Amazon Alexa Review

Team 11

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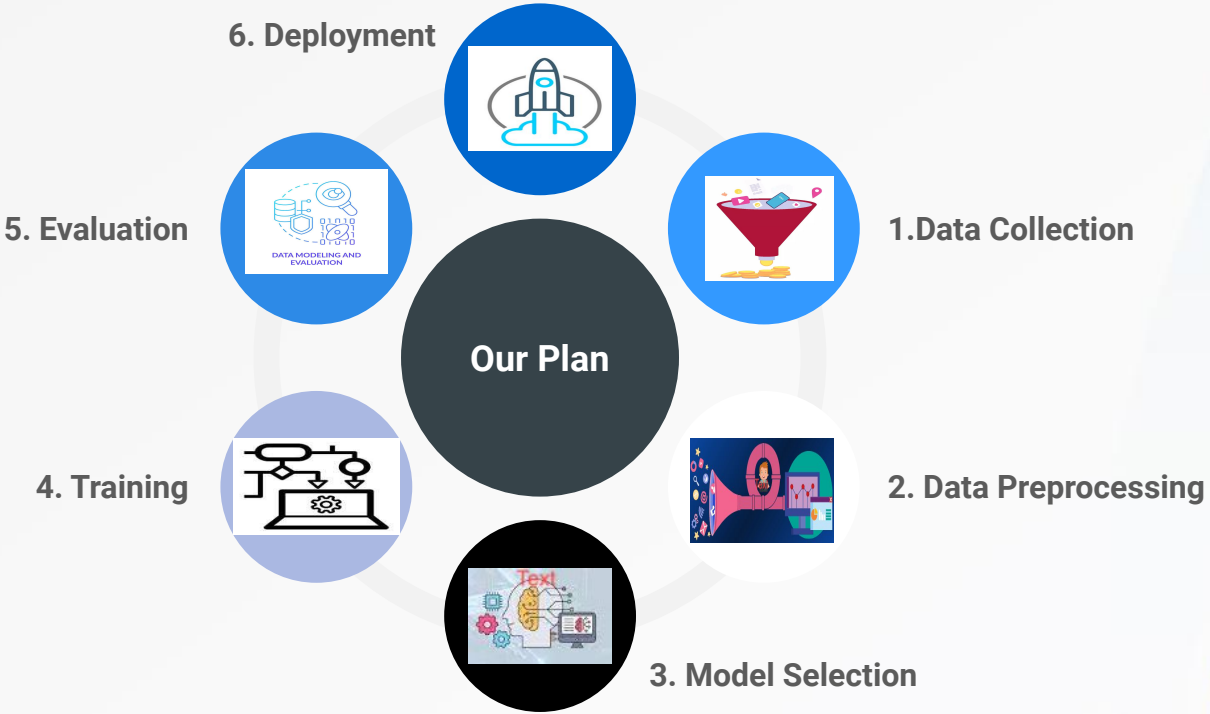
GOOD
BAD

Objective

Develop machine learning models to perform sentiment analysis on customer reviews, assessing the number of positive reviews and determining the product's overall quality.

