

SHELF LIFE OF SNACK PRODUCTS

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MS – BUSINESS AND INFORMATION SYSTEMS

OUTLINE



- Shelf life introduction
- Given dataset
- Models
- Logistic regression cross validation model
- Results
- Challenges
- Example

SHELF LIFE

DEFINITION

According to Institute of Food Science and Technology,

“The period during which the food product will remain safe; be certain to retain its desired sensory, chemical, physical, microbiological, and functional characteristics; where appropriate, comply with any label declaration of nutrition data, when stored under the recommended conditions.”

Shelf life is used in reference to these common codes: **(Use by Date, Sell by Date, and Best Before Date)**.

FACTORS

Intrinsic factors include:

1. Initial quality
2. Nature of product
3. Product formulation

Extrinsic factors include:

1. Processing methods
2. Packaging
3. Transportation and storage conditions
4. Consumer handling

DATASET

- Contains 15 attributes and 749 records, which consists of 8 numerical attributes and 7 categorical attributes.
- Target variable: Difference From Fresh.
- Product is considered fresh if Difference From Fresh is less than equal to 20.
- Important features are selected.
- Categorical variables undergo one – hot encoding.
- The dataset is normalized.



MODELS

	LOGISTIC REGRESSION	LOGISTIC REGRESSION CROSS VALIDATION	SUPPORT VECTOR MACHINE
Accuracy	0.84000	0.83979	0.86000
ROC/AUC	0.55	0.58	0.56

LOGISTIC REGRESSION CROSS VALIDATION

Definition:

Cross validation version of logistic regression is `LogisticRegressionCV()` from sklearn package.

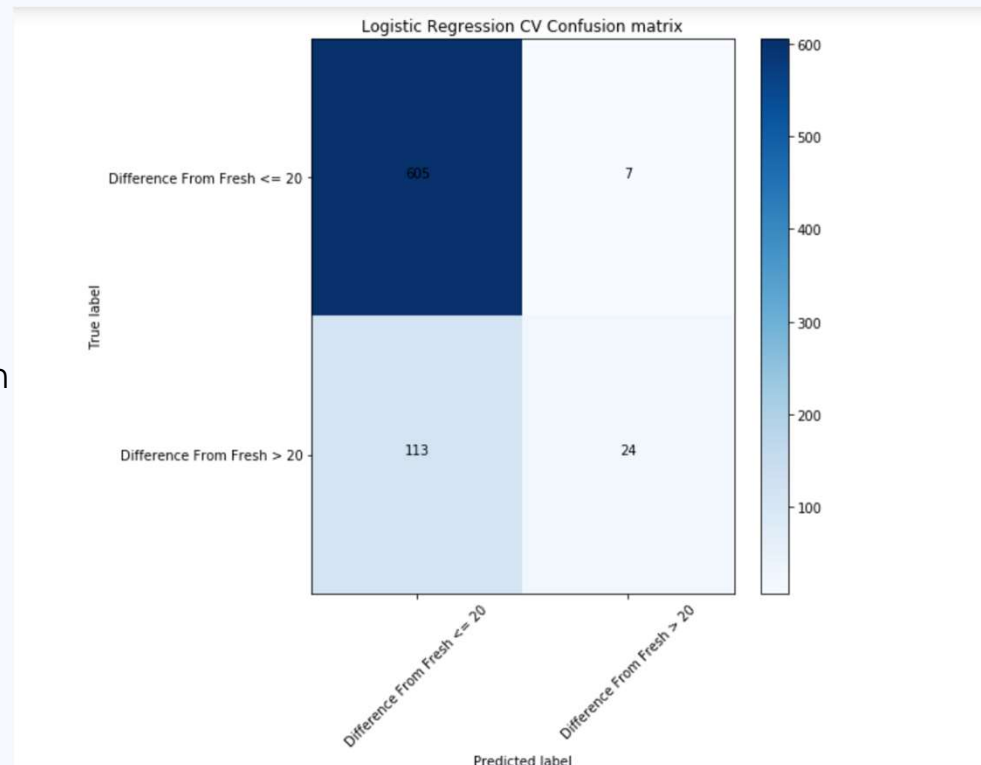
This class implements logistic regression and 10 – fold cross validation using liblinear solver.

Parameters:

Number of folds (cv) = 10

Multi – class = 'auto'

Solver = 'liblinear'

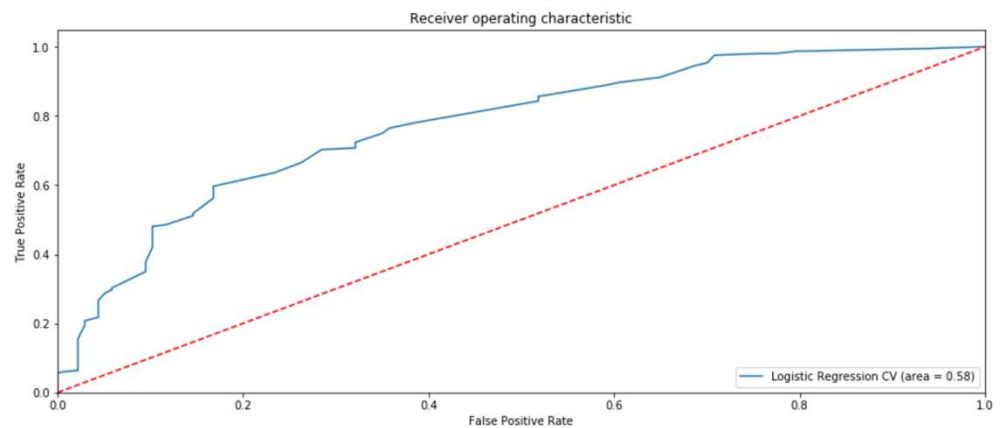


CONFUSION MATRIX



RESULTS

- Precision: 84.26%
- Recall: 98.86%
- F1 – measure: 90.98%



ROC/AUC curve

CHALLENGES

1. Missing values
2. No correlation among variables
3. No knowledge on intrinsic factors of the products
4. Anonymity of “Difference From Fresh”
5. Products synthesis



EXAMPLE

PUMPKIN



Pumpkins Expiration Date

Unopened	Counter	Refrigerator
Fresh Pumpkins last for	2-3 Months	3-5 Months
Canned Pumpkin lasts for	1-2 Years	1-2 Years
Opened	Refrigerator	Freezer
Fresh Cut Pumpkins last for	2-3 Days	6-8 Months
Cooked Pumpkin lasts for	7 Days	6-8 Months
Canned Pumpkin lasts for	7 Days	3-5 Months
Pumpkin Pie lasts for	3-4 Days	4-6 Months

ONION PAKORA

- Lasts for 6 – 8 months

- Fresh onions last for 1 – 2 months in Fridge
- Fresh chopped onions last for 1 week in Fridge

Gram flour



Onions



- Lasts for 1 week in Fridge

Onion pakora



Thank you

References

1. "Determining Product Shelf Life", By Carol Zweep, September 13, 2018, <https://www.foodqualityandsafety.com/article/determining-product-shelf-life/>
2. <http://www.eatbydate.com/>