Introduction

For the past years, one of the biggest everyday issues being faced all around the globe, is healthcare. Unfortunately, this is happening due to most people having a lesser quality of life then our ancestors. The quality of life has decreased because of Social Determinants of Health (SDOH) (1) such as the way we live, work, exercise and learn. Because of these determinants, it could be very difficult to for one to be able to follow a healthy diet whilst also making sure that a good amount of physical activity is met daily. Money also plays a very big factor in this, because often junk food is a lot cheaper than their healthier counterparts. With cost of living increasing on the daily, many are opting to buy these un-healthy foods to cut down their costs to afford paying their rents. The COVID-19 pandemic was also a major challenge for people who were stuck at home for months. In March 2021 an article from the American psychological association stated that from undertaken surveys, 42% of Americans gained more weight they what was intended (2). 32% of these individuals gained an average of 29 pounds whilst the rest of gained more than 50, therefore some might have considered the pandemic to be a double-edged sword.

The obesity issue in Malta also proves to be an out-of-control issue in the past years. *“Obesity rates in Malta have risen over the past decade and are now the highest in the EU for both adults and children”* (3). As of 2021, the rate of obese men and women was that of 30.6% and 26.7%, this meant that almost one third of the population is obese. The main reason for this is due to the larger portion sizes which Maltese citizens consume and the large numbers of un-healthy, ready-made foods which many opt to purchase instead of preparing a healthy meal.

This paper will focus on classifying a small part of traditional Maltese foods and then generating an estimated calorie value for each of the items in the image. The proposed solution will make use of “Mask R-CNN” as the classifier, whilst also using simple proportion formulas to estimate the calorie value. The results for this research are to be compared by manually weighing each item and comparing that value with the one estimated from the algorithm, whilst also identifying how the algorithm performed in both the classification and instance segmentation sections. As part of this research, a custom dataset for the subset of Maltese foods chosen will also be created, whilst also creating an automated process to create annotations for many images. Apart from that, there is also the option of using such algorithm as a steppingstone for tourist applications, where one can easily identify a traditional food item just by taking a single picture, giving them a better understanding and a better experience of Maltese food.

Throughout my years, national food was always something which I appreciated whilst working as a *Commis Chef*, combining this with my passion for learning different programming concepts, the idea of creating an image processing algorithm which estimates the nutritional values for food items in an image came to mind. My sister is also a diabetic, therefore calculating nutritional values for her meal is a daily requirement which was very challenging at the beginning. This is because traditionally, all the food items used in the cooking process had to be manually noted down and weighed first. Then the food items had to be looked up one by one and their nutritional values had to be calculated from the previously recorded weight.

The coming is a general structure of how this research paper is structured: Section I consists of background research on the methods previously used by other researchers, whilst also gaining more knowledge on what algorithms/applications have been used in the past. The second section focuses on how the actual research of this paper was handled and the results from these methods are mentioned and discussed in the third section. Finally, the conclusion is where future works/improvement were mentioned and a decision whether this research was successful, was also mentioned.

1. <https://www.cdc.gov/obesity/basics/causes.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fobesity%2Fadult%2Fcauses.html>
2. <https://www.apa.org/news/press/releases/2021/03/one-year-pandemic-stress>
3. O. O. on Health Systems and M. Policies, “Country health profile 2019,state of health in the eu, oecd publishing, paris/european observatory on healthsystems and policies, brussels.” 2019.