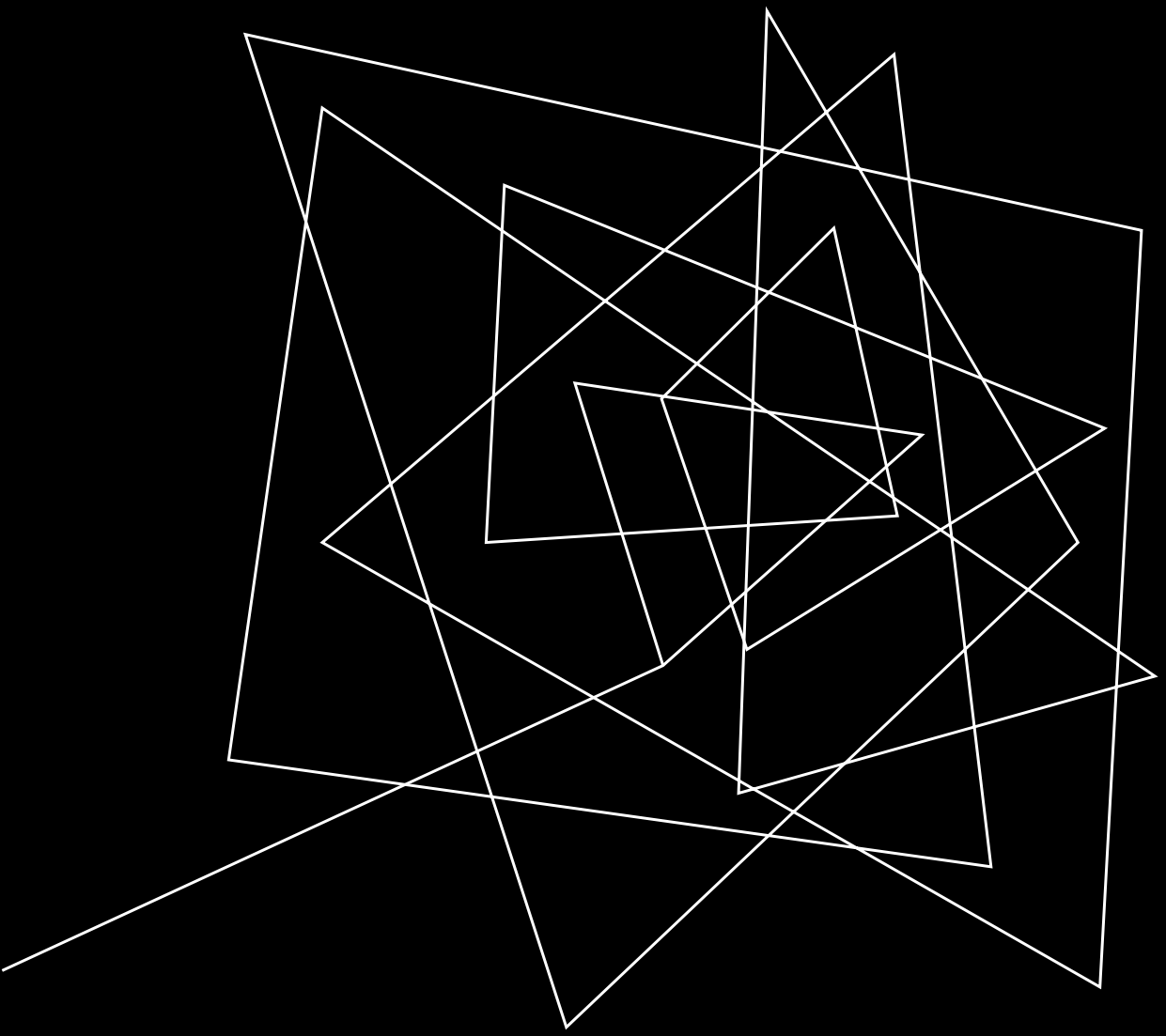


# DIGITAL MAMMOGRAPHY CHALLENGE

86000 test

diagnosed with cancer or not

AUC = 0.85 in final test dataset

2nd place

# DATA

train

DDSM(digital database for screening mammography)

