## LITERATURE SURVEY:

### Categories:

Estimating dietary intake accurately with a high-quality food journal is crucial for managing weight loss [27]. Unfortunately, due to many technical barriers, how to improve the accuracy of dietary intake estimation is still an open question. In this paper, we aim to develop a systematic approach as a first step to address this issue. We envision that there are four most relevant research areas, listed as below.

### Food Recognition Algorithms:

In this section, we will introduce our proposed food recognition algorithms, which runs on the FC and BC. Essentially, our system is a multiple-stage food recognition system that distributes the analytics throughout the network.

### SYSTEM IMPLEMENTATION:

In order to verify the efficacy and effectiveness of the proposed system, we implemented a prototype system for food recognition. Specifically, the front-end component (FC) is implemented on Android 6.0.1 (Marshmallow). The back-end component (BC) is implemented using server equipped with CentOS 7.0.

### Implementation of Back-end Component:

Our back-end system is mainly used for classification when we receive the images from the mobile device. Before testing, we used pre-trained GoogLeNet model from ImageNet, and then fine-tuned on public food data set like Food-101 and UEC-100/UEC-256. After these steps, a fine grained model is generated which can be used for specifically food image classification. We use Caffe to train and tune the model.

### Experimental Results:

As we have introduced before, we employ two data sets for our experiments. We will introduce our experimental results for the first category in this section, which is UEC dataset [57]. It was first developed by Deep Food Cam project [59] and the majority of the food items in UEC dataset is Asian food.

### The Employment of Bounding Box:

To verify this hypothesis, we conducted a simple experiment. Our goal is to demonstrate that even very simple pre-processing can help improve the recognition performance. For example, we can use a simple bounding-box strategy to reduce the image size without analyzing the image content fully.