Predicting the number of people have tried the recipe based on the food data

BA 865

Group members

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PROBLEM STATEMENT

Business goals:

- Understanding how different features can affect the result
- Building appropriate models for our data using tensorflow and keras
- Achieving website click-through rate increasing
- Generating more users to use the recipe website in the future

Project description:

- The main aim of our project is to predict the number of people who have tried the recipe based on the food recipes data using deep learning technology

DATASET

- The ‘BBC Food Recipes dataset’ was downloaded from Crawl Feeds, originally extracted from the BBC good food, and there is more than 14000+ recipes
- Consisted of a json file with **18 columns** and **14.2k rows**, and json file containing category names
- All the features are object data type, and 6 columns has more than 1k null values

Column	Non-value	Dtype
total_time	2011	object
cook_time	3859	object
serving	2076	object
crawled_at	0	object
description	0	object
title	0	object
url	0	object
nutritions_info	2197	object
image	0	object
ingredients	137	object
uniq_id	0	object
source	0	object
author	0	object
prep_time	3090	object
published_date	0	object
keywords	360	object
total_ratings	53	object
instructions	1959	object

Source: https://crawlfeeds.com/datasets/bbc-food-recipes-dataset

DATA CLEANING

- Drop columns: too much to handle or related to other column

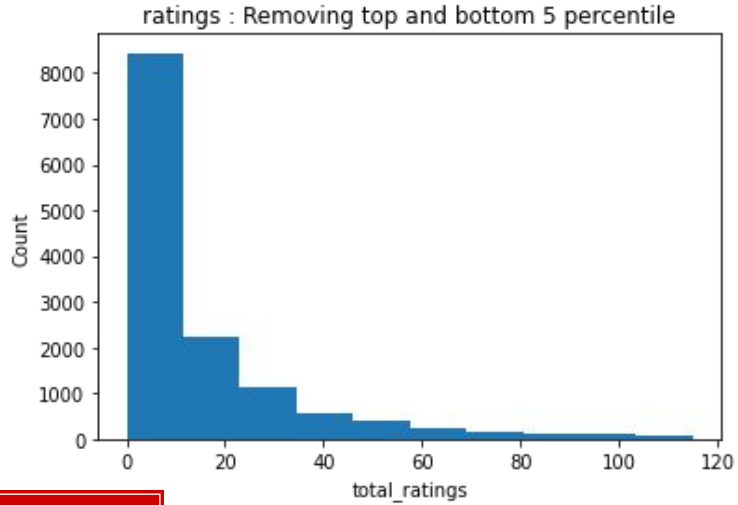
‘uniq_id’	‘prepare_time’
‘cook_time’	‘instructions’
‘crawled_at’	‘url’
‘source’	

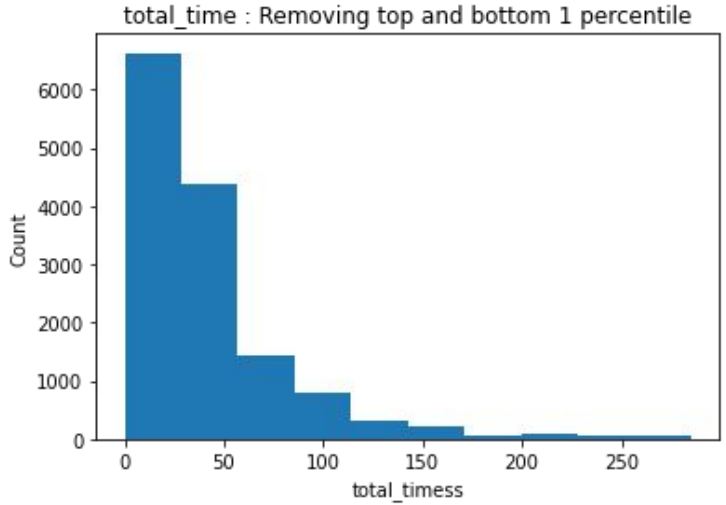
- Deal with all the null-values, using timestamp to convert the unusual time type to minutes
- Using LabelEncoder to encode the ‘author’
- Using TfidVectorizer to token the text columns: ‘description’, ‘keywords’, ‘ingredients’

- Split the ‘nutrition_information_values’ column into 8 columns: 'calories', 'fat', 'saturatedFat', 'carbohydrate', 'sugar', 'fiber', 'protein', 'sodium', and deal with the null value
- Drop the columns that we tokenized