2620 X-ray image with pixel-level annotation

train

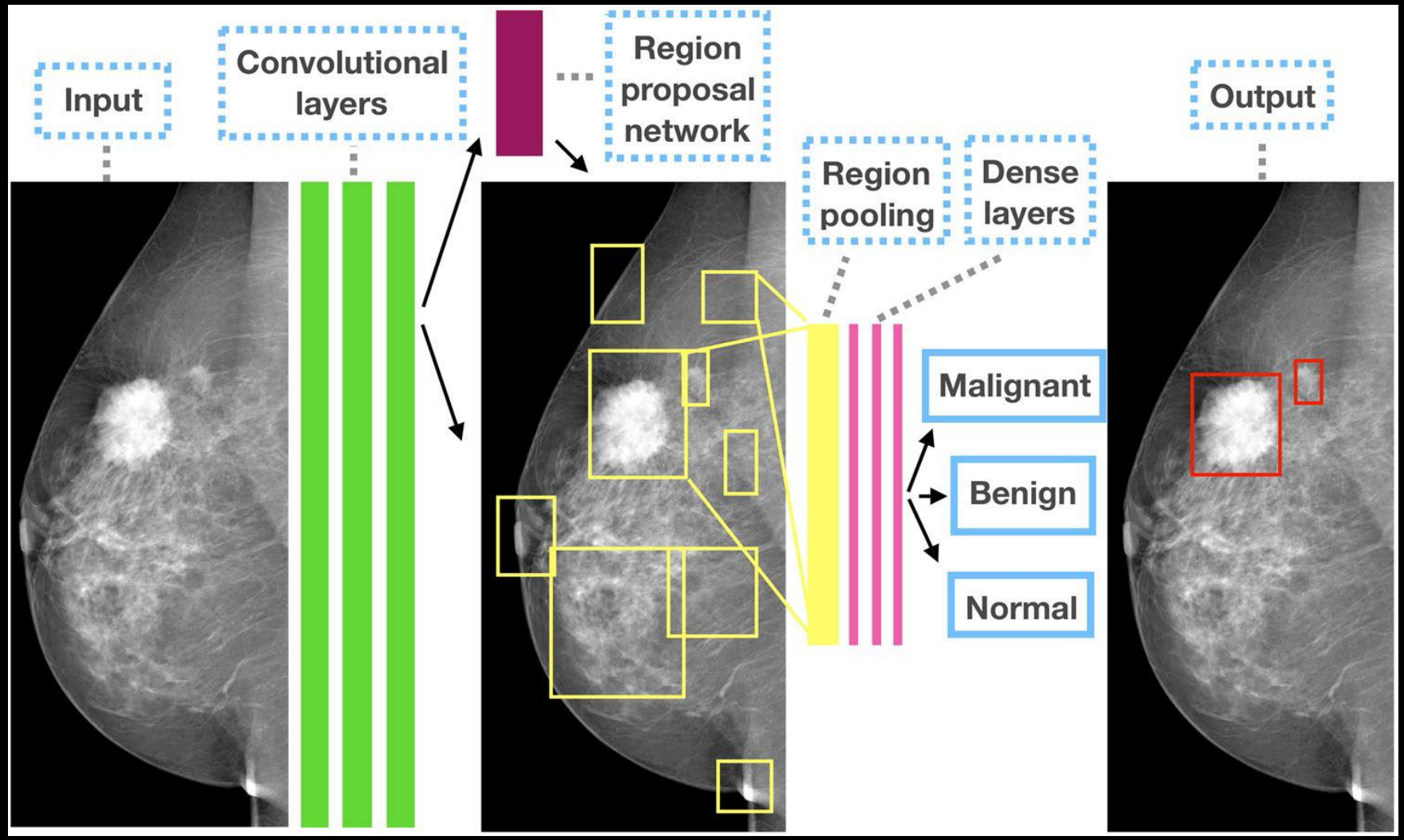
Department of Radiology at Semmelweis University

847 X-ray image

test

INbreast dataset

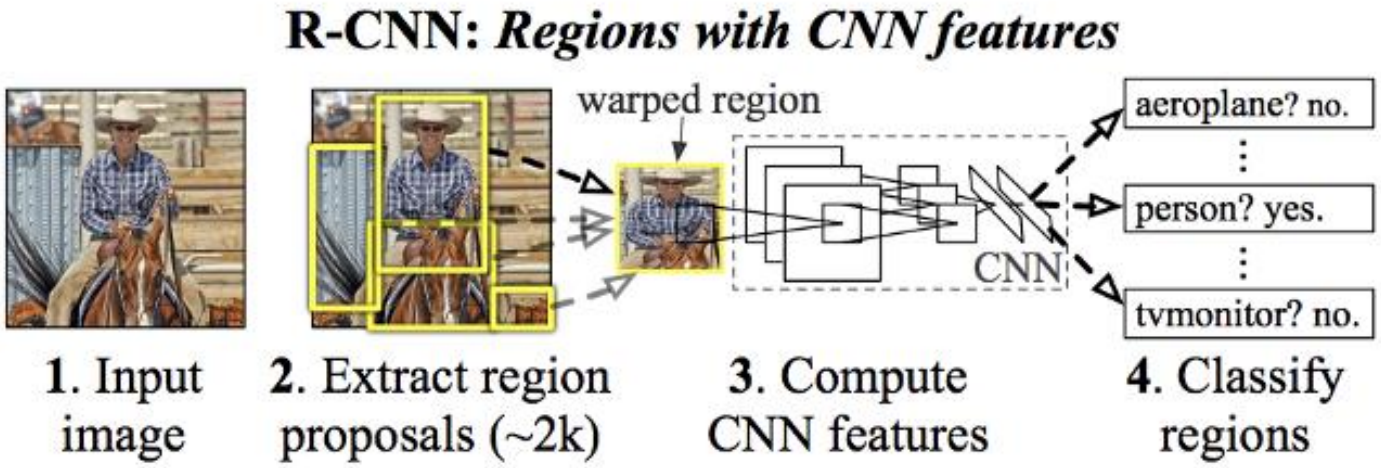
# METHOD


Input
Convolutional layers
Region proposal network
Region pooling
Dense layers
Output
Malignant
Benign
Normal

