

# Importing The Model Building Libraries

Date	24 October 2022
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Project Name	AI-POWERED NUTRITION ANALYZER FOR FITNESS ENTHUSISASTS

## Importing the necessary libraries

```
import numpy as np #used for numerical analysis
import tensorflow #open source used for both ML and DL for computation
from tensorflow.keras.models import Sequential #it is a plain stack of layers
from tensorflow.keras import layers #A layer consists of a tensor-in tensor-out computation function
#Dense Layer is the regular deeply connected neural network layer
from tensorflow.keras.layers import Dense, Flatten
#Flatten-used for flattening the input or change the dimension
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Dropout #Convolutional Layer
#MaxPooling2D-for downsampling the image
from keras.preprocessing.image import ImageDataGenerator
```

- Throughout the study, whenever a senior nutritionist recoded a diet record for QC, she gave written feedback to the coder about line errors. From these reports we were able to categorise different types of errors that arose:
- Keying: typing in the wrong code number or weight.
- Choice of code: e.g. choosing the code for standard mayonnaise when a low-fat variety was recorded.
- Subjective decisions: these were probably the most common mistakes initially, e.g. coding an unknown type of milk as whole

milk when the code book stated that if the type is unknown it is to be coded as semi-skimmed.

- Calculations: sometimes these errors were simple, e.g. coding for weight of one slice of bread when two were eaten, and sometimes these were more complex (e.g. when the participant reported intake in g, the coder multiplied by density, which is required only when intake is estimated by volume) or making an error in calculating weight (e.g. of a sausage from its estimated length, diameter and density).
- Interpretation: e.g. when it was recorded that half a cup of coffee was not drunk, halving only the weight of coffee consumed not the weight of milk and sugar.
- Decisions about brand items: e.g. coding what a volunteer described as 'Co-op Weetabix' as 'Weetabix' when Weetabix is a brand; the Co-op cereal should have been treated as a possible new food. In this case it is likely that it would be coded in the same way, but the nutrient label would have to be checked first.