Face detection neural network

Neural network is a network or circuit of neurons, or in a modern sense, an artificial neural network, composed of artificial neurons or nodes. Information flows through a neural network in two ways. When it's learning or operating normally, patterns of information are fed into the network via the input units, which trigger the layers of hidden units, and these in turn arrive at the output units.

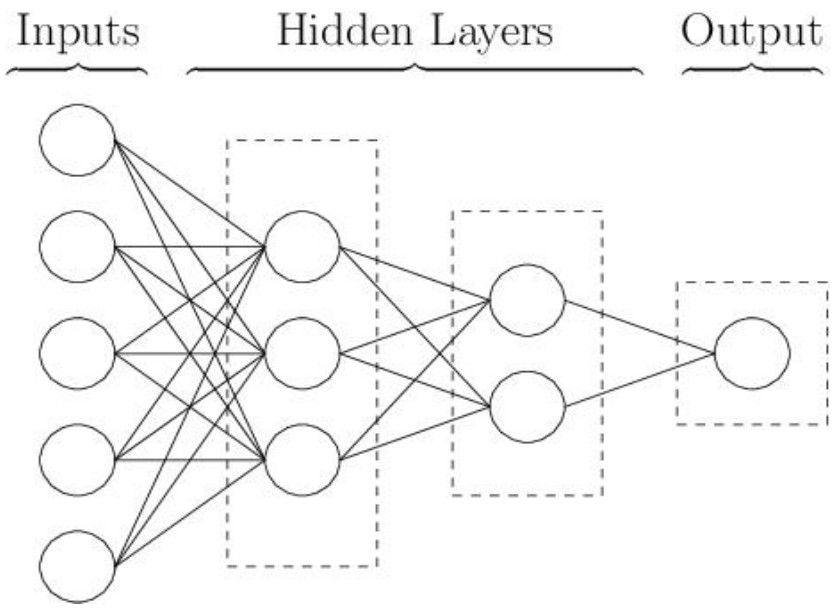

fig: neural network diagram

MTCNN (Multi-task Cascaded Convolutional Neural Networks) is an algorithm consisting of 3 stages. P-net, R-net and O-net. For every image we pass in, the network creates an image pyramid. Which is basically multiple copies of that image in different sizes.

Summary of the whole MTCNN process is-

✧ P-Net:

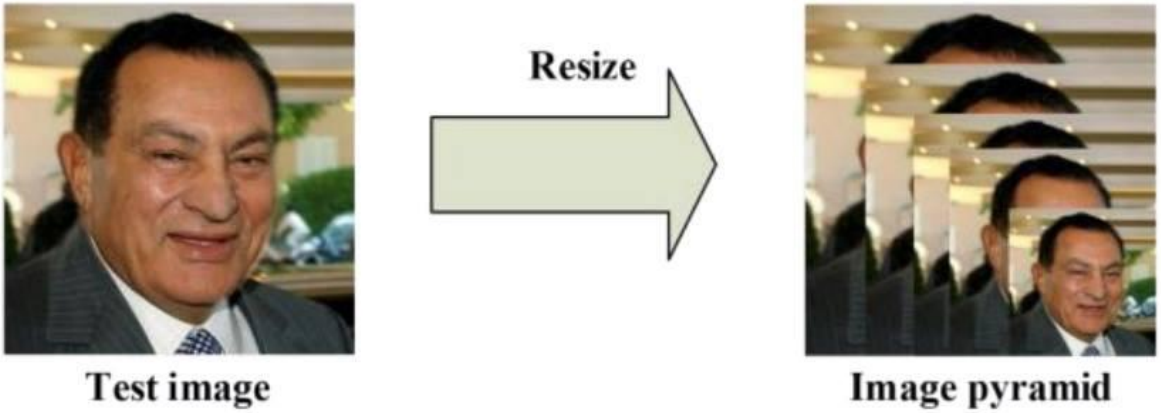

Image 1: Image Pyramid

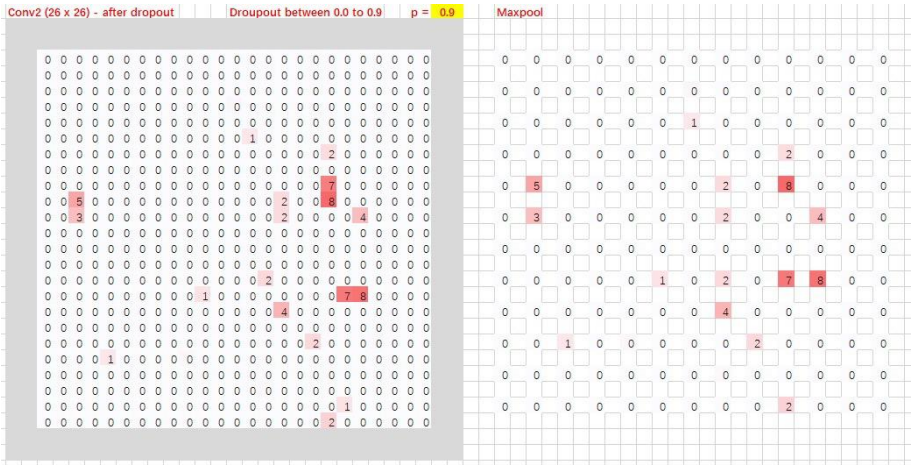

Image 2: Max-Pool

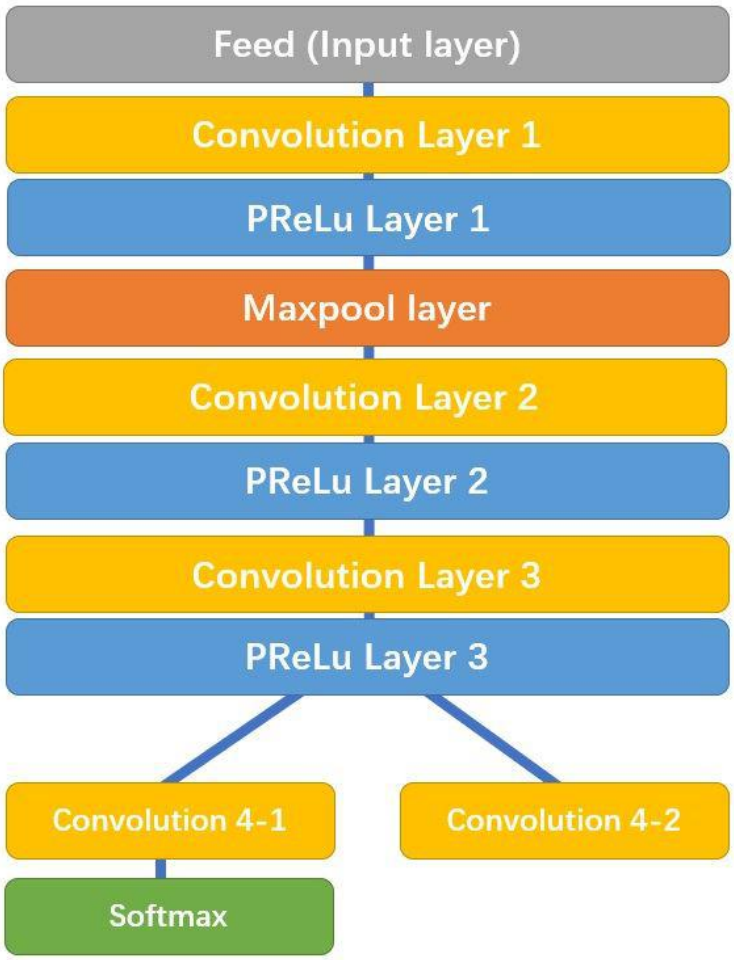
Feed (Input layer)
Convolution Layer 1
PReLu Layer 1
Maxpool layer
Convolution Layer 2
PReLu Layer 2
Convolution Layer 3
PReLu Layer 3
Convolution 4-1
Convolution 4-2
Softmax

Image 3: P-Net

✧ R-Net:

Image 4: R-Net

✧ O-Net

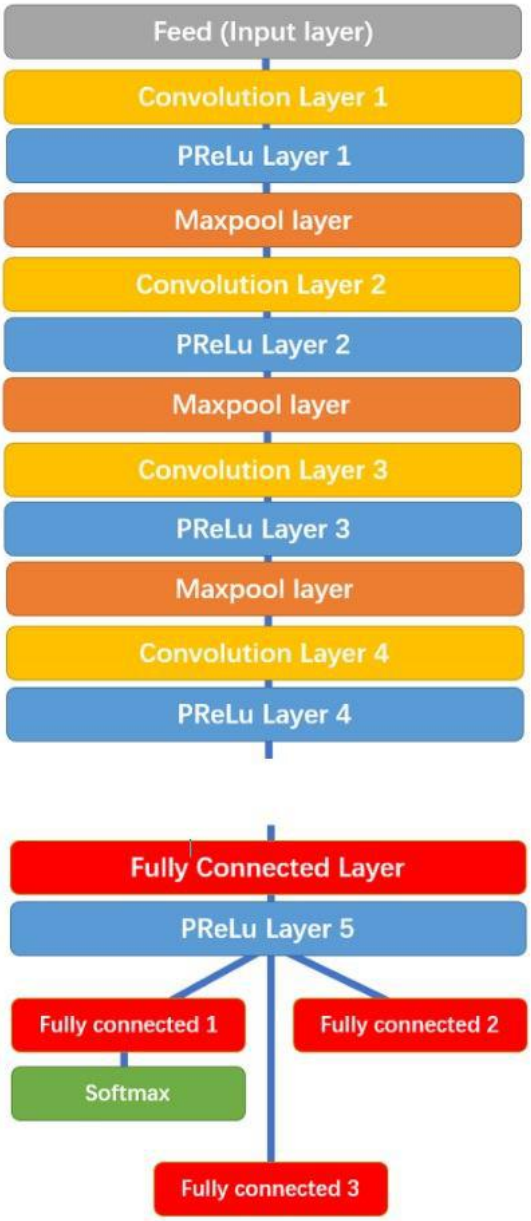

Image 5: O-Net


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[{'box': [277, 90, 48, 63], 'confidence': 0.9985162615776062,
'keypoints': {'left_eye': (291, 117), 'right_eye': (314, 114),
'nose': (303, 131), 'mouth_left': (296, 143), 'mouth_right': (313,
141)}}]
```

References-

1. https://towardsdatascience.com/how-does-a-face-detection-program-work-using-neural-networks-17896df8e6ff
2. https://towardsdatascience.com/face-detection-neural-network-structure-257b8f6f85d1
3. https://towardsdatascience.com/what-is-a-neural-network-6010edabde2b?fbclid=IwAR3Bnl8KEVaB4FTp9xWkikYMHdGH8fm6DQ69i9uvLjkk4HVObkf7sA2MVc8