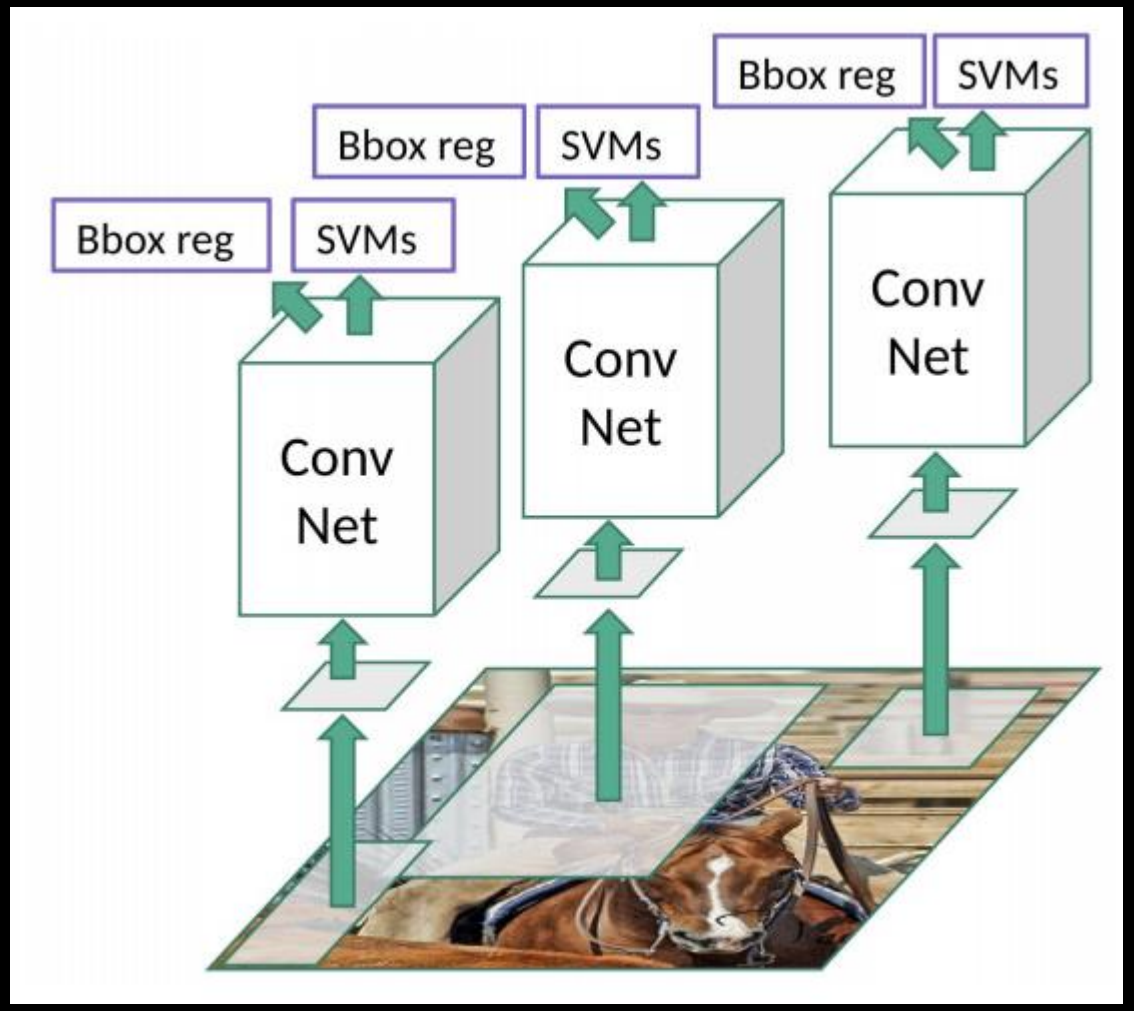
# R-CNN

Use selective algorithms to extract 2000 regions from image ,These regions are called region proposals

