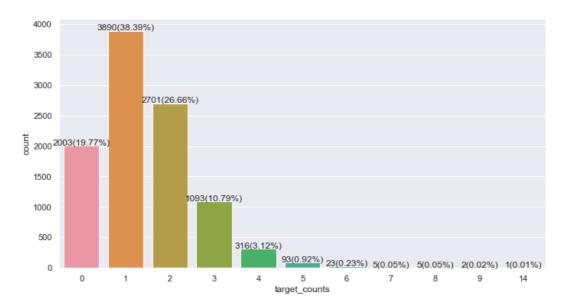
Data Exploration

Data Loading

There are 10132 Rows in Data

Distribution of Count of Labels per Datapoint



There are 2003 datapoints that doesn't have any labels and most of the datapoints have less than or equal to 4 labels and one datapoint have 14 labels and that is an outlier so we will remove it

	text	target	target_counts
384	test review, should be deleted	[refund not actioned positive, refund timescal	14

As we can see this datapoint is just for testing so we can easily drop it

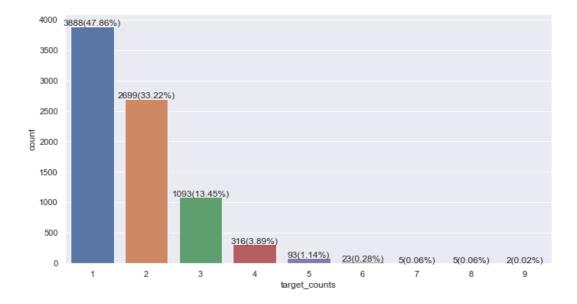
Shape of dataframe after removing outlier datapoint (10131, 3)

Number of Unique labels - 99

	Count
value for money positive	4780
garage service positive	2031
ease of booking positive	1187
location positive	1063
length of fitting positive	657
delivery punctuality positive	453
tyre quality positive	434

wait time positive 27. delivery punctuality negative 28. autvisoragent service positive 22. autvisoragent service positive 22. advisoragent service positive 22. advisoragent service positive 23. value for money negative 13. value for money negative 14. damage negative 12. advisoragent service negative 14. discounts positive 15. discounts positive 16. autvisoragent service negative 16. discounts positive 17. autvisoragent service negative 18. discounts positive 19. discounts positive 19. autvisoragent service negative 19. discounts positive 19. autvisoragent service negative 19. autvisoragent 19. autvisorage	garage service negative	Сония
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advisoragent service positive mobile fitter positive advisoragent service positive value for money negative value for money negative value for money negative advisoragent service negative booking confusion negative discounts positive discounts positive to booking confusion negative discounts positive discounts positive funcorrect tyres sent negative no stock negative extra charges positive response time negative discounts negative response time negative discounts negative discounts negative funcorrect tyres sent negative dextra charges negative dextra	wait time positive	274
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advisor/agent service positive value for money negative damage negative discounts positive discounts positive value of service negative value	advisoragent service positive	233
advisor/agent service positive value for money negative damage negative discounts positive discounts positive value of service negative value		227
advisor/agent service positive value for money negative wait time negative damage negative advisoragent service negative tele advisoragent service negative teles advisoragent service negative discounts positive langth of fitting negative extra charges positive langth of fitting negative response time negative response time negative advisoragent service negative advisoration negative adviso		225
value for money negative wait time negative damage negative advisoragent service negative booking confusion negative discounts positive illength of fitting negativo extra charges positive response time negative incorrect tyres sent negative destra charges negative no stock negative extra charges negative destra charges negative refund negative destra charges negative nobile fitter didn't arrive negative refund not actioned negative refund direscale negative descount not applied negative tyre aged ot code negative refund timescale negative field descount not applied negative descount not applied negative field negative field negative refund timescale negative good price pooking confusion positive good communication really good prices simple fitting procedure	·	202
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late notice negative incorrect tyres sent negative advisor/agent service negative extra charges negative no stock negative tyre quality negative tyre quality negative advisor important in the positive facilities positive advisor in the positive a		85
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booking confusion positive good communication really good prices simple fitting procedure		5
good communication really good prices simple fitting procedure	-	2
really good prices simple fitting procedure	booking confusion positive	2
simple fitting procedure	good communication	1
	really good prices	1
good prices	simple fitting procedure	1
	good prices	1

Count	telephone help avaiable if required.
1	it feels more transparent than buying from a mechanic based on their opinion.
1	easily navigable web site
1	faster than dealerships to arrange supply and partnership with ATS works well .
1	tyre agedot code positive
1	staff were courteous
1	ability to browse through various makes of tyres before making a decision
1)
1	incorrect tyres sent positive
1	recommended a great local shop for fitting
1	wide choice of tyres at great prices including delivery and fitting.
1	no issues
1	keep it up! Will definitely buy from you again.
1	my tyre supplier of choice!.
	one tyre with dangerously low air pressure. Asked the garage to top up the tyre and check the other three. They
1	did top up the one tyre but didn't bother to check the others. When I checked the tyres 10 minutes later all four tyres had varying pressures (from 29 to 37.5). I emailed both companies and have not received an apology from either. I will never use Lavender Motors again (they shouldn't be in business) and likely not [REDACTED].com either.
1	won't be using anyone else.
1	clean reception area and free coffee
1	only 8 as the garage was unable to fit the tyres in the allotted time and I had to wait over an hour
1	great price.
1	simple to use website
1	and an excellent service from the garage who fitted the tyre.
1	cheaper than anything else I have found by some way.
1	polite staff
1	prompt deliveries
1	good range and competitive prices on website
1	fitting took a long time.
1	the process was simple and quick.Regular offers make it easy to find premium tyres at decent prices.
1	slick delivery service and good fitter.
1	good local fitting services
1	and both times have been good experiences.
1	Great garage fitted them
1	Cheapest price
1	Garage was quick & efficient with fitting of tyres
1	they looked grey and old (but unused) not at all how new tyres normally look. Not surprising when I inspected the 'Dot Date' and it was 4517 (ie tyres manufactured in week 45 of 2017.Queried this with [REDACTED] who told me that they have many different suppliers and do not check the age of the tyres. They could re-order but no guarantee that the replacements would be any newer. Not at all happy and requested a refund which they say they will do.
1	the site is easy to use
1	simple booking for fitting procedure.
1	good service
1	easy to browse selection of tyres before making a choice
1	tje garage i choice to go to in order to have the tyres fitted was nit that good and i certainly will not be using them again.
1	really friendly and efficient service.