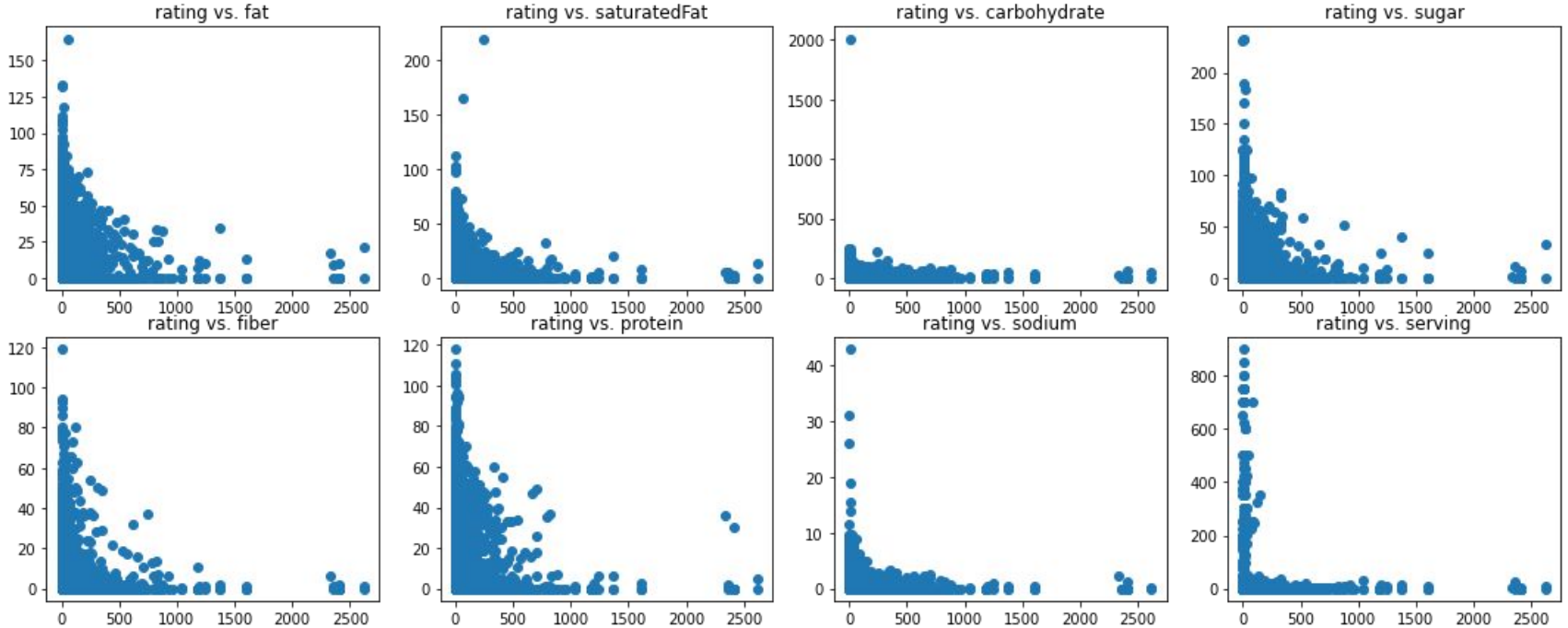
EDA

- To see the true distributions of our target label and important feature, we remove the top and bottom 5 and 1 percentile.

