FOOD RECOGNISATION & NUTRITION ANALYSIS

DATA SCIENCE PROJECT

CONTENTS

DATA COLLECTION

(Back Bone of our project)

- Data Sources:
  -Our institute mess
  -Internet
  -Public Data Set (Kaggle,Robo Flow)
- Huge Data Set of 10000 Images.
- About 21 Food Classes.

DATA PRE- PROCESSING

Data Inspection

- Check for Corrupt files
- Valid Image Format(JPEG,PNG) Detection

Data Labeling & Splitting

- Data set Labeled into 21 Food Classes
- Splitting Data with 70-15-15 rule.

Data Balancing

- Recognising Bais
- Balancing Over sampling & under Sampling

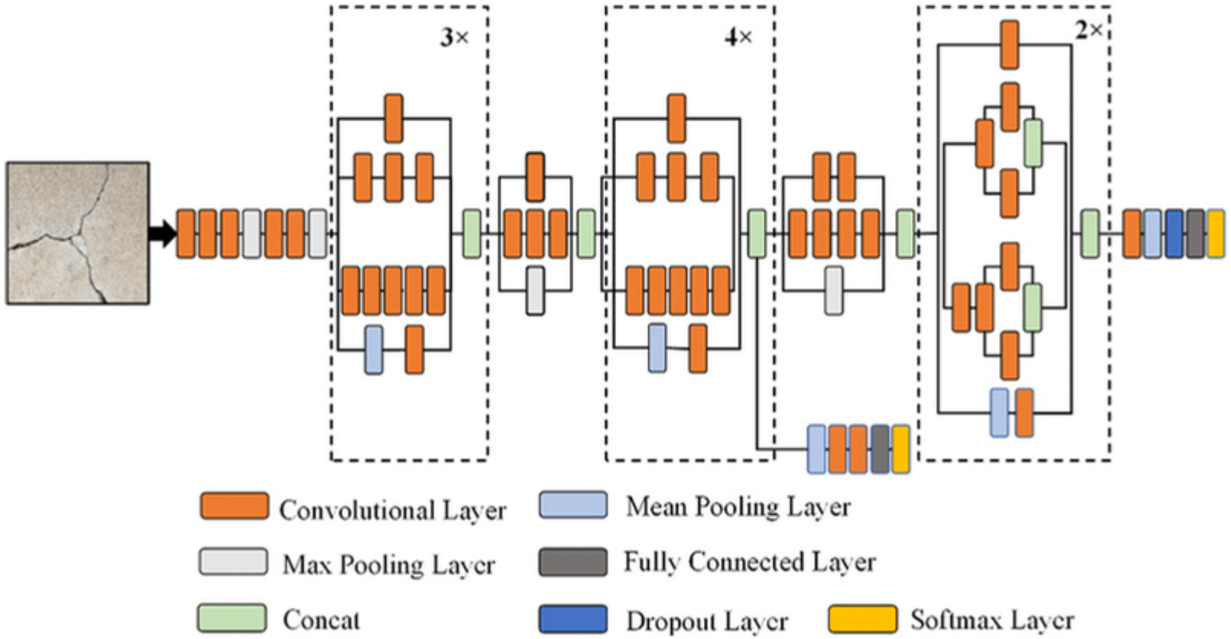
Data Augumentation

- Technique to increase Data set
- Make model more Generalized
- Reduces over fintting

MODEL DEVELOPMENT & TRAINING

Inception V3

- CNN Architecture
- Developed by google
- Robust Feature Extraction
- Transfer Learning
- Fine Tuning Model



- Hyper Parameter Tuning
- Training Parameter Tuning
- Optimization Techniques
- Data Feeding
- Evaluation Matrices

MODEL DEVELOPMENT & TRAINING

Why Inception V3 ?

- Highly effective for Complex tasks like Food recognition
- Pre-Trained on Large Data set (ImageNet)

Components

- GAP Layer
- Dense Layer. (128 units)
- Output Layer. (Soft max Activation)
- SGD optimizer.

Traininng Parameter Tuning

- Epochs: 20
- Batch Size: 16

Hyper Parameter Tuning

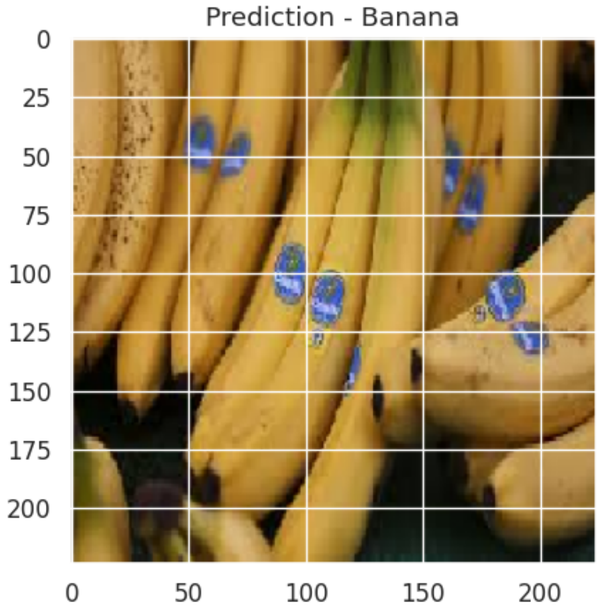
- Learning Rate: 0.0001
- Momentum: 0.9
- Dropout Rate:20%
- L2 Regularization: 0.05

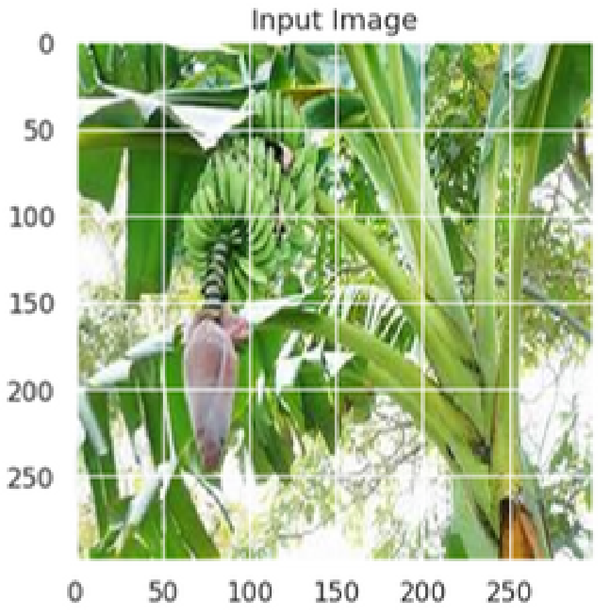
EVALUATION MATRICES

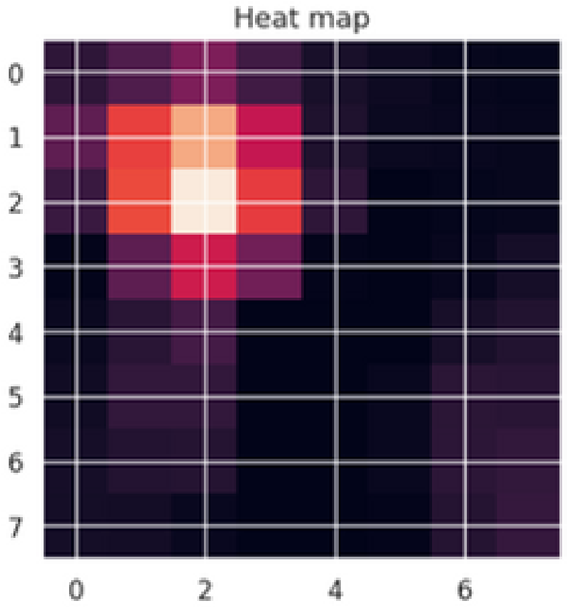
- Training Validation Accuracy: 79.3%
- Testing Accuracy: 80%
- Loss & Accuracy curves
- Confusion Matrix

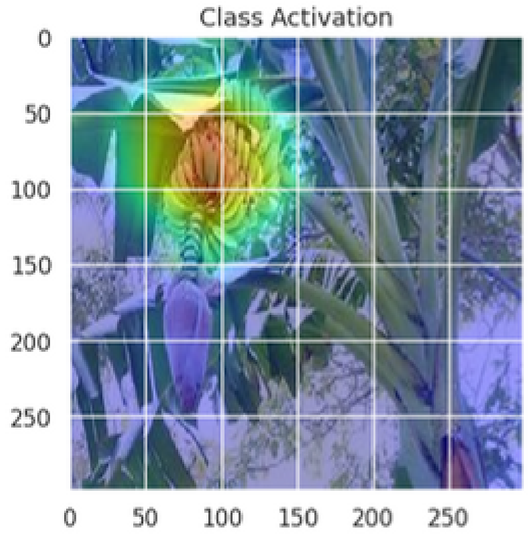
```
Found 1417 images belonging to 21 classes.

[ ]  scores = model.evaluate_generator(test_generator)

     print("Test Accuracy: {:.3f}".format(scores[1]))

     Test Accuracy: 0.808
```

MODEL PREDICTION



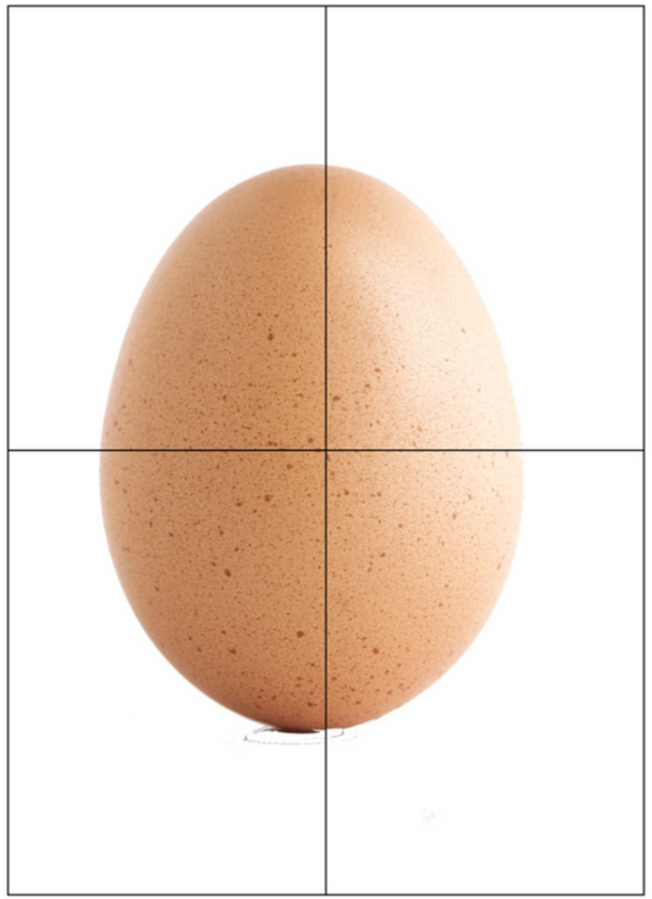






NUTRITION ANYLASIS

- Nutrition Info from USDA Data Base
- Displays Nutrition Info per 100g of Food.
- (Example shown in figure aside)



```
EGG
 Nutrition Analysis(1 Egg-34g)
*Carbohydrates:0.802g
*Minerals: Selenium se- 6.09 micro g
*Vitamins:
  Riboflavin- 0.133 mg
*Amino acids:
   Tryptophan-0.064      g
  Isoleucine-0.207       g
     Leucine-0.347       g
    Lysine-0.279 g
       Methionine-0.165  g
    Phenylalanine-0.247  g
     Tyrosine-0.158      g
      Valine-0.265       g
  Arginine-0.235         g
  Histidine-0.087        g
   Alanine-0.243         g
 Aspartic acid-0.452     g
  Glutamic acid-0.598    g
 Glycine-0.143 g
 Proline-0.168 g
  Serine-0.291 g
    Hydroxyproline-<0.01         g
    Cysteine-0.138       g
```

CONCLUSION

- **Project Colab notebook link:**

https://colab.research.google.com/drive/1ZoaL8_E4cCfzBil8F8wFlXAmFLl8JQgp?usp=sharing

THANK YOU !

TEAM:

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(Data collection & preprocessing)

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