Business model / Plan



DataSet Sample

amazon_alexa

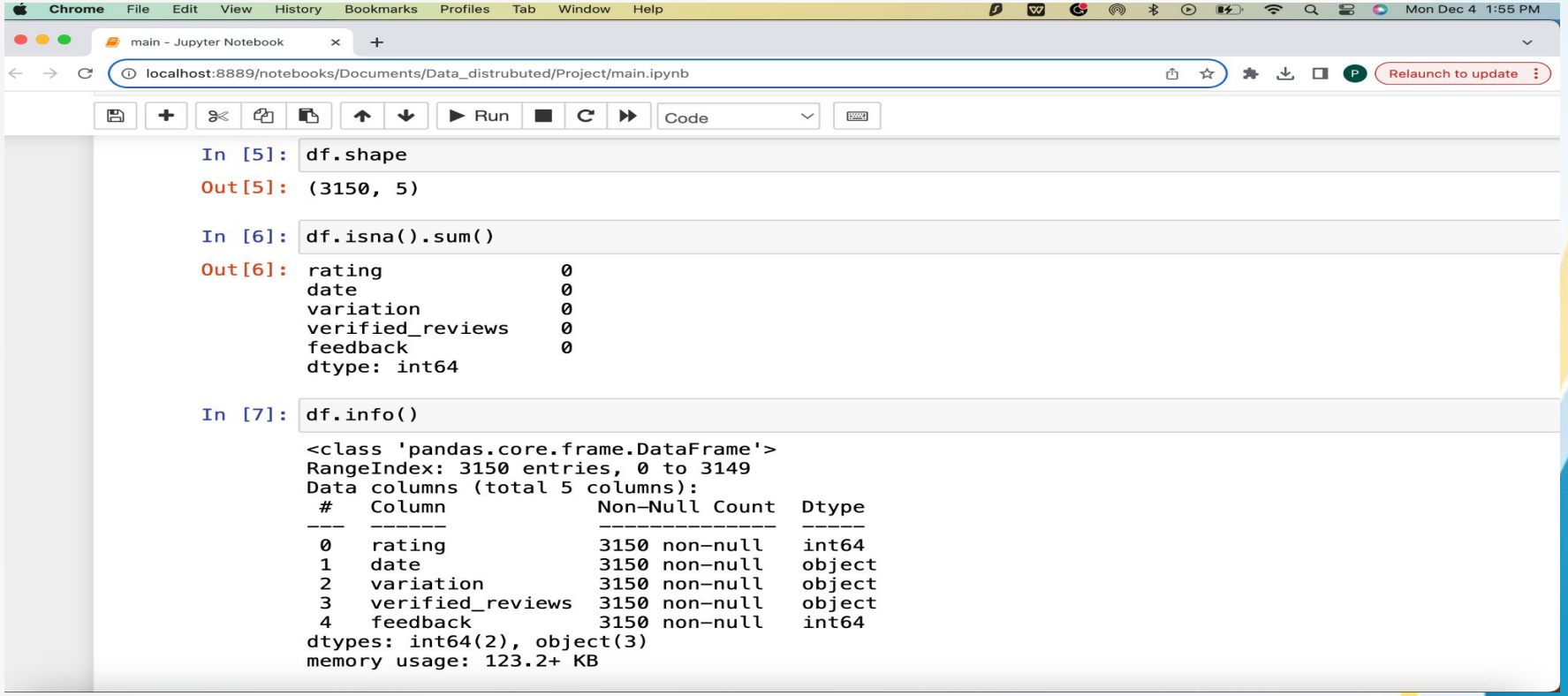
	A	B	C	D	E
1	rating	date	variation	verified_reviews	feedback
2	5	31-Jul-18	Charcoal Fabric	Love my Echo!	1
3	5	31-Jul-18	Charcoal Fabric	Loved it!	1
4	4	31-Jul-18	Walnut Finish	Sometimes while playing a game, you can answer a question correctly but Alexa says you got it wrong and answers the same as you. I like being able to turn lights on and off while away from home.	1
5	5	31-Jul-18	Charcoal Fabric	I have had a lot of fun with this thing. My 4 yr old learns about dinosaurs, i control the lights and play games like categories. Has nice sound when playing music as well.	1
6	5	31-Jul-18	Charcoal Fabric	Music	1
7	5	31-Jul-18	Heather Gray Fabric	I received the echo as a gift. I needed another Bluetooth or something to play music easily accessible, and found this smart speaker. Can't wait to see what else it can do.	1
8	3	31-Jul-18	Sandstone Fabric	Without having a cellphone, I cannot use many of her features. I have an iPad but do not see that of any use. It IS a great alarm. If u r almost deaf, you can hear her alarm in the bedroom from out in the living room, so that is	1
9	5	31-Jul-18	Charcoal Fabric	I think this is the 5th one I've purchased. I'm working on getting one in every room of my house. I really like what features they offer specifily playing music on all Echos and controlling the lights throughout my house.	1
10	5	30-Jul-18	Heather Gray Fabric	looks great	1
11	5	30-Jul-18	Heather Gray Fabric	Love it! I've listened to songs I haven't heard since childhood! I get the news, weather, information! It's great!	1
12	5	30-Jul-18	Charcoal Fabric	I sent it to my 85 year old Dad, and he talks to it constantly.	1
13	5	30-Jul-18	Charcoal Fabric	I love it! Learning knew things with it eveyday! Still figuring out how everything works but so far it's been easy to use and understand. She does make me laugh at times	1
14	5	30-Jul-18	Oak Finish	I purchased this for my mother who is having knee problems now, to give her something to do while trying to over come not getting around so fast like she did.She enjoys all the little and big things it can do...Alexa play this s	1
15	5	30-Jul-18	Charcoal Fabric	Love, Love, Love!!	1
16	5	30-Jul-18	Oak Finish	Just what I expected....	1
17	5	30-Jul-18	Heather Gray Fabric	I love it, wife hates it.	1