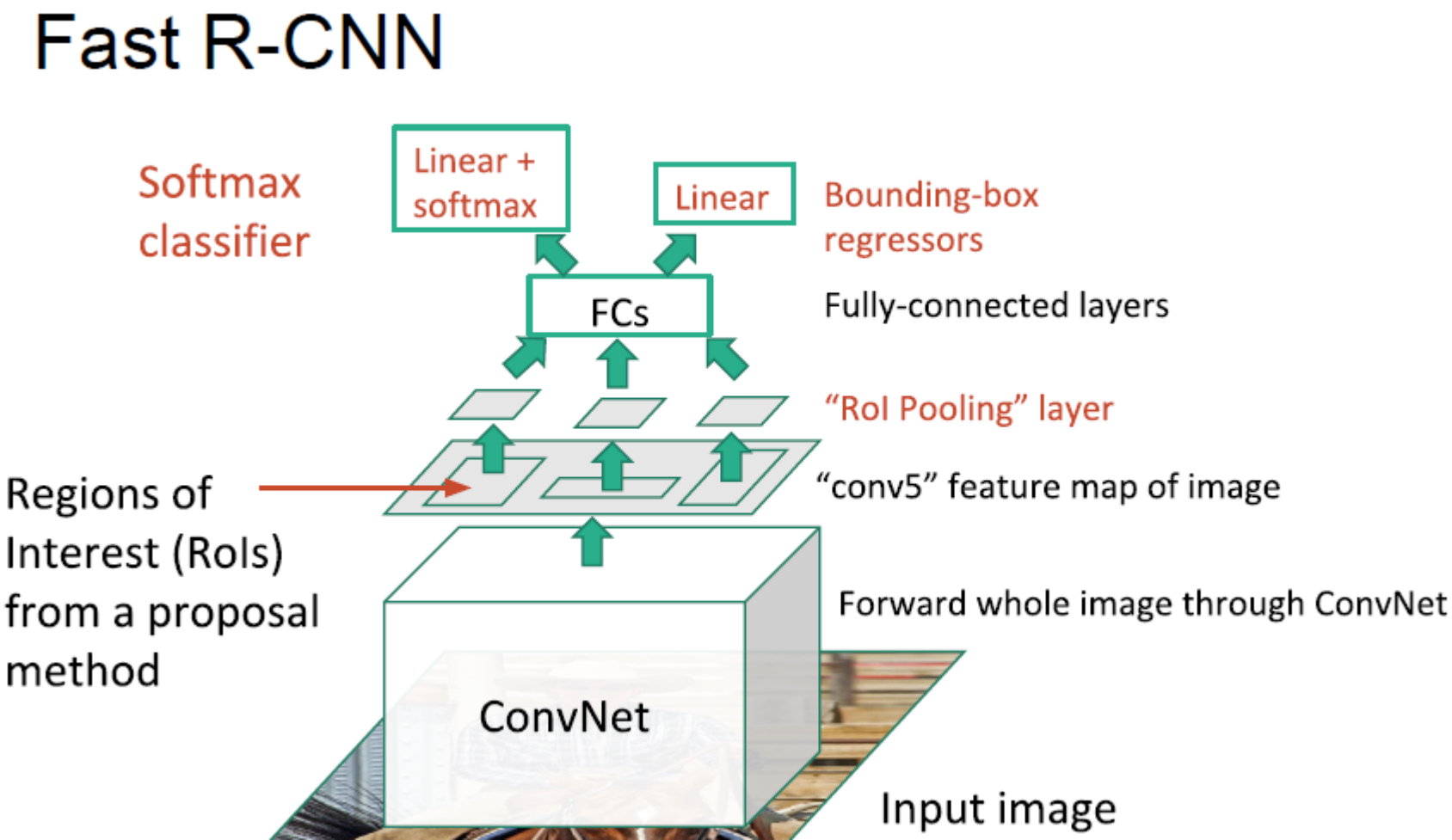
2000 candidate region proposals are warped into a square and fed into a convolutional neural network



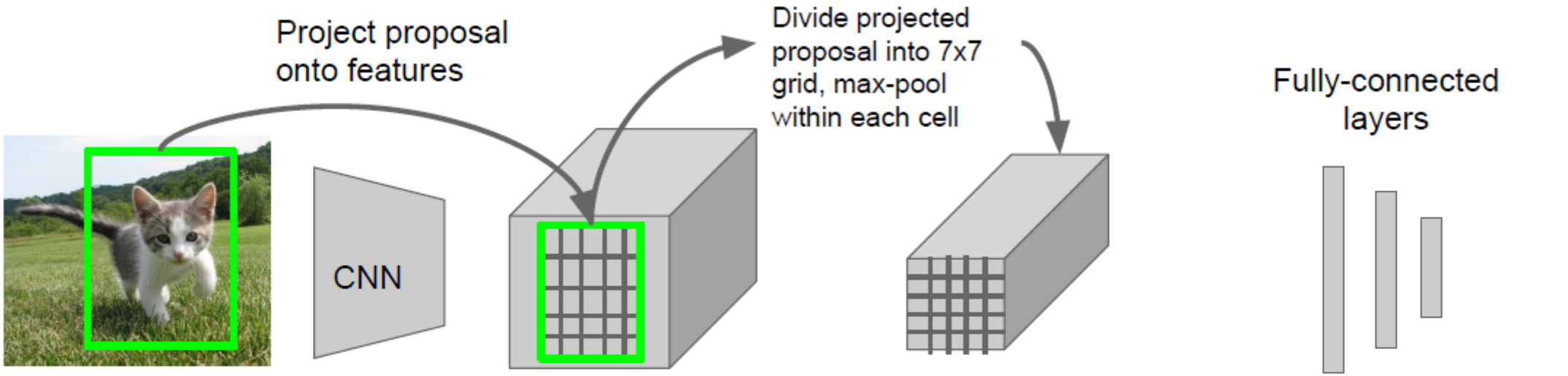
features are fed into an SVM to **classify the presence of the object ,** the algorithm also predicts four values which are offset values to increase the **precision of the bounding box**



we feed the input image to the CNN to generate a convolutional feature map. From the convolutional feature map, we identify the region of proposals and warp them into squares and by using a RoI pooling layer we reshape them into a fixed size so that it can be fed into a fully connected layer



