Assignment 3 (Due: Jun. 21, 2020)

1. (**Math**) In our lecture, we mentioned that for logistic regression, the cost function is,

$$J(\boldsymbol{\theta}) = -\sum_{i=1}^{m} y_i \log\left(h_{\boldsymbol{\theta}}(\boldsymbol{x}_i)\right) + (1 - y_i) \log\left(1 - h_{\boldsymbol{\theta}}(\boldsymbol{x}_i)\right)$$

Please verify that the gradient of this cost function is

$$\nabla_{\boldsymbol{\theta}} J(\boldsymbol{\theta}) = \sum_{i=1}^{m} \boldsymbol{x}_i \left(h_{\boldsymbol{\theta}}(\boldsymbol{x}_i) - y_i\right)$$

2. (**Programming**) In intelligent retail, one task is to investigate the proportion of each commodity occupying shelves. In this assignment, suppose that you are provided a surveillance video of a shelf and you need to recognize and locate two specific kinds of products, "康师傅香辣牛肉面" and "康师父卤香牛肉面" in real time. You are recommended to use YoloV2 (an object detection approach) for this task.

The test video is given on the course website. Please show your results to TA.