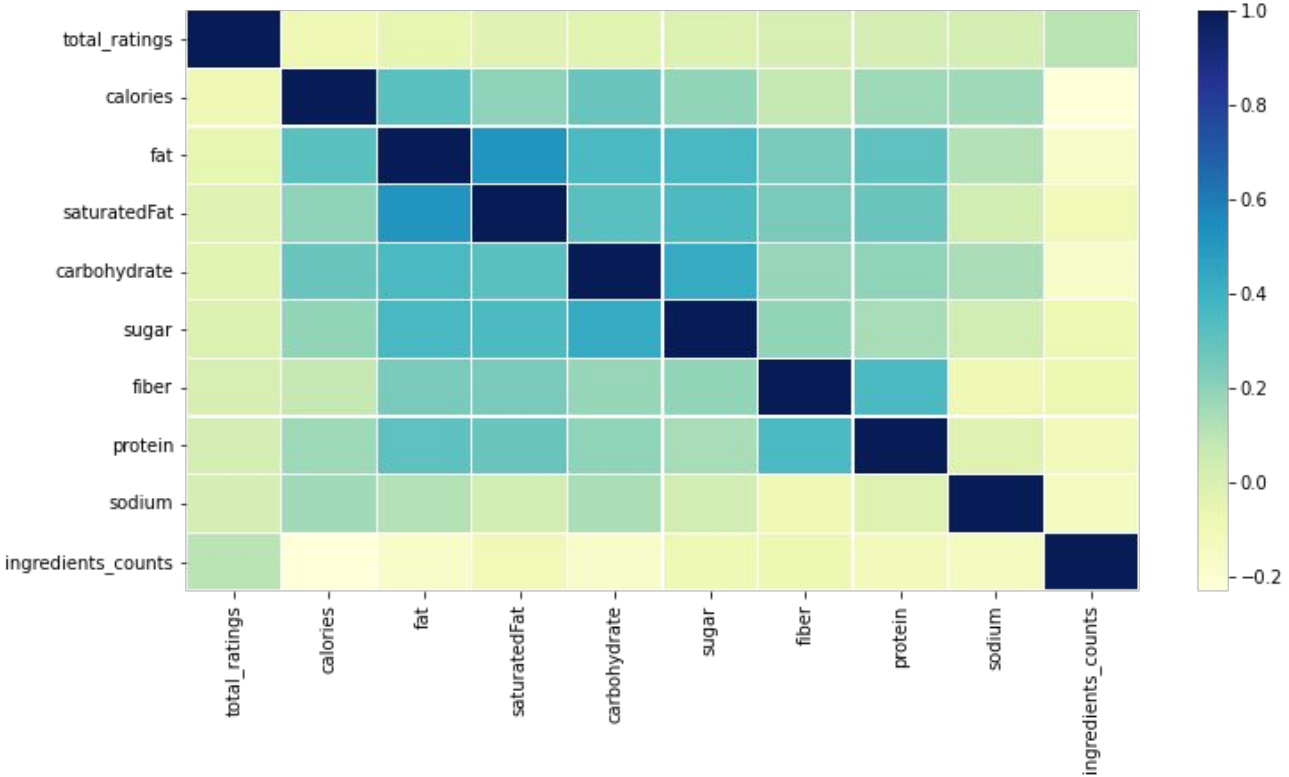




EDA


rating vs. fat
rating vs. saturatedFat
rating vs. carbohydrate
rating vs. sugar
rating vs. fiber
rating vs. protein
rating vs. sodium
rating vs. serving

EDA


total_ratings
calories
fat
saturatedFat
carbohydrate
sugar
fiber
protein
sodium
ingredients_counts
1.0
0.8
0.6
0.4
0.2
0.0
−0.2

DEEP LEARNING - IMAGE

Image Pre-processing

- Dealing the problem that some image urls not able to access.
- Delete the rows that contains dead links

```
[24] deadlist = ['https://images.immediate.co.uk/production/volatile/sites/30/2021/05/Five-bean-chilli--e4da69b.jpg',
      'https://images.immediate.co.uk/production/volatile/sites/30/2020/09/Snacks-Chickpeas_00154-31614c9.jpg',
      'https://images.immediate.co.uk/production/volatile/sites/30/2013/05/vegan-jambalaya-01e5bde.jpg',
      'https://images.immediate.co.uk/production/volatile/sites/30/2021/08/easy-jam-sponge-aff767d.jpg',
      'https://images.immediate.co.uk/production/volatile/sites/30/2020/08/passion-fruit-cake-896b246.png',
      'https://images.immediate.co.uk/production/volatile/sites/30/2020/10/Chicken-stew-425b8e0.jpg',
      'https://images.immediate.co.uk/production/volatile/sites/30/2017/06/Tomato-soup-5cf0912.jpg',
      'https://images.immediate.co.uk/production/volatile/sites/30/2021/07/Griddled-courgettes-4c9269d.jpg',
      'https://images.immediate.co.uk/production/volatile/sites/30/2021/08/vegan-tiramisu-1dab5a8.jpg',
      'https://images.immediate.co.uk/production/volatile/sites/30/2020/11/Butter-chicken-8f9fd05.jpg',
```

- Resize the image size to (200,200,3) and convert to numpy arrays
- Replicate grayscale image 3 times to make it like a RGB photo
- Split our dataset with 2100 for training and 900 for testing

DEEP LEARNING -NUMERIC

Numeric Pre-processing

- MinMax scaler numeric values

```
["total_time","calories","fat",'saturatedFat','carbohydrate','
sugar','fiber','protein','sodium']
```

- Labels: total_ratings; Predictors: Total_time, serving, published_date…..
- train/test split (70%/30%)
- One hot encoded as mentioned in previous