Dataset

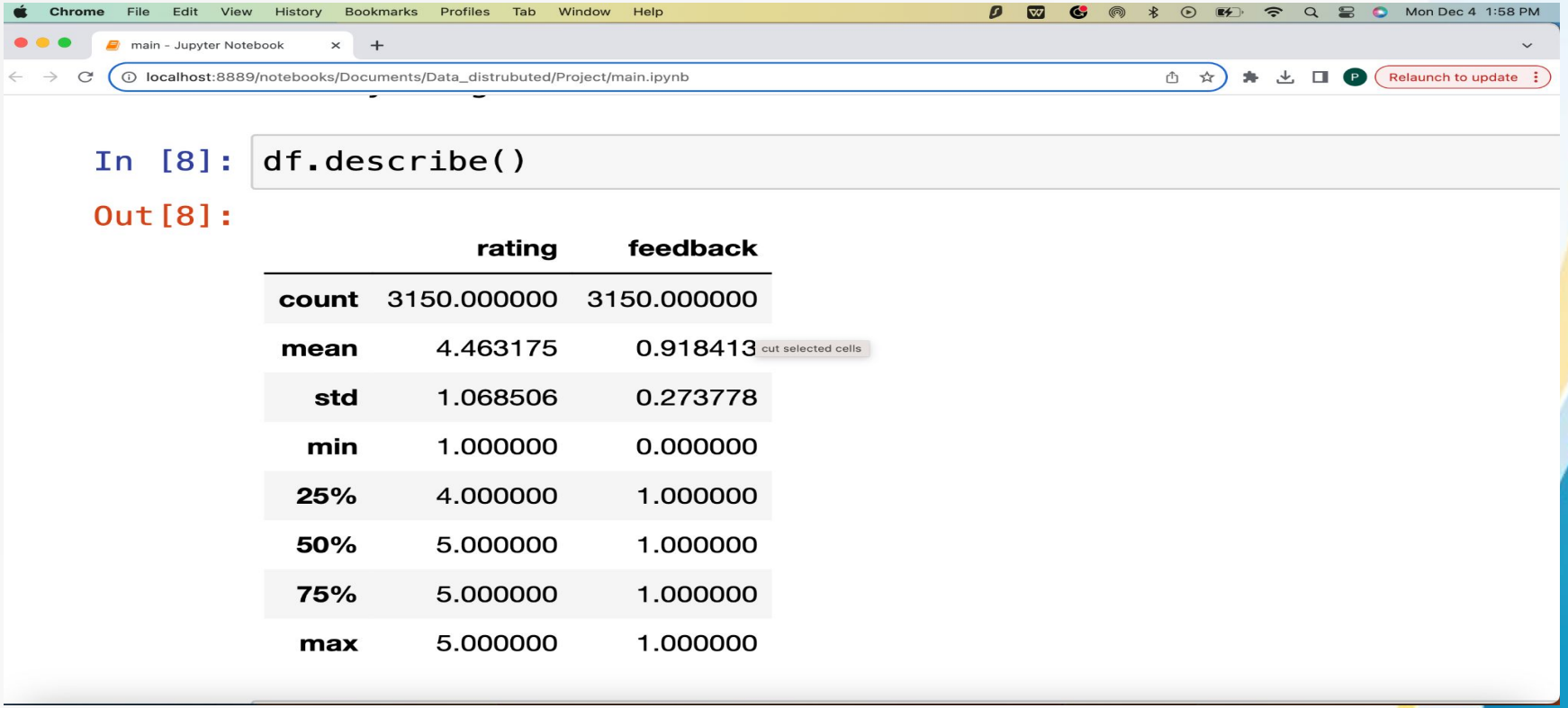
This dataset consists:

- 3000 Amazon customer reviews (input text),
- star ratings,
- date of review,
- variant and feedback of various amazon Alexa products like Alexa Echo, Echo dots, Alexa Fire Sticks etc.