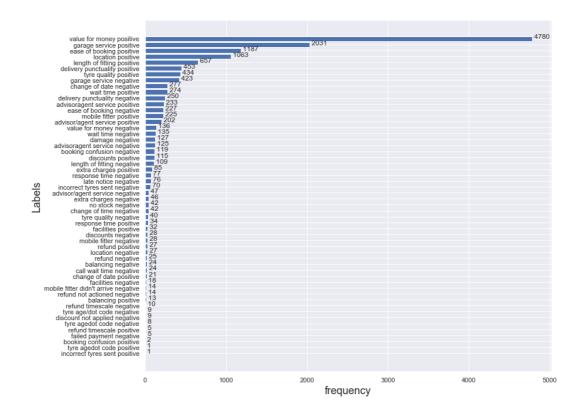


So we have removed datapoints that have 0 labels and also some noisy labels that have no sentiments associated with it

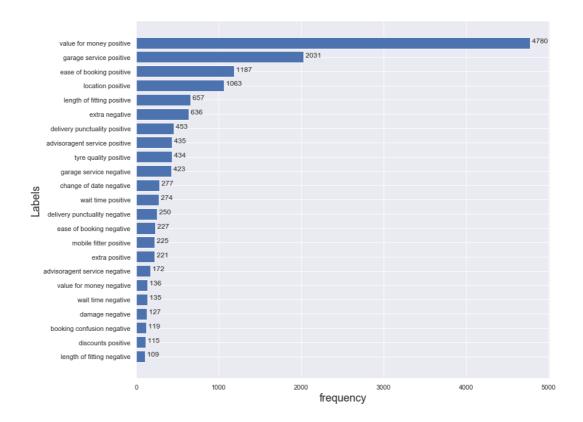
Number of Unique labels after removing noisy labels - 54

After Removing noisy labels we are left with 54 labels

Count of Each Labels



As there are alot of labels that are less than 100, so we can combine them to there respective sentiment labels as due to there low frequecies it will be very difficult for model to learn and we can also there are some labels like 'advisor/agent service positive', 'advisoragent service positive' are same but due to some characters they are split so we can fix this too



So we have combined all the labels that have frequency less than 100 to 'extra positive' and 'extra negative' and also Labels like 'value for money positive', 'garage service positive' have very large frequency as compared to othere labels we can undersample those

Number of Unique Labels after all processing - 23

After combining less frequent labels and correcting some duplicate labels, we have 23 labels now

Under Sampling Analysis

No. of Rows after removing datapoint with 0 labels and noisy labels - 8124

Undersampling Analysis for value for money positive label

No. of rows with only 'value for money positive' as Label - 2143

There are 2143 datapoints in which there is only one label that is value for money positive, we can directly undersample these

No. of rows after undersampling 'value for money positive' - 6195

After Removing 90% of single occuring value for money positive label we have 6195 datapoints

Undersampling Analysis for garage service positive label

No. of rows with only 'garage service positive' as Label - 558

There are 558 datapoints in which there is only one label that is 'garage service positive', we can

No. of rows after undersampling 'garage service positive' - 5749

After Removing 80% of single occuring garage service positive label we have 5749 datapoints

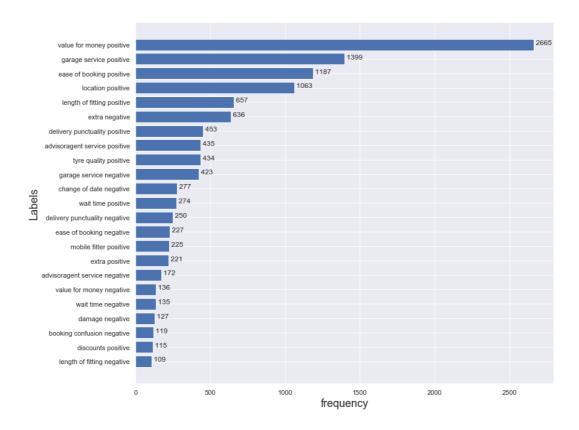
Undersampling Analysis for value for money positive, garage service positive label together

No. of rows with both 'value for money positive' and 'garage service positive' as Label - 232

No. of rows after undersampling 'value for money positive' and 'garage service positive' together - 5563

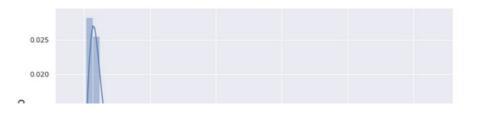
After Undersampling of most frequent occuring labels we have 5587 datapoints

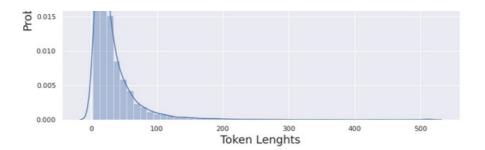
Final Distribution of Labels



We have reduced the most frequently occuring labels significantly

Distibution of Token Lengths of Texts





Most of the tokens length will come under 128