

Introduction

- Review is defined as “to think or talk about something again, in order to make changes to it or to make a decision about it”, according to the Cambridge Dictionary.
- Reviews are important in help the ones developing those products or projects to identify the flaws of the creations, in which the developers or creators fail to detect.
- One way to quickly read through hundreds or thousands of reviews is by utilizing Machine Learning which help the Artificial Intelligence (AI) to learn from the reviews and learn whether the reviews are positive or negative.
- Through AI, one can maintain the task of identifying the number of positive or negative reviews in a short time compared to when a human done the exact task.



Problem Statement

- Mobile phones have changed the way customers buy things online by putting all the information at the receiver's fingertips.
- Thus, Customers reviews, and ratings have become an important part of the decision-making process for potential buyers or customers.
- It is hard to read all the feedback for a certain item, particularly for popular goods with several comments, as each item could contain tens of thousands of reviews which takes a lot of time for a normal human to read through.
- Although the ability to done such task is required so that the reviews can be learned quickly and notify the receiver of reviews.



Solution to the Problem Statement

- To work on the project, below are some applications used in solving the problem statement:
 - The Amazon Cell Phone Review Datasets (Main Dataset which is being working on)
 - Jupyter Notebook file (Model Creation)
 - Python Flask App file (Flask App Creation)
 - Html file (App Template Creation)
- For the html file, python file and the Jupyter Notebook file, the Visual Studio Code (VSC) software will used for programming and coding purposes.



The Amazon Cell Phone Review Datasets

- A dataset is a collection of information.
- For each column of the dataset, the data set provides values for each of the variables, such as an object's height and weight.
- The dataset on the right is used for this project, which included 8 columns: Asin, name, rating, date, verified, title, body and helpful notes.

The screenshot shows an Excel spreadsheet titled 'reviews.csv - Excel (Product Activation Failed)'. The spreadsheet contains a dataset of Amazon cell phone reviews. The columns are: asin, name, rating, date, verified, title, body, and helpfulVotes. The data includes reviews for various phone models like B0000SX2I, B0009N5L, and B000SKTZ. The reviews are sorted by date, with the most recent at the top.

asin	name	rating	date	verified	title	body	helpfulVotes
B0000SX2I	Janet	3	October 1	FALSE	Def not be I had the S		1
B0000SX2I	Luke Wyat	1	January 7,	FALSE	Text Mess: Due to a se		17
B0000SX2I	Brooke	5	December	FALSE	Love This I This is a gr		5
B0000SX2I	amy m. tei	3	March 18,	FALSE	Love the P I love the p		1
B0000SX2I	tristazbim	4	August 28,	FALSE	Great phoi The phone		1
B0000SX2I	J. White	4	Septembe	FALSE	Worked gr Hello, I have this phone and used it until I decided to buy a flip phone. I have had NO problems with the battery or new cases--it has a new fish case on it now and it stays as well as the origin		2
B0000SX2I	the cell ph	5	April 16, 2	FALSE	Wanna co Cool. Chee		2
B0000SX2I	Matt	4	April 3, 20	FALSE	Problem w The 3599i		2
B0000SX2I	Charles Co	5	November	FALSE	cool phoni I've never		7
B0000SX2I	Amazon Ci	3	February 2	FALSE	Pissed off- ok well im		3
B0000SX2I	habblie	4	December	FALSE	works gre I've had th		1
B0000SX2I	Zachary O.	1	November	FALSE	Slow, annc 1.) Slow - I		4
B0000SX2I	esti	2	Septembe	FALSE	Worth pay I bought th		5
B0000SX2I	brittho	4	August 17,	FALSE	Great free This is an e		1
B0009N5L	Marcel The	1	March 5, 2	TRUE	Stupid pho DON'T BUY OUT OF SERVICE		
B0009N5L	William B.	4	February 9	FALSE	Excellent Se I have been with nextel for nearly a year now I started out this time last year with the Motorola i205 and just upgraded to the i265 it is one of the best phones I have ever had the service is th		
B0009N5L	K. Mcilharj	5	February 7	FALSE	I love it I just got it and have to say its easy to use, i can hear the person talking just fine and i have had no problems dealing with nextel.		
B0009N5L	Stephen Ci	1	December	TRUE	Phones loc 1 star because the phones locked so I have to pay additional fees to unlock it		
B0009N5L	Mihir	5	December	TRUE	Excellent f The product has been very good. I had used this cell phone in one of my projects and it worked wonders. I will definitely recommend this to anyone interested in buying it....		
B0009N5L	L. Hughes	1	July 21, 20	FALSE	WARNING My problems with nextel did not stop when I canceled my service. I will get to the problems with the service. When I went to get a new phone a day before my contract expired, I of course w		
B0009N5L	1 Stop 4 W	5	June 27, 2	FALSE	NEXTEL BC GREAT PRODUCT THAT IS AS GREAT FOR NEXTEL AS IT IS FOR BOOST INSERT YOUR SIM & GO!		
B000SKTZ	Thomas	4	September	TRUE	Nice, but I bought this phone to replace an LG phone that I didn't like. As I expected, all I had to do was put the old SIM card in the new phone and it worked. There are two serious drawbacks to this d		
B000SKTZ	Kei, San Jo	1	May 13, 2	TRUE	It seems it I purchased this phone for my AT&T phone replacement, even though one of the FAQ mentioned it works with AT&T SIM, in my case, it didn't. Since this is my primary phone, in stead of spend		
B000SKTZ	Kristy	1	March 13,	TRUE	Supply are: The phone did not come with a charger and didn't have a sims card.		
B000SKTZ	MARIO GA	5	May 1, 20	TRUE	Five Stars SERVED ME WELL AS A BACK UP PHONE.		
B000SKTZ	R-Dash	3	February 1	TRUE	does the jcl got this phone just as secondary cell phone. It is really lightweight and very cheap. The reception is good. But most of the time a windy noise is heard when somebody is calling to this cell pl		
B000SKTZ	John R. Ris	4	January 19	TRUE	Awesome Sturdy - clarity is great - easy to use Only problem - no Speaker option..... Big issue for me but im living with it atm.		
B000SKTZ	Amazon Ci	1	February 3	TRUE	One Star Phone stoped working		



