

# CHOWNET-V1: An Image Dataset of Nigerian Food

AI Saturdays Lagos Community

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## MOTIVATION

People from diverse cultural backgrounds often have distinct food preferences, with studies[1] indicating that individuals connect with their food choices as an expression of identity. Building on our community's 2018 initiative to gather a dataset of Nigerian food images—aimed at addressing the poor classification of Nigerian cuisine by object detection models (see Fig. 1)—we present CHOWNET.

CHOWNET is a **high-quality** dataset containing **118** human-annotated food images, designed for **multi-label classification**, **food object detection**, and **food captioning** tasks. The dataset is available for download at [https://bit.ly/chownet\\_indaba](https://bit.ly/chownet_indaba)



Fig. 1: Real-Time Object Detection using Tensorflow and OpenCV

## DATASET CLEANING

We curated a dataset of **118** food images with **99** unique labels. This dataset, contributed by our community members in 2018, is being published for the first time. We engaged in extensive cleaning to ensure quality and compliance which significantly reduced the dataset from the initially collected and reported 568 images to 118 clean, non-copyrighted images. The cleaning steps taken include:

- Duplicate Removal:** We used CLIP with a similarity threshold of over 90% to identify duplicates and near-duplicates, which were then manually inspected and removed.
- Image Quality:** Blurry images were excluded.
- Privacy Considerations:** Images with visible body parts, such as hands, were removed.
- Copyright Compliance:** Google Image Lens was used to identify and remove copyrighted images.
- Resolution Considerations:** Lower-resolution images were retained in some cases since real-life scenarios may not always provide high-quality images due to variations in user camera capabilities.

Food name	Number of Images containing food name
Diced Fried Plantain	36
Jollof Rice	33
Protein	19
Fried Chicken	18
Fried Rice	15
Cow Skin	15
Stew	11
Fried Egg	10
Boiled Egg	10
Peppered Fried Fish	9
Moi-Moi	9
Boiled Yam	9
Peppered Fried Chicken	8
Assorted Meat	8
Vegetable Soup	7

Table 1: Top-15 Food represented in CHOWNET

## REFERENCES

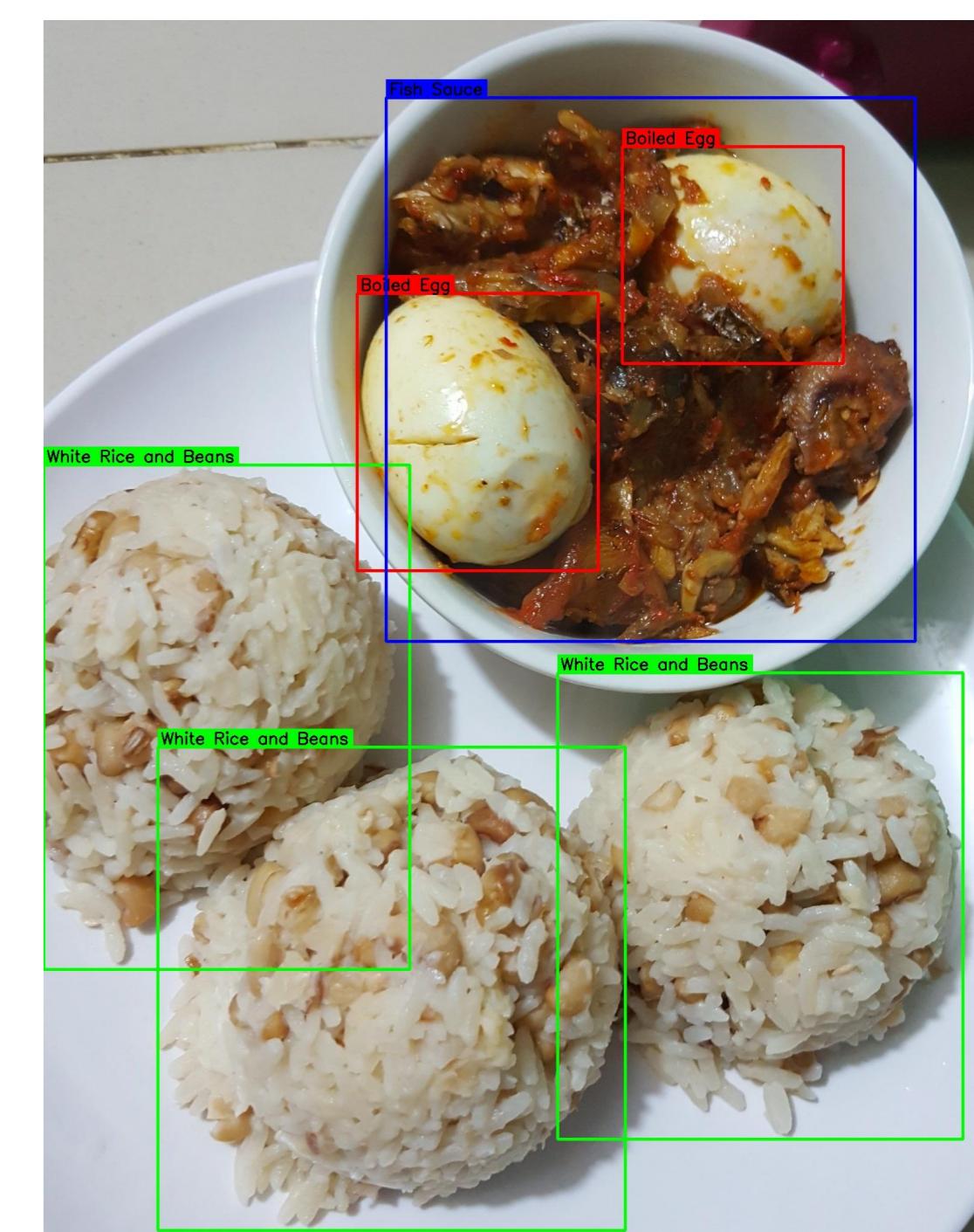
1. Gina M. Almerico. Food and Identity: Food studies, cultural, and personal identity. *Journal of International Business and Cultural Studies Volume 8 - June, 2014*