DEEP LEARNING - CNN

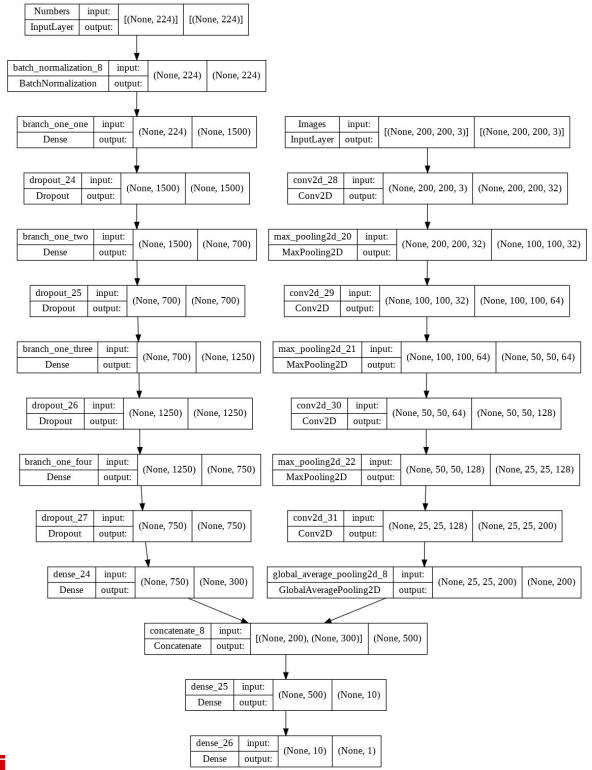
Model Building - Overfitting

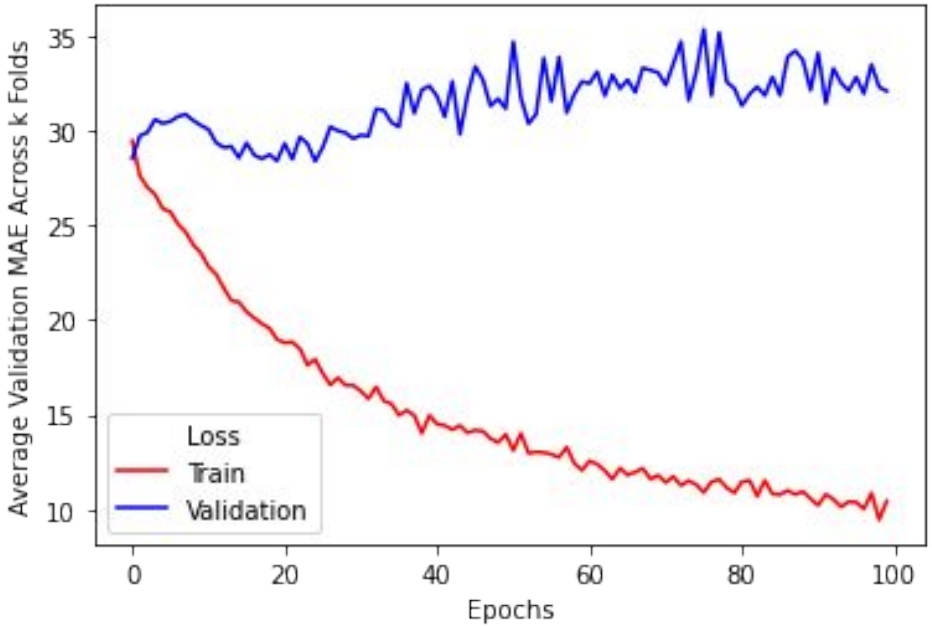
- Multiple layers
- Droup-out layers for numeric layers (0.5)
- Enlarging kernel sizes
- Applying Kernal regularizer and bias regularizer on both convolutional layer and numeri layers
- ‘Relu’ activation function. (Not a categorical question)

Model fitting - 4 fold cross validation

- Epoch: 100
- Batch size: 75

MODEL





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CONCLUSION

Limitations:

- MAE train lower than 10 while validation loss remained high
- Overfitting issue still remains, potential reasons could be cutting a lot of data points.
- Data pre-processing takes up a lot of time and computer glitched brought technical issues.

Bright sight:

- New idea in combination of text analytics, different kinds of ingredients and pictures of the food
- Increase the accuracy of the model by bringing in more data points
- Help those choose recipes wisely and those who have an intention to publish blog. :)

Thank You for Watching!