Analysis of data

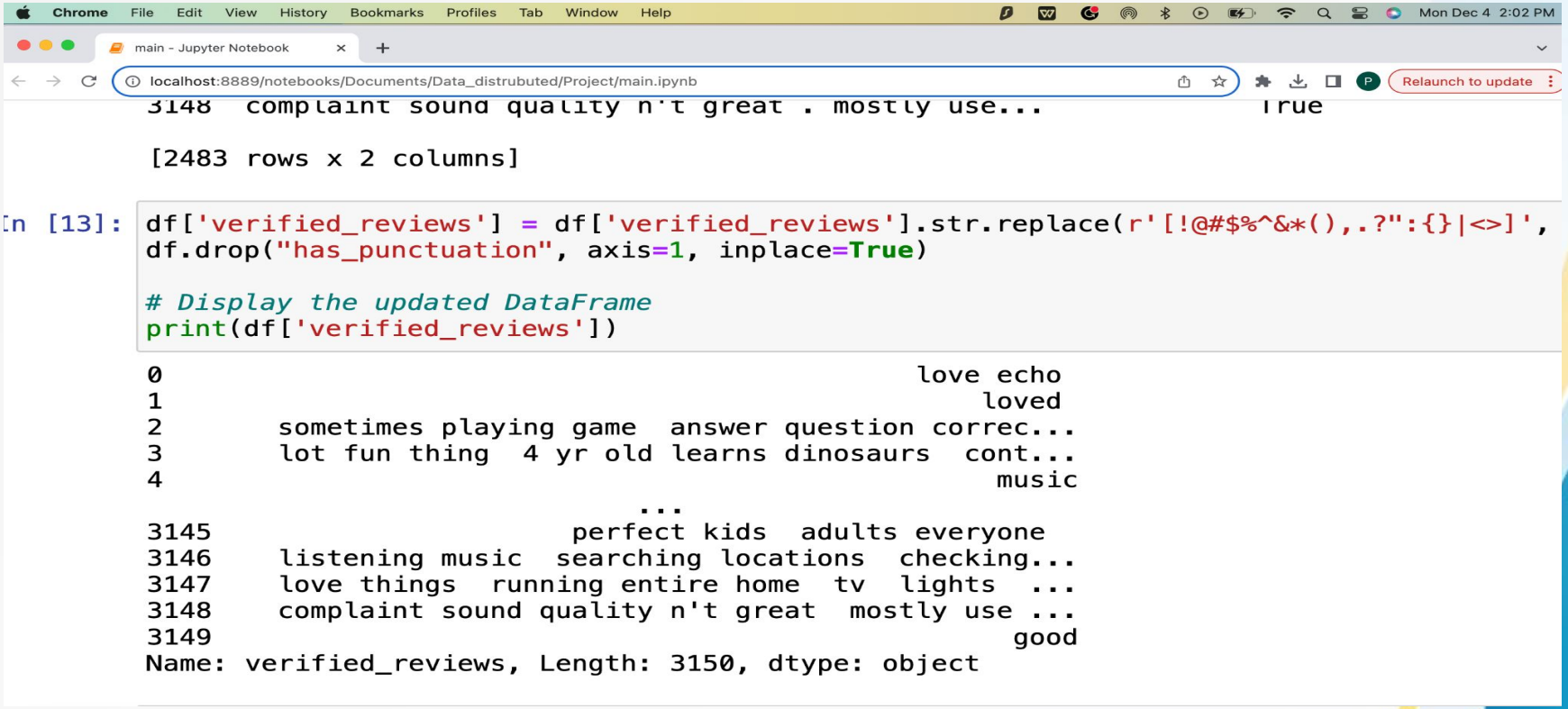


Analysis of data

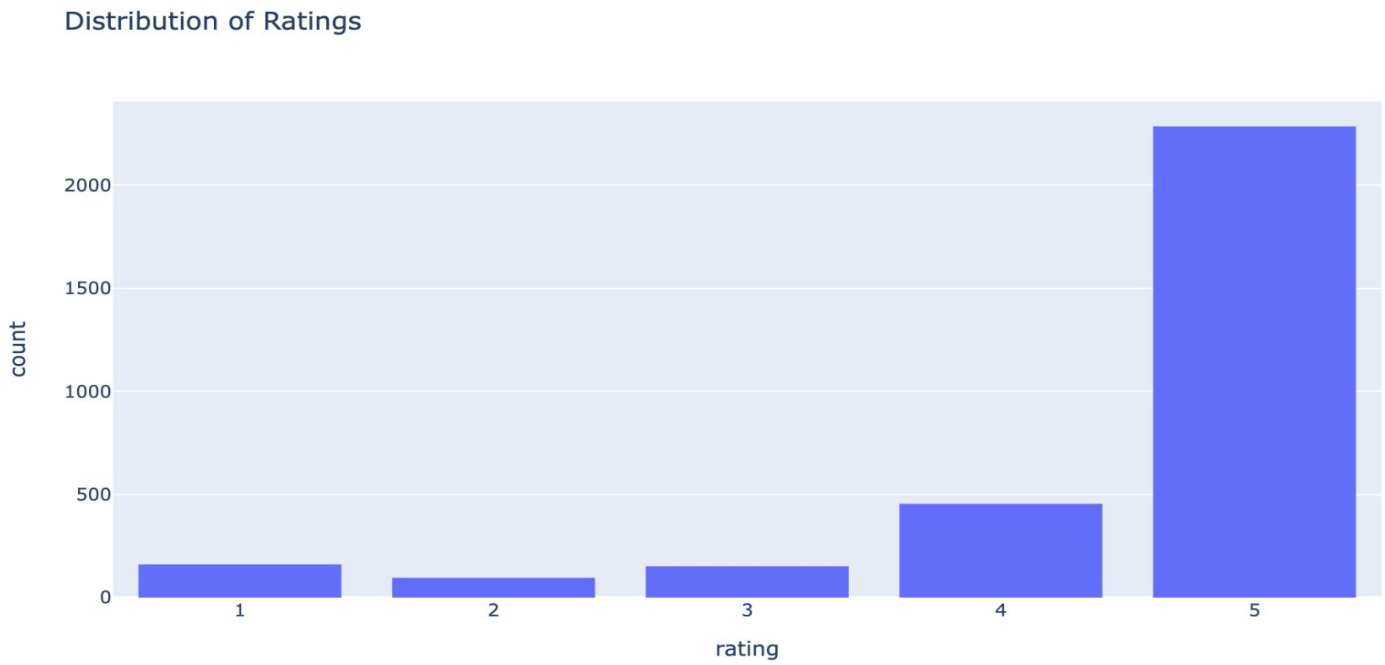


	rating	feedback
count	3150.000000	3150.000000
mean	4.463175	0.918413
std	1.068506	0.273778
min	1.000000	0.000000