Jupyter Notebook File

- The Jupyter Notebook file is used for creating the model, training the model and testing the model.
- The reason why the Jupyter Notebook file is used for such purpose is that it allows for analysis the code step by step instead of executing all at once.
- This in turn makes it easier to monitor each line of code and document the thought process while developing the analysis process.
- There are a total of 8 parts in model building using Jupyter Notebook, namely:
 1. Import Libraries
 2. Reading the Datasets
 3. Checking the null values and filling it
 4. Column Manipulations (Dropping Column(s)/ Concatenate Column(s))
 5. Data separation into input (x) and output (y)
 6. Text Preprocessing/ Cleaning
 7. Model Building
 8. Model testing



Python Flask App File

- By using the python file, the flask app is created which included the model.h5 file and the pkl file saved from the Jupyter Notebook file, as well as the html files which acts as the backbone for the web appearance of the app.
- Flask is an open-source web framework, which gives tools, frameworks, and technologies needed to create a web app.

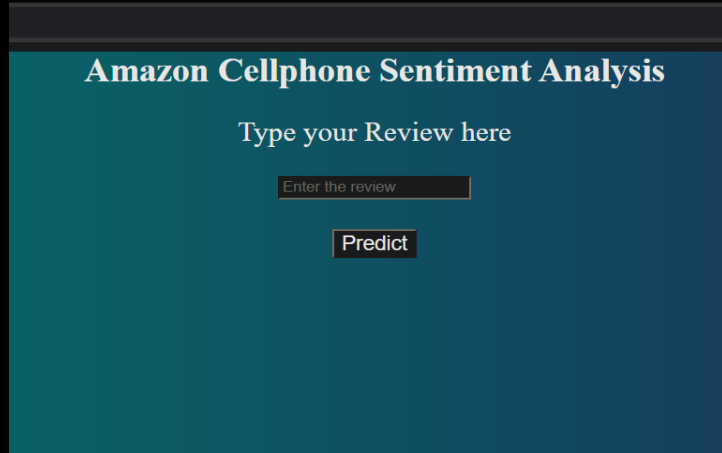


Html File

- HTML, or HyperText Markup Language, is the standard markup language for texts that are intended to be viewed on a web browser.
- The purpose of the html file is to create a blueprint for the flask web applications.
- To use the html files alongside the Flask app, a folder called “templates” will be used to store available html files.




Output



The screenshot shows the web application interface with a teal background. At the top, the title "Amazon Cellphone Sentiment Analysis" is displayed in white. Below the title, the instruction "Type your Review here" is shown. A text input field with the placeholder "Enter the review" is centered, followed by a "Predict" button.

Default



This screenshot shows the same web application interface, but with the prediction result "Negative review" displayed in white text below the "Predict" button. The input field and other UI elements remain the same.

Negative Review typed in



This screenshot shows the web application interface with the prediction result "Positive review" displayed in white text below the "Predict" button. The input field and other UI elements remain the same.

Positive Review typed in



Future Improvements

- Although the Flask App created and implemented in IBM Watson using AI model training had proven to be successful in differentiating reviews from positive and negative, improvement can still be made to increase effectiveness of the app as well as the accuracy of the prediction.
- The model training program can be look at once again and even refined via introducing new methods such as including other libraries such as joblib and Ray, changing the optimization function etc., so that the model can predict much faster while maintaining high prediction accuracy.



Conclusion

- In every aspect of the world, model learning is essential including in business, education and so on.
- According to some of the most prominent AI researchers, it has the potential to enhance network robustness, uncertainty estimating abilities, and machine learning model training costs.
- According to testing, it shows that for most cases, the app can manage to predict it correctly.
- Thus, proving that the model training and flask application is indeed successful.

