ones. The post pandemic IT sector had an influential development as it was able to regain from the loss with the introduction of Apple's new iPhones, Mac Books and many more. With each release, the Apple Corporation ensured to increase the security and privacy aspects too. Hence this analysis and prediction serves as a solution for the sales prediction and factors affecting the downfall across the globe to gauge the next update release of Apple iPhone. This would enable the company to plan in prior and restructure the user interface, hardware and software accordingly. Thus, improving the sales, efficiency, security and compatibility of the mobile phones. The researchers in the long run, can extend these results to procure solutions for the prediction using image classification with the feature of the iPhone, iOS by Apple. The applications of this work also help in the growth of technology, thereby augmenting the economy of a country.

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Appendix A

Table 1: Sample dataset used for Decision Tree Model

	iPhone	Rating for display	Rating for design	Rating for software	Rating for perfor	Value for money	Battery Life	Camera
2	iPhone 12 Pro Max	10	8	10	10	7	9	
3	iPhone 12 Pro	10	9	10	10	6	8	
4	iPhone 12 Mini	10	9	9	9	8	8	
5	iPhone 11	8	8	9	10	9	9	
6	iPhone X	9	9	9	10	6	9	
7	iPhone XR	8	8	9	10	8	8	
8	iPhone XS	9	9	9	10	6	8	
9	iPhone XS Max	9	8	9	10	6	9	
10	iPhone 8	8	8	8	10	9	8	
11	iPhone 8 Plus	8	8	8	10	8	9	
12	iPhone 7 Plus	8	8	9	10	7	9	
13	iPhone 7	8	9	9	10	8	8	
14	iPhone 6	9	9	7	9	7	7	
15	iPhone 6s Plus	8	8	8	9	6	8	
16	iPhone 6s	8	9	9	9	7	7	
17	iPhone 5C	8	8	8	8	7	8	
18	iPhone 4S	8	8	8	8	7	7	
19	iPhone 4	8	8	8	8	7	7	
20	iPhone 3GS	8	8	8	8	7	7	
21	iPhone 3G	8	8	8	8	8	7	
22	iPhone	8	7	8	8	7	7	