25%	4.000000	1.000000
50%	5.000000	1.000000
75%	5.000000	1.000000
max	5.000000	1.000000

Cleaning of data



Visualization of data



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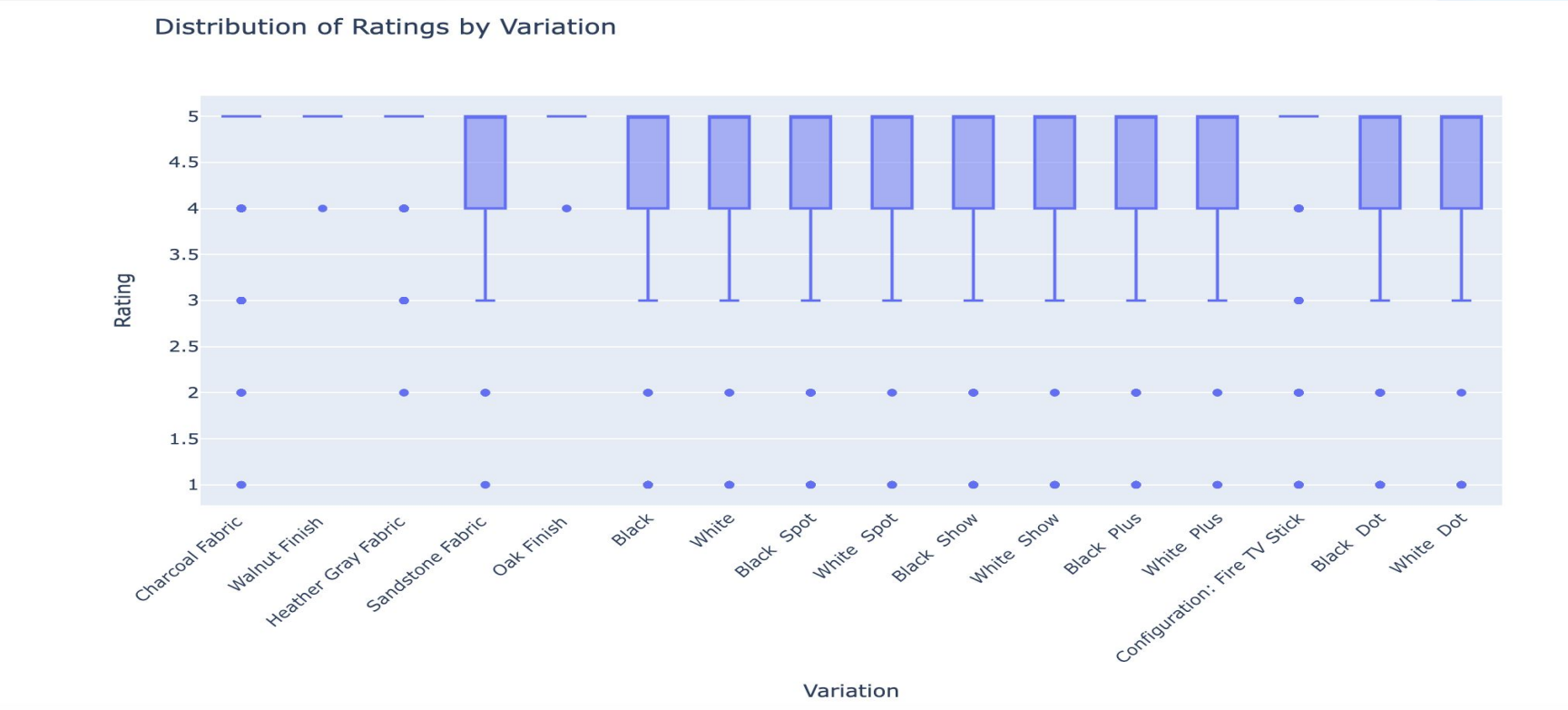