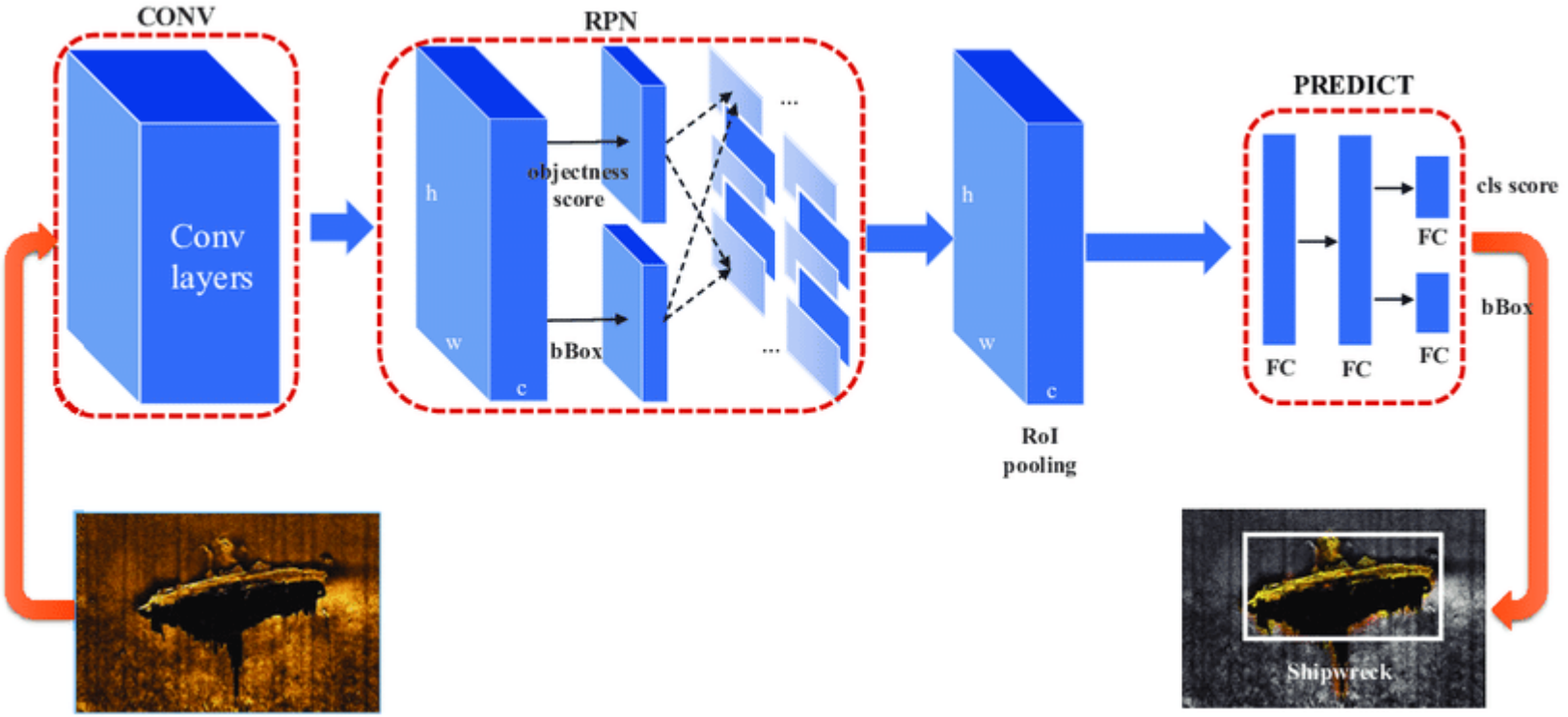
# Fast R-CNN: RoI Pooling



# FASTER R-CNN

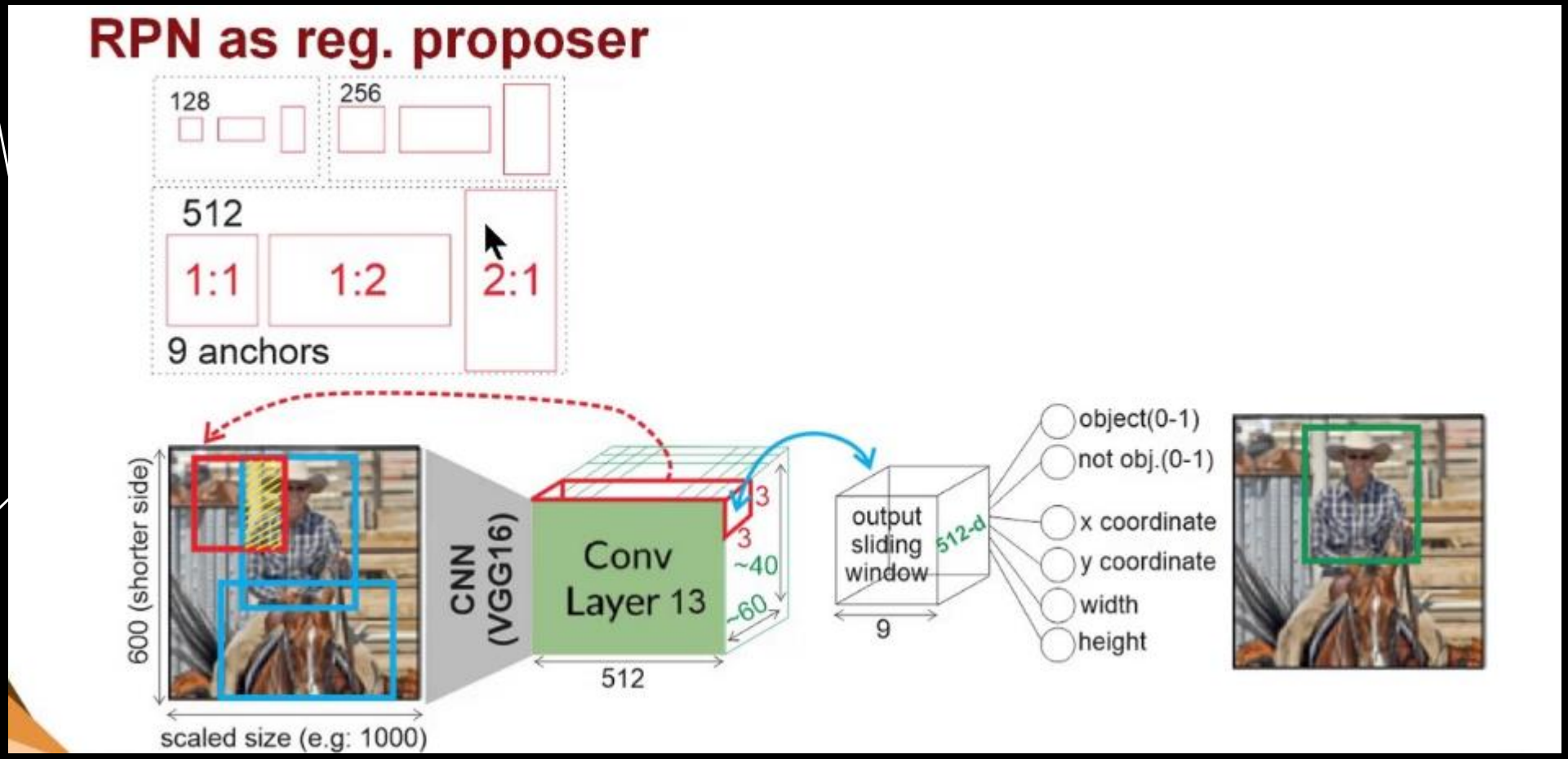
lets the network **learn** the region proposals

The predicted region proposals are then reshaped using a RoI pooling layer which is then used to classify the image within the proposed region and predict the offset values for the bounding boxes

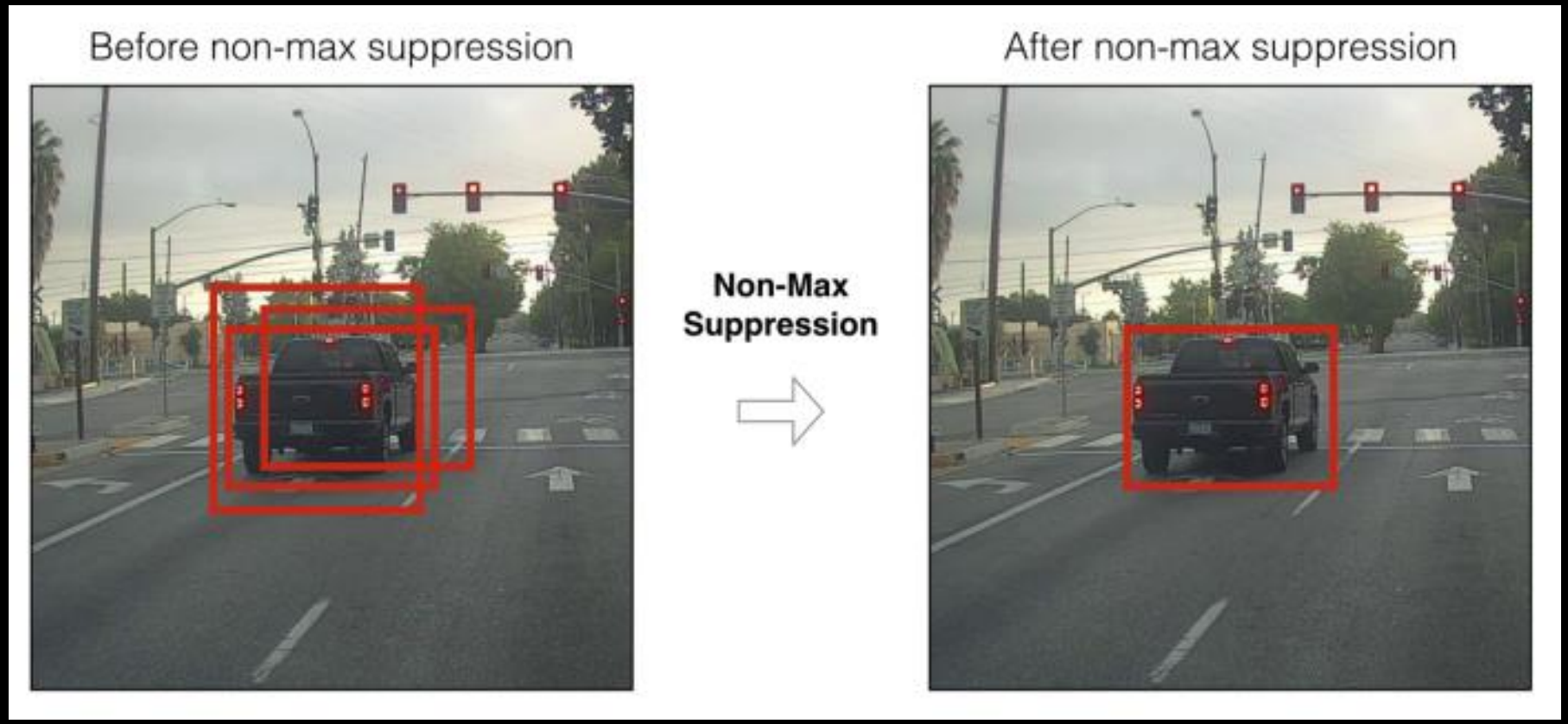


# RPN

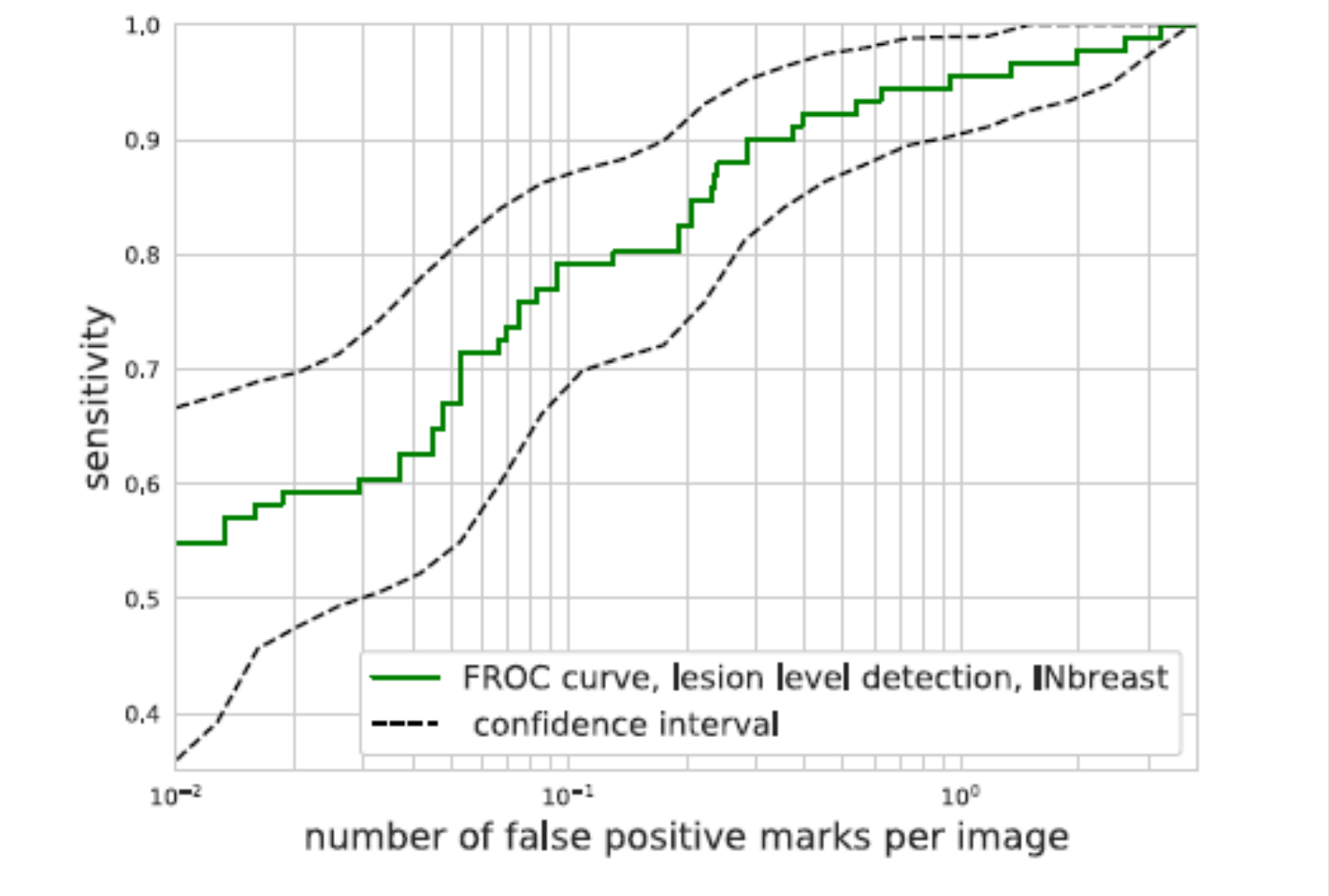
RPN uses a two-class classification, which only distinguishes the background from the object, but does not predict the class of the object



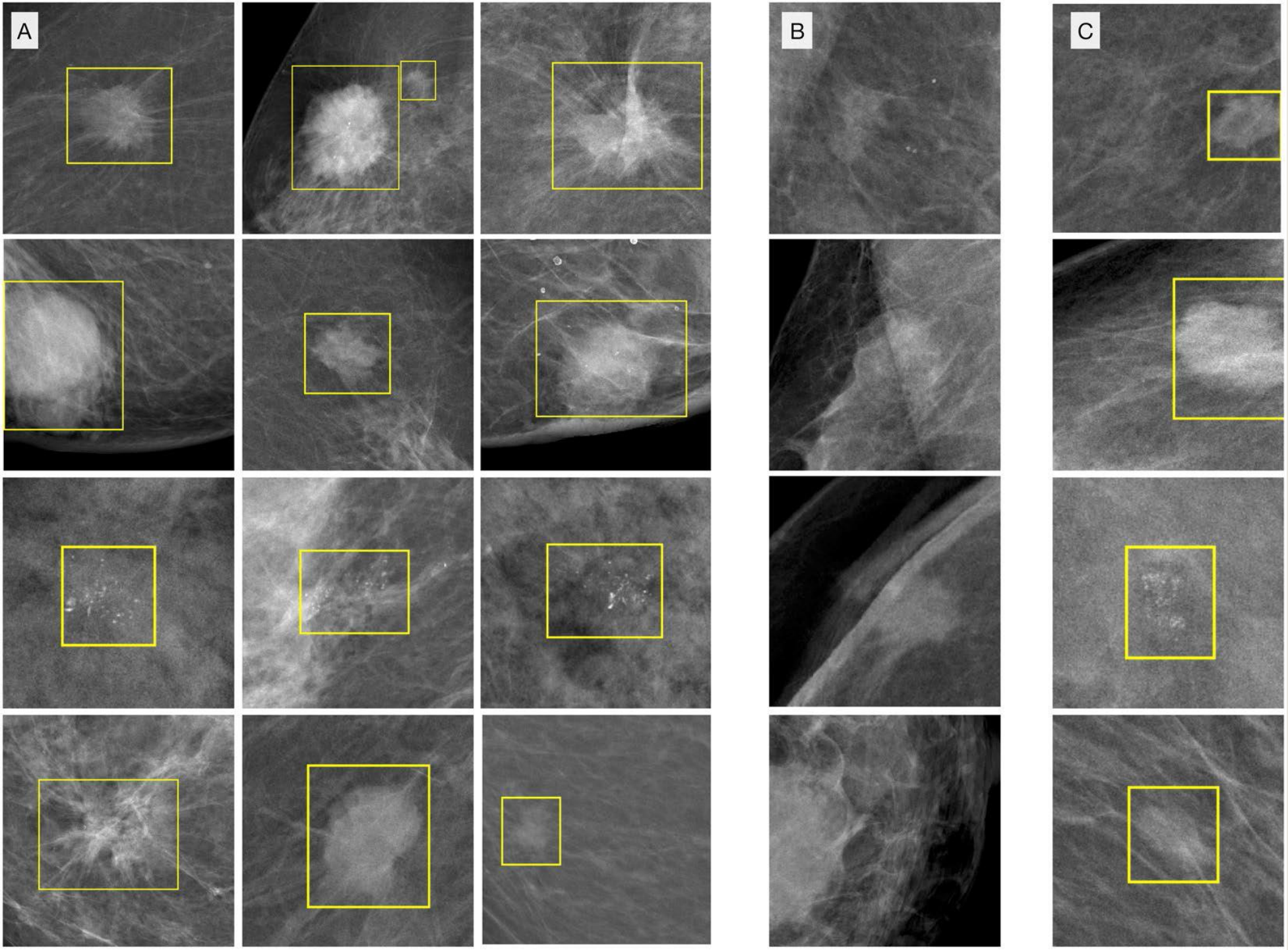
# NON-MAXIMUM SUPPRESSION



# FROC (FREE-RESPONSE RECEIVER OPERATING CHARACTERISTIC)




sensitivity of 0.9 and 0.3 false positive marks per image




A)Correctly detected

B)Missed lesions

C)False positive detections