## DATASET TASKS

- Food Clustering
- Multi-label\* Classification
- Food object Detection
- Food Captioning\*\*

\* **Multi-label:** Boiled Egg, Fish Sauce, Rice and Beans

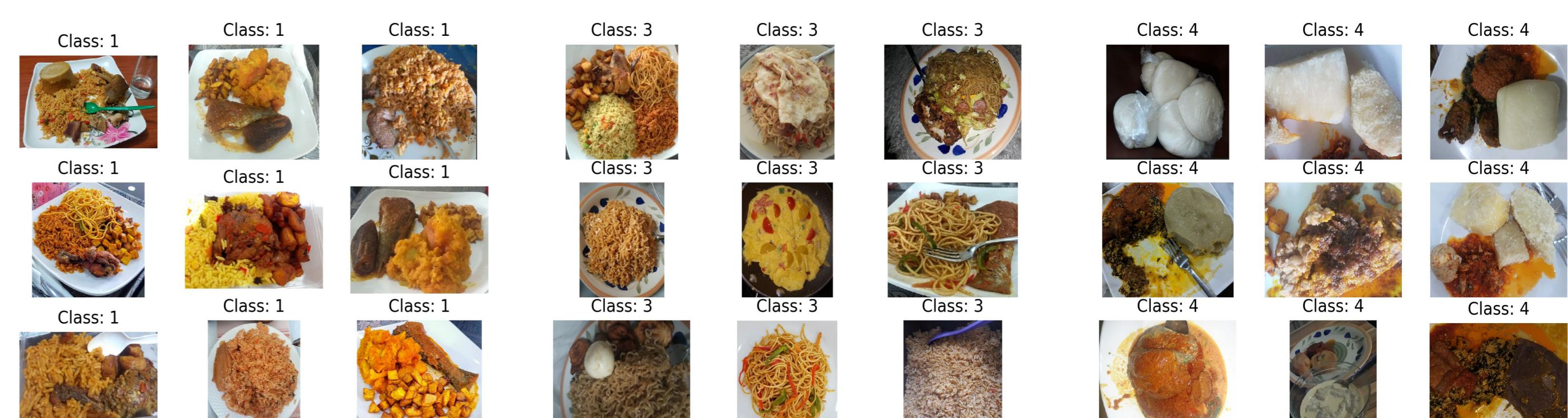
\*\* **Captioning:** Three portions of rice and beans paired with fish peppered sauce and boiled eggs