Visualization of data

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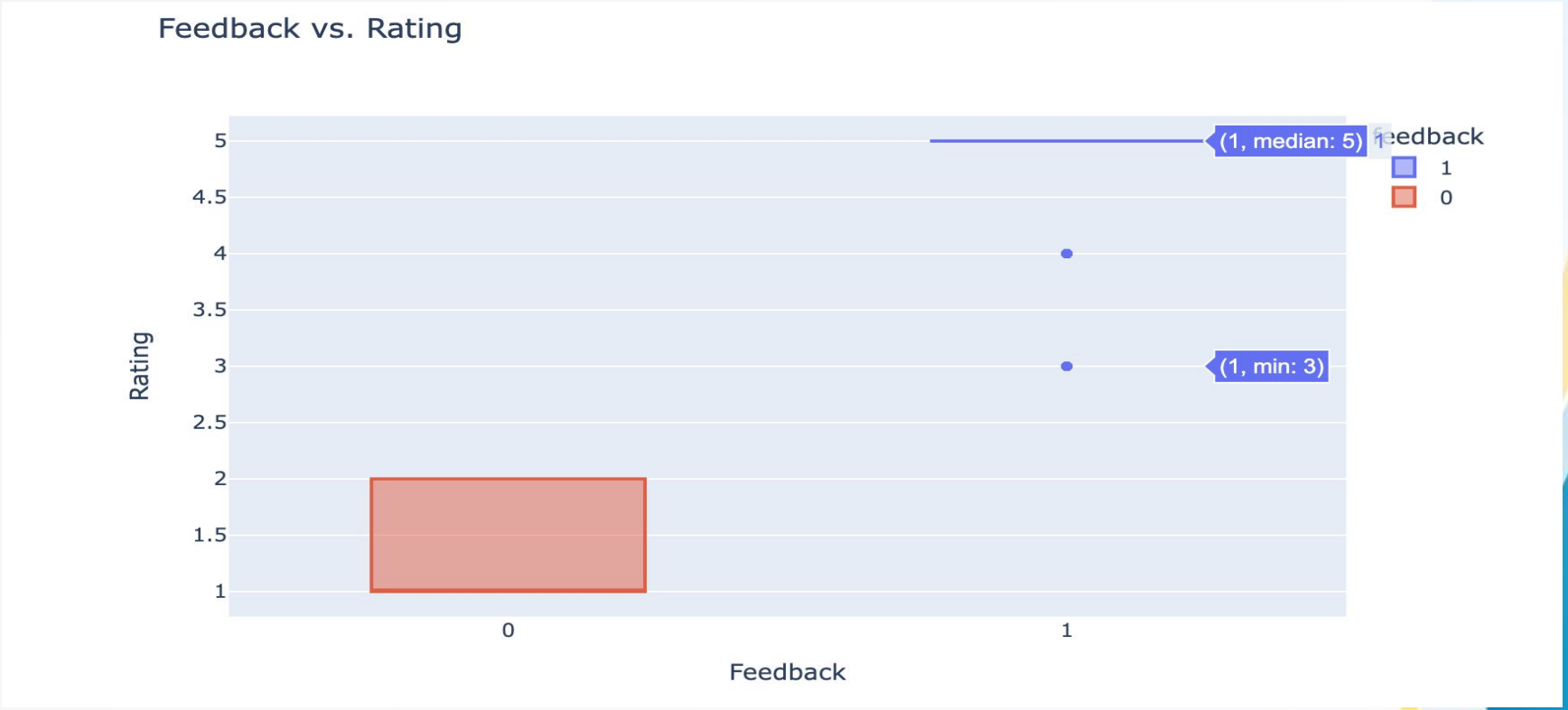

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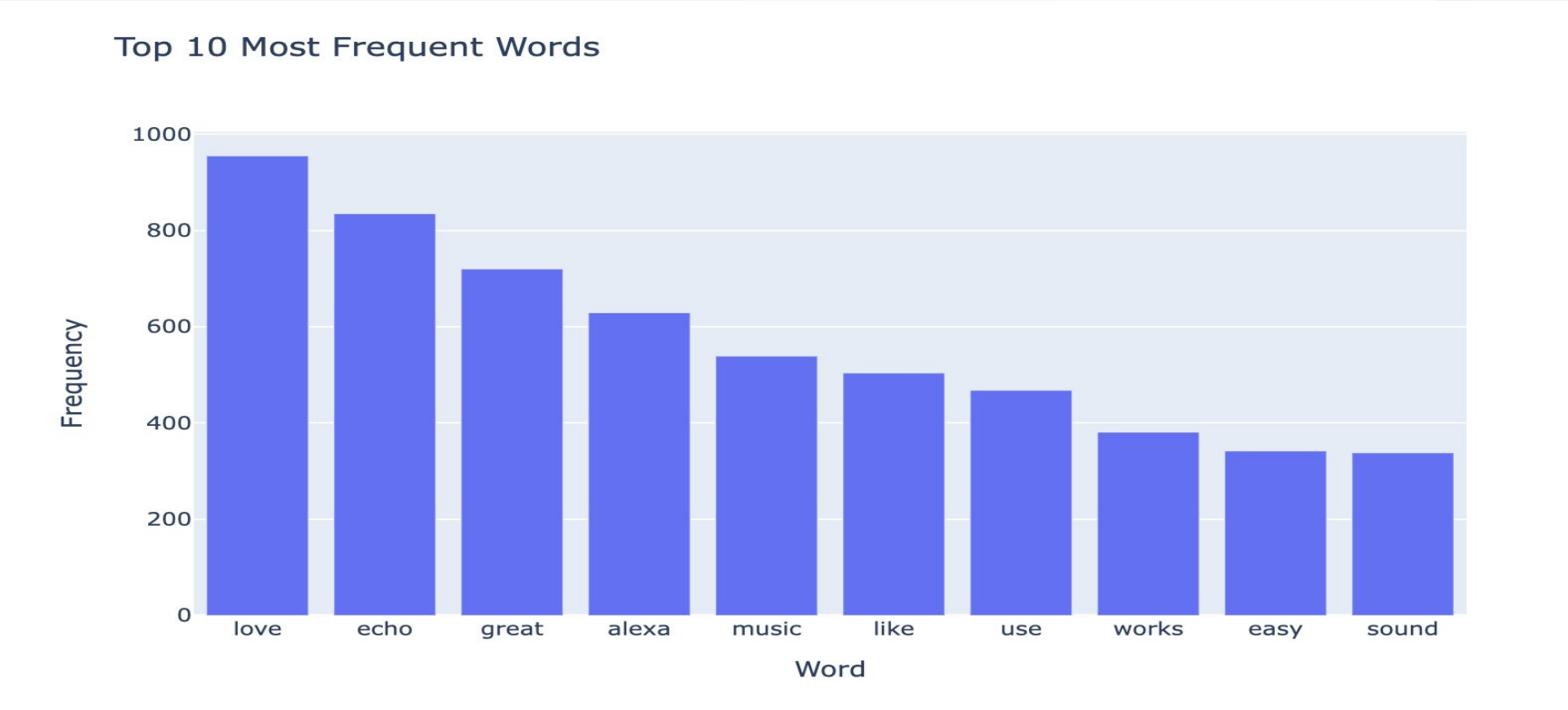

