## About Project

Generally my aim was detecting objects from a camera in real time, of course within good accuracy. When i made my resarch, i noticed that, image processing stuffs has some principles. Before the start coding, i tried to learn some image processing methods compatible with my subject.

So in general, this project based on convolutional neural networks.

## Convolutional Neural Networks

The idea of a Convolutional Neural Networks (CNNs) model was firstly applied to recognize a picture automatically.

A picture can be transformed into a matrix. Then a convolution operation is processed by simply sums up each cell product with weight within a window size. This window size scans from two directions (left to right, and from top and down).

I used these methods before when i was working on engineering project 1, so it was not hard to me to understand the topic.

## Project Steps

1. Firstly i collected a lot of information about what i can do in this project. Obviosly i had to use opencv, also numpy library was very important to learn. I read offical documents from opencv offical website.
2. After that i made some more research i found very strong and useful dataset called “YOLO version 3”. Yolo datasets are the best choice for object detection so i decided to use them.
3. Then i started to coding. In begining i tried to learn some basics of opencv like drawing shapes, reading frames, reading mathematical variables of a picture, using camera etc.
4. When i done with the tutorials, i created my project. I decided to move on in 3 process. Firstly i detected objects from a picture, secondly detected objects from a video and finally i would detect the objects from a webcam in real time. In these progress i encountered many problems about accuracy.
5. Again i made researches about this accuracy problem and i finally found a method called non-maximum supression which is reduces errors and increases accuracy. So I learned the method thoroughly and adapted it to my own project.

## Prototype

1. After these long progress, my project has reached it’s first prototype. In this prototype, we can detect eighty different objects and displaying it in realt time with good accuracy.
2. Simply, When we run the program, detection begins. As you can see i tested the prototype with different objects like teddybear, tenis racket, bananas..

bottle and myself, toothbrush, keyboard, mouse.

1. It increases the accuracy rate thanks to the Non Maximum Suppression method. Almost all my tests protoype gave me the exact result.
2. Since the dataset is very large, the program runs a little slow but we get the results right.