## EXPERIMENTAL RESULTS

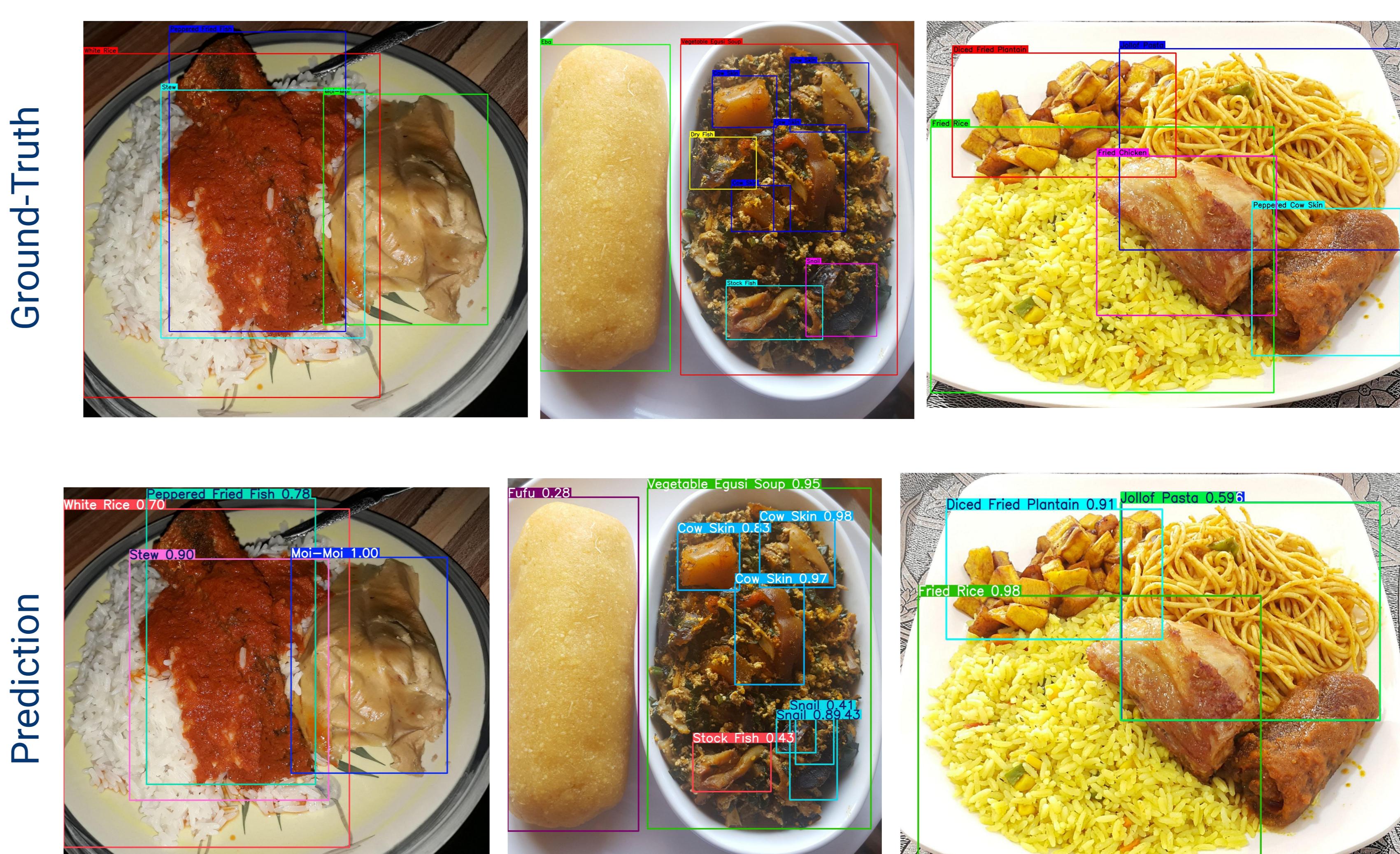
### FOOD CLUSTERING

We converted the images to vector embeddings using a pre-trained ResNet18 model to obtain food classes with similar characteristics. We then applied the PCA algorithm to the embedding with a cluster size of 5 and an embedding dimension of 16. From the images below, we can observe that class 1 consists mainly of "Rice", while class 3 and class 4 consist of "Noodles" and "Swallow" respectively.



### FOOD OBJECT DETECTION

In this experiment, we split the dataset into a train and validation set of 80:20 ratio and trained a **YOLOv8** model using PyTorch. First, we trained the model without augmentation for about **568** epochs and then retrained it with augmentation. We noticed that the augmented model performed better with a **mAP@50** score of **0.395** and **mAP@95** score of **0.297**. The compute used in the experiment was an **RTX2080** with **8GB** dedicated memory and the training took approximately one hour. The first image below (left) is an sample from the train set.



## CONTRIBUTE YOUR LOCAL FOOD

We **aim to expand** this dataset and we **need your support** to make it happen. You can contribute images of your food by visiting: [https://bit.ly/chownet\\_indaba](https://bit.ly/chownet_indaba).