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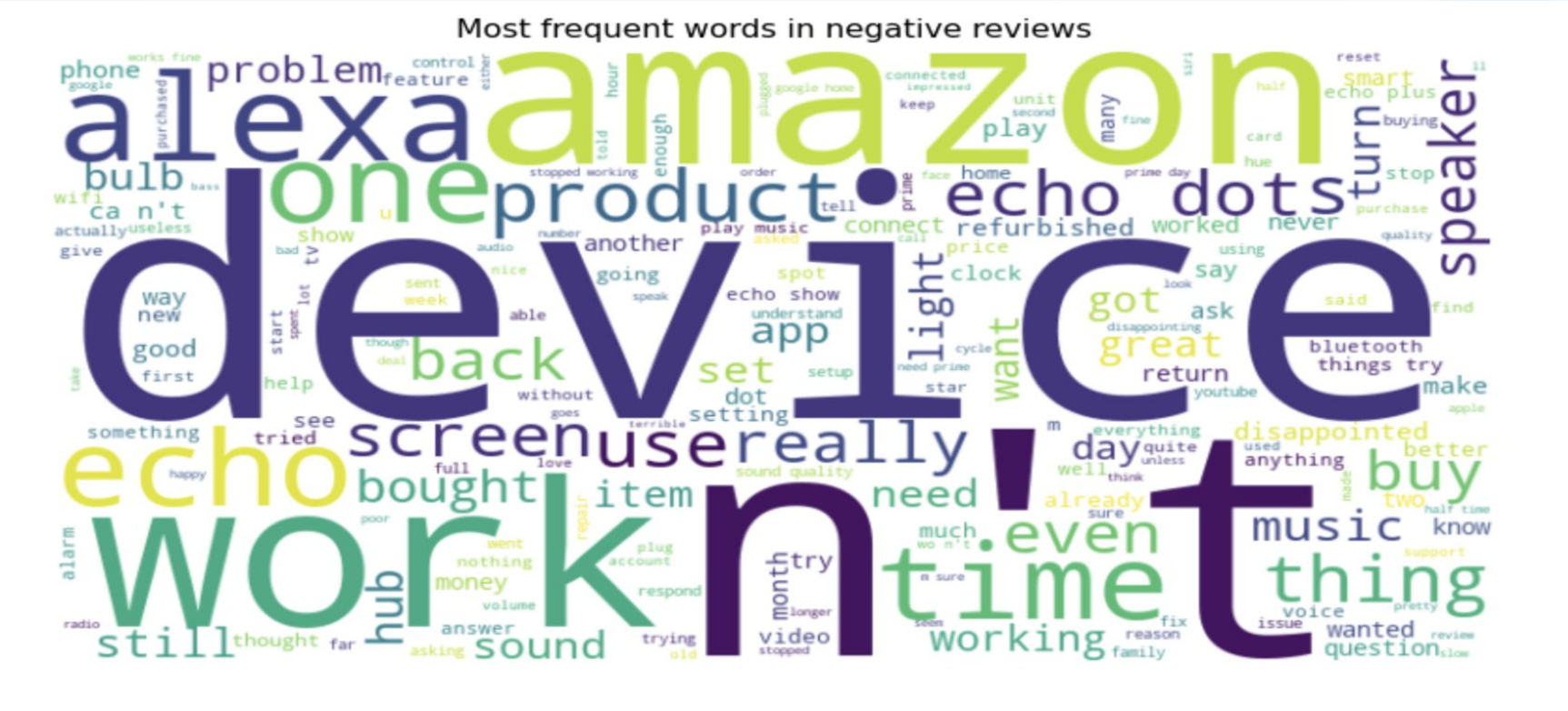

Algorithms

1. Naive Bayes Classifier

2. Random Forest Classifier

3. Decision Tree

Naive Bayes Classifier

- The Naïve Bayes classifier is a supervised machine learning algorithm, which is used for classification tasks, like text classification.
- It is also part of a family of generative learning algorithms, meaning that it seeks to model the distribution of inputs of a given class or category.
- Unlike discriminative classifiers, like logistic regression, it does not learn which features are most important to differentiate between classes.

Naive Bayes Classifier

Naive Bayes Accuracy: 0.9095238095238095

	precision	recall	f1-score	support
0	1.00	0.02	0.03	58
1	0.91	1.00	0.95	572
accuracy			0.91	630
macro avg	0.95	0.51	0.49	630
weighted avg	0.92	0.91	0.87	630

Decision Tree

- A decision tree is a non-parametric supervised learning algorithm.
- It is utilized for both classification and regression tasks.
- It has a hierarchical, tree structure, which consists of a root node, branches, internal nodes and leaf nodes.

Decision Tree

Decision Tree Accuracy: 0.9333333333333333

	precision	recall	f1-score	support
0	0.68	0.52	0.59	58
1	0.95	0.98	0.96	572
accuracy			0.93	630
macro avg	0.82	0.75	0.78	630
weighted avg	0.93	0.93	0.93	630

Random Forest Classifier

- Random forest is a commonly-used machine learning algorithm which combines the output of multiple decision trees to reach a single result.

- Its ease of use and flexibility have fueled its adoption, as it handles both classification and regression problems.

Random Forest Classifier

Random Forest Accuracy: 0.9412698412698413

	precision	recall	f1-score	support
0	1.00	0.36	0.53	58
1	0.94	1.00	0.97	572
accuracy			0.94	630
macro avg	0.97	0.68	0.75	630
weighted avg	0.94	0.94	0.93	630

Accuracy

Naive Bayes Classifier: 0.9095238095238095

Random Forest Classifier: 0.9412698412698413

Decision Tree: 0.9333333333333333

Links

Github:
https://github.com/phadkep/Data_Distributed

Dataset:
https://www.kaggle.com/datasets/sid321axn/amazon-alexa-reviews

Conclusion

In summary, we employed three algorithms, and the random forest algorithm demonstrated higher accuracy for the Amazon Alexa review dataset.

Our data science project, centered around Amazon Alexa reviews, strives to provide valuable insights, assessing the overall merit of Alexa as a product through a thorough analysis of customers' historical reviews.